

10-1-1999

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Ian R. Kerr*

Spirits in the Material World:
Intelligent Agents as
Intermediaries in Electronic
Commerce

The article provides an in-depth analysis of the contract issues peculiar to automated electronic commerce. The aim of the study is to provide a critical evaluation of the various solutions that might be adopted by a legislature seeking to cure formal defects in agreements that are negotiated and entered into by software programs, independent of human review. The author begins with an examination of the current state of the technology that automates electronic commerce, offering some speculation as to its future development. He then outlines the barriers to automated electronic commerce inherent in traditional contract doctrine. He argues against the proposal to cure doctrinal difficulties by deeming electronic devices to be legal persons and investigates the merit of the legislative approaches adopted by UNCITRAL, the National Conference of Commissioners of Uniform State Laws (U.S.), and the Uniform Law Conference of Canada. He ends by advocating an alternative approach, based on the law of agency.

Cet article analyse en profondeur les questions de droit contractuel soulevées par le commerce électronique automatique. L'étude a pour but d'évaluer les diverses solutions que peut adopter une assemblée législative désirant remédier aux lacunes formelles des accords négociés et conclus par des programmes informatiques sans intervention humaine. L'auteur commence par examiner l'état actuel de la technologie qui permet d'automatiser le commerce électronique et formule quelques prédictions quant à son développement futur. Il souligne ensuite les obstacles au commerce électronique automatique inhérents à la doctrine traditionnelle du droit contractuel. Il s'inscrit contre l'idée de combler les lacunes de la doctrine en attribuant aux dispositifs électroniques le statut de personnes morales et explore les mérites des approches législatives adoptées par UNCITRAL, la National Conference of Commissioners of Uniform State Laws (É.-U.), et la Conférence sur l'uniformisation des lois du Canada. Il termine en préconisant une approche alternative, basée sur le droit du mandat.

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Introduction

I. The Technological Promise of Autonomous Electronic Devices

- 1. What Is An Intelligent Software Agent?*
- 2. Recent Applications of Intelligent Software Agents in Electronic Commerce*
- 3. Future Applications of Intelligent Software Agents in Electronic Commerce*

II. Doctrinal Difficulties Associated with Automated Electronic Commerce

- 1. Only Legal Persons Can Contract*
- 2. Contractual Capacity*
- 3. Consensus Ad Idem*

III. Curing Doctrinal Difficulties by Treating Electronic Devices as Independent Legal Persons

- 1. Artificial Persons*
- 2. The Justification for Deeming Electronic Devices Legal Persons*

IV. Curing Doctrinal Difficulties by Treating Electronic Devices as Extensions of Human or Corporate Interaction

- 1. Attribution Rules in the Proposed and Enacted Legislation*
 - a. The UNCITRAL Model Law on Electronic Commerce*
 - b. The Proposed Uniform Electronic Transactions Act*
 - c. The Proposed Uniform Electronic Commerce Act*
 - d. The Proposed Uniform Computer Information Transactions Act*
 - e. Other Relevant Proposed and Enacted Legislation*
- 2. The Rationale Underlying the Attribution Rules*

V. Curing Doctrinal Difficulties by Treating Electronic Devices As Agents

- 1. The Electronic Slave Metaphor*
- 2. The Electronic Agent Metaphor*
- 3. Relevant Principles in the Law of Agency*
 - a. Authority*
 - b. Ratification*
 - c. Disclosed and Undisclosed Principals*

Conclusion

Introduction

The Internet has exceeded most people's expectations in terms of its role as a new forum for communications and commerce. Despite the fact that most entrepreneurs of the new economy fancy the idea of sky rockets in flight, the exponential growth of online interaction poses a serious threat to the future success of electronic commerce. Many computer and information scientists are concerned that the Internet is becoming too big, too fast. With the advent of secure encryption, the increasing acceptance of electronic currency and many government sponsored incentives, various stakeholders, including manufacturers, suppliers, wholesalers, merchants and consumers, have demonstrated a remarkable interest in doing business online. However, as the Internet continues to increase in popularity in the business sector, it becomes more and more unwieldy. Sorting through the mountains of consumer and corporate information, the inestimable valleys of product lines and the sea of available services has become an unmanageable, almost impossible task.

The diversity of the Internet, not to mention its perceived ubiquity, pushes the boundaries of human comprehension, making the online world an increasingly difficult place for most folks to visit and interact. Here is how two computer scientists describe it:

Put simply, the sheer volume of information available to us via the Internet and World Wide Web (WWW) represents a very real problem. The potential of this resource is immediately apparent to anyone with more than the most superficial experience of using the WWW. But the reality is often disappointing. There are many reasons for this. Both human factors

(such as users getting bored or distracted) and organizational factors (such as poorly organized pages with no semantic markup) conspire against users attempting to use the resource in a systematic way. . . .

One important contributing factor to information overload is almost certainly that an end user is required to constantly *direct* the management process. But there is in principle no reason why such searches should not be carried out by agents, acting autonomously to search the Web on behalf of some user.¹

The “agents” referred to by the authors in the above passage are not human agents, but are in fact electronic devices. Often referred to in the computer science and business literature as “intelligent software agents,”² these electronic devices are thought by many to be a promising solution to the current threat of “information overkill.”³ As one author has recently predicted,

[a]gents will be a highly necessary tool in the process of information supply and demand. However, agents will not be able to replace skilled human information intermediaries. In the forthcoming years their role will be that of a valuable personal assistant that can support all kinds of people with their information activities.⁴

One obvious application for agent technology is electronic commerce. Commerce is an information intensive activity. Traditionally, the informational transactions required for engaging in commerce have been driven mostly by *human* interaction. Typical interactions include: a determination of unmet business or consumer needs (need identification), the retrieval of information about what to purchase in order to fulfill those needs (product brokering), an evaluation of merchant-specific information in order to determine whom to buy needed products from (merchant brokering), a method of determining the terms and conditions for the purchase or sale of products (negotiation), and a determination of

1. N.R. Jennings & M. Wooldridge, “Applications of Intelligent Agents” in *Agent Technology* (Heidelberg: Springer-Verlag, 1998) 3 at 13.

2. Or “autonomous agents” or “mobile agents” or some other permutation of these phrases. Up until recently, the legal literature has tended to avoid this terminology so as not to confuse these agents with the common law notion of agency. Consequently software agents are sometimes referred to in the legal literature as “electronic devices.” Canadian and American drafters of electronic commerce legislation have recently given up on this and have adopted the phrase “electronic agents,” which has been described in the Reporter’s Notes of the *Uniform Electronic Transactions Act*, *infra* note 12 as a “near term of art.”

3. See, e.g., P. Maes, “Agents that Reduce Work and Information Overload” (1994) 37:7 *Communications of the ACM* 30; B. Hermans, *Intelligent Software Agents on the Internet: An Inventory of Currently Offered Functionality in the Information Society and a Prediction of (Near-)Future Developments* (Ph.D. Thesis, Tilburg University 1996), (1997) 2:3 *First Monday*, online: <<http://www.hermans.org/agents/>> (last modified: 3 March 1997).

4. Hermans, *ibid.* c.1.

the perceived level of the quality and service of the products purchased (customer satisfaction).⁵ However, as commercial enterprise migrates further into electronic environments, it is unlikely that all of these interactions will continue to be carried out *exclusively* by humans.⁶ Intelligent software agents will be employed to assist people in the elimination of many of these time consuming activities and will thereby reduce transaction costs.

For example, recent innovation in the field of artificial intelligence makes it possible for electronic devices to interact, exchange information and engage in operations that from all outward appearances look much like the negotiation and creation of contractual agreements.⁷ These interactions can be distinguished from an earlier generation of automated transactions in which computer networks were merely the electronic conduit for human trading. The newer technology makes it possible for computers to initiate and complete a transaction *autonomously*, i.e., without human intervention. In fact, the entire point of the new technology is to allow such transactions to take place without any need for human traders to review or even be aware of particular transactions.⁸ Such innovation is revolutionary. It transforms the role of computer hardware and software in electronic commerce from that of a passive pipeline to that of an animated associate.

How the law responds to such innovation will have an important effect on the future development and growth of electronic commerce. In order to fully enjoy the benefits of automation, human and corporate traders need to be confident that the transactions generated by and through their computers are legally enforceable. This need notwithstanding, it is quite clear that the involvement of an autonomous computer or mobile computer program in the contract formation process, especially in an online

5. K. Runyon & D. Stewart, *Consumer Behaviour*, 3rd ed. (Merrill Publishing, 1987); J. Engel & R. Blackwell, *Consumer Behaviour*, 4th ed. (CBS College Publishing, 1982).

6. I. Terpsidis et al., "The Potential of Electronic Commerce in Re-Engineering Consumer-Retail Relationships Through Intelligent Agents" in J.-Y. Roger, B. Stanford-Smith, & P. Kidd, eds., *Advances in Information Technologies: The Business Challenge* (IOS Press, 1997).

7. See, e.g., A. Chavez, et al., "A Real-Life Experiment in Creating an Agent Marketplace" (Proceedings of the Second International Conference on the Practical Application of Intelligent Agents and Multi-Agent Technology (PAAM'97), London, UK, April 1997), online: MIT Media Laboratory <<http://ecommerce.media.mit.edu/papers/paam97.pdf>> (last modified: 25 March 1998).

8. Maes, *supra* note 3.

environment, generates considerable doctrinal difficulties.⁹ Although these devices are generally referred to as “software agents,” they are not contracting agents in the traditional legal or commercial sense. This is because electronic devices are not legal persons.

In addition to their want of legal status, electronic devices currently lack the legal capacity to enter into contracts. Notwithstanding recent advances in intelligent agent technology, these devices are unable to form the requisite intention to enter into legal relations. Consequently, whether one contemplates future automated transactions as between two electronic devices or between one electronic device and a human individual or corporation, it is difficult to conceive of any such transaction as achieving the fundamental traditional prerequisite to contract formation, *viz.* the parties’ formation of a *meeting of the minds*.

In keeping with the spirit underlying the *UNCITRAL Model Law on Electronic Commerce*,¹⁰ this article is meant to provide an in-depth analysis of the contract formation issues peculiar to automated electronic commerce. The central aim of this article is to provide a critical evaluation of the various possible solutions that might be adopted by a legislator seeking to cure formal defects in agreements negotiated and entered into by one or more intelligent software agents. Part I of this article includes a description of the essential aspects of current agent technology and surveys the technological and commercial promise of autonomous electronic devices. In Part II, the barriers to automated electronic commerce are highlighted via a brief examination of the relevant traditional contract doctrine. Part III canvasses the recent academic interest in attempting to cure the doctrinal difficulties raised in Part II by treating electronic devices as independent legal persons. In Part IV, the approaches currently

9. See, e.g., L. Davies, “Contract Formation on the Internet: Shattering a Few Myths” in L. Edwards & C. Waelde, eds., *Law & The Internet* (Oxford: Oxford-Hart Publishing, 1997) 97; T. Allen & R. Widdison, “Can Computers Make Contracts?” (1996) 9 *Harv. J. Law & Tech.* 25; C. Karnow, “Liability For Distributed Artificial Intelligences” (1996) 11 *Berkeley Tech. L. J.* 147.

10. *Model Law on Electronic Commerce*, GA Res. 51/162, UN GAOR, 51st Sess., UN Doc. A/51/628, (1997) at IA6 [hereinafter *Model Law*], online: UNCITRAL <<http://www.uncitral.org/english/texts/electcom/ml-ec.htm>> (last modified: 29 January 1999). The spirit underlying the *Model Law* is exemplified by the following passage from its “Guide To Enactment”:

The objectives of the Model Law, which include enabling or facilitating the use of electronic commerce and providing equal treatment to users of paper-based documentation and to users of computer-based information, are essential for fostering economy and efficiency in international trade. By incorporating the procedures prescribed in the Model Law in its national legislation for those situations where parties opt to use electronic means of communication, an enacting State would create a media-neutral environment.

adopted by the *Model Law*,¹¹ *UETA*,¹² *UECA*¹³ and *UCITA*¹⁴ are investigated in detail.¹⁵ Each of the relevant provisions of these proposed pieces of legislation posits in its own way the general rule that automated electronic devices are treated merely as an extension of human and corporate interactions. The analysis in Part IV aims to uncover the profits and pitfalls of each of the particular approaches in order to determine whether any provisions currently lacking in the proposed legislation are needed to accompany such a general rule. In Part V, a different approach is offered. The attempt in Part V is to take seriously the *agency* metaphor in order to determine whether the law of agency has anything useful to contribute to the question about how to treat autonomous electronic devices in electronic commerce. Part VI provides a brief summary of each of the issues canvassed.

I. *The Technological Promise of Autonomous Electronic Devices*

1. *What Is An Intelligent Software Agent?*

To begin simply, “an agent is a software thing that knows how to do things that you could probably do yourself if you had time.”¹⁶ Besides carrying out tasks on behalf of some information user, what distinguishes software agents from other computer programs is that an agent is said to perform such tasks *autonomously*, i.e., without oversight or intervention. Besides autonomy, other properties characteristic of software agents include:¹⁷

11. *Ibid.*

12. *Uniform Electronic Transactions Act* (draft approved at July 1999 annual conference) [hereinafter *UETA*], online: National Conference of Commissioners of Uniform State Laws <<http://www.law.upenn.edu/bll/ulc/uecicta/uetast84.htm>> (last modified: 26 October 1999).

13. *Uniform Electronic Commerce Act* (draft August 1999) [hereinafter *UECA*], online: Uniform Law Conference of Canada <<http://www.law.ualberta.ca/alri/ulc/current/euecfa.htm>> (last modified: 23 November 1999).

14. *Uniform Computer Information Transactions Act* (draft approved at July 1999 annual conference) [hereinafter *UCITA*], online: Uniform Law Commissioners <<http://www.law.upenn.edu/bll/ulc/ucita/cita10st.htm>> (last modified: 25 October, 1999).

15. Other proposed and enacted legislation are considered in lesser detail.

16. T. Selker cited in P. Jancar, “Pragmatic Application of Information Agents” in *BIS Strategic Decisions* (Norwell, 1995)

17. See e.g., Hermans, *supra* note 3; Jennings & Wooldridge, *supra* note 1 at 4-5; M.R. Genesereth & S.P. Ketchpel, “Software Agents” (1994) 37:7 *Communications of the ACM* 48; J.E. White, “Mobile Agents White Paper” (1997-1998), online: General Magic <<http://www.genmagic.com/technology/techwhitepaper.html>> (last modified: 18 September 1998); J.S. Rosenschein & M.R. Genesereth, “Deals Among Rational Agents” in A.K. Joshi, ed., *IJCAI 1985 : Proceedings of the Ninth International Joint Conference on Artificial Intelligence*, Los Angeles, CA (Morgan Kaufmann, 1985).

- *social ability* (the capacity to interact with other software agents or with human beings through a shared language)
- *mobility* (the ability to move around an electronic environment)
- *temporal continuity* (the ability to run a process continuously in an active or passive mode rather than merely performing a once-only computation)
- *reactivity* (the ability to perceive an environment and respond to changes that occur within it)
- *proactivity* (the ability to initiate goal-directed behaviour)
- *goal orientedness* (the ability to handle complex, high level tasks by performing operations that break down tasks into smaller sub-tasks and then prioritize the order in which these tasks will be accomplished)
- *adaptivity* (the ability to adjust to the habits, working methods and preferences of a user)

In the current literature, agenthood is often measured along two axes: agency and intelligence.¹⁸ In this context, the concept of agency refers to the degree of authority and autonomy given to an electronic device as it interacts with its user and with other electronic devices in an environment.¹⁹ The concept of intelligence in this context refers to

the degree of reasoning and learned behaviour: the agent's ability to accept the user's statement of goals and carry out the task delegated to it. At a minimum, there can be some statement of preferences, perhaps in the form of rules, with an inference engine or some other reasoning mechanism to act on these preferences. Higher levels of intelligence include a user model or some other form of understanding and reasoning about what a user wants done, and planning the means to achieve this goal. Further out on the intelligence scale are systems that learn and adapt to their environment, both in terms of the user's objectives, and in terms of the resources available to the agent. Such a system might, like a human assistant, discover new relationships, connections, or concepts independently from the human user, and exploit these in anticipating and satisfying user needs.²⁰

18. P. Fingar, "A CEO's Guide to eCommerce Using Object-Oriented Intelligent Agent Technology" (June 1998) at 20, online: <<http://home1.gte.net/pfingar/eba.htm>> (last modified: 30 November 1998).

19. *Ibid.*

20. A. Gilbert et al., "The Role of Intelligent Agents in the Information Infrastructure" (1995) [unpublished] cited by Hermans, *supra* note 3 at c. 2, online: <<http://activist.gpl.ibm.com:81/WhitePaper/ptc2.htm>>.

One of the early prototypes out of the MIT Media Lab that exemplifies a number of the properties characteristic of intelligent agents was a software program called Maxim.²¹ Described as a “personal digital assistant,” this software exploits agent technology in order to manage and filter email. The program can “learn to prioritize, delete, forward, sort, and archive mail messages on behalf of a user” by “looking over the shoulder”²² of a user as he or she works with his or her email and by making internal predictions about what a user will do with the email. Once Maxim achieves a particular level of accuracy in its predictions, it commences offering suggestions to the user about how best to handle the email.

Around the same time that Maxim was being developed, Maes et al. also designed an Internet news filtering program known as Newt. After a human user provides Newt with a series of examples of news articles that would and would not be of interest, this information-specific feedback is utilized by Newt to develop an internal model of the user’s preferences, which is ultimately employed by Newt to filter and thereby select those items of news that would be of interest, without any need for the human user to browse the items. Newt is also capable of retrieving articles on the basis of explicit rules as provided by the user.²³

2. *Recent Applications of Intelligent Software Agents in Electronic Commerce*²⁴

More recent developments at the MIT Media Lab and elsewhere have shifted away from automating pure information management systems in favour of agent technology aimed specifically at furthering electronic commerce. PersonaLogic, for example, is a tool that assists consumers in determining what to buy (product brokering) by guiding them through a large product feature space.²⁵ This is accomplished by allowing consumers to specify constraints on a product’s features. A constraint satisfaction search engine then returns an ordered list of only those products that satisfy all the consumer’s chosen preferences. A similar product, known as Firefly, helps consumers find products.²⁶ But instead of filtering on the

21. Maes, *supra* note 3.

22. *Ibid.* at 35.

23. *Ibid.*

24. It should be noted that intelligent agent technology has a number of other commercial and industrial applications including: information management, business process management, healthcare management, patient monitoring, gaming technologies, interactive theater, product manufacturing, air traffic control, etc. See Jennings & Wooldridge, *supra* note 1 at 11-17 and Hermans, *supra* note 3 at 19-27.

25. PersonaLogic URL: <<http://www.personalogic.com/>>.

26. Firefly URL: <<http://www.firefly.com>> (date accessed: 28 March 1999).

basis of product features, Firefly recommends products via a word of mouth recommendation mechanism called automated collaborative filtering (ACF).²⁷ “Essentially, Firefly uses the opinions of like-minded people to offer consumer recommendations. The system is currently being used to recommend commodity products such as music and books.”²⁸

Other shopping agents have been developed that make comparisons not on the basis of products but by comparing merchant alternatives (merchant brokering). The first agent of this kind, developed by Andersen Consulting, is known as BargainFinder.²⁹ When a user provides the name of a particular product, e.g., the CD titled: *Dave Mathews Band - Live at Red Rocks*, BargainFinder is able to search a number of merchant Web sites and determine and compare various price differentials. More recent agents, such as Jango,³⁰ have been developed in order to correct certain limitations found in the earlier versions of merchant brokering agents.³¹ Other agents exploit different mechanisms for merchant brokering. Instead of surfing the Web for the best advertised prices, the University of Michigan’s AuctionBot allows buyers and sellers to congregate in the same virtual space and participate in personalized auctions that are created by sellers who are allowed to specify parameters such as clearing times, methods for resolving bidding ties, etc.³² One of the features said to distinguish AuctionBot from a number of other auction sites is that it provides an “application programmable interface” that enables users to create their own software agents to autonomously compete in the

27. See U. Shardanand & P. Maes, “Social Information Filtering: Algorithms for Automating ‘Word of Mouth’” in I.R. Katz et al., eds., *CHI 1995: Proceedings of the Computer-Human Interaction Conference, Denver, Co.* (ACM/Addison-Wesley, 1995).

28. R. Guttman, A.G. Moukas & P. Maes, “Agent-Mediated Electronic Commerce: A Survey” (1998) 13 *The Knowledge Engineering Review* 147, online: MIT Media Laboratory <<http://ecommerce.media.mit.edu/papers/ker98.pdf>> at 3.

29. BargainFinder URL: <<http://bf.cstar.ac.com/bf7/>>.

30. Jango URL: <<http://www.jango.com/>>.

31. See R. Doorenbos, O. Etzioni & D. Weld, “A Scalable Comparison-Shopping Agent for the World Wide Web” in *Agents 1997: Proceedings of the First International Conference on Autonomous Agents, Marina Del Rey, C.A.* (New York: ACM Press, 1997).

32. AuctionBot URL: <<http://auction.eecs.umich.edu/>>. See also P.R. Wurman, M.P. Wellman & W.E. Walsh, “The Michigan Internet AuctionBot: A Configurable Auction Server for Human and Software Agents” in K.P. Sycara, M. Wooldridge eds., *Proceedings of the Second International Conference on Autonomous Agents, St. Paul Minneapolis, USA* (New York: ACM Press, 1998), online: Association for Computing <<http://www.acm.org/pubs/citations/proceedings/ai/280765/p301-wurman/>> (last modified: 29 June 1999).

AuctionBot marketplace.³³ By virtue of this feature, human users need not invest time in the actual bidding process, which often lasts for several hours or, in some cases, several days.

One of the more promising recent developments in agent technology related to merchant brokering is the MIT Media Lab's Kasbah.³⁴ This system is described as an "online, multi-agent classified ad system":

A user wanting to buy or sell goods creates an agent, gives it some strategic direction, and sends it off into a centralized agent marketplace. Kasbah agents proactively seek out potential buyers or sellers and negotiate with them on behalf of their owners. Each agent's goal is to complete an acceptable deal, subject to a set of user-specified constraints such as a desired price, a highest (or lowest) acceptable price, and the date by which to complete the transaction. The latest version of Kasbah incorporates a distributed trust and reputation mechanism called the Better Business Bureau. Upon the completion of a transaction, both parties may rate how well the other party managed their half of the deal (e.g., accuracy of product condition, completion of transaction, etc.). Agents can then use these ratings to determine if they should negotiate with agents whose owners fall below a user specified threshold. . . .

Negotiation in Kasbah is straightforward. After buying agents and selling agents are matched, the only valid action in the negotiation protocol is for buying agents to offer a bid to selling agents with no restrictions on time or price. Selling agents respond with either a binding "yes" or "no".

Given this protocol, Kasbah provides buyers with one of three negotiation "strategies": anxious, cool-headed, and frugal - corresponding to a linear, quadratic, or exponential function respectively for increasing its bid for a product over time. The simplicity of these negotiation heuristics makes it intuitive for users to understand what their agents are doing in the marketplace.³⁵

As indicated in the above passage, Kasbah not only facilitates human users in the merchant brokering phase of electronic commerce but in the negotiation process as well. "Agent communication is based on a request-response protocol and is strictly agent-to-agent. There is no broadcast of messages and a third party agent cannot eavesdrop on a transaction taking place between two other agents."³⁶ When an agent (buying or selling) completes a transaction, a notification is sent to the user who created the agent. In a recent real-life experiment held at the MIT Media Lab, the notification messages were delivered to human users by pagers. Of

33. See Guttman et al., *supra* note 28 at 4.

34. Kasbah URL: <<http://kasbah.media.mit.edu/>>.

35. See Guttman et al., *supra* note 28 at 3,4.

36. *Supra* note 7 at 7.

course, there are other possibilities. Once the agent completes the deal, it ceases to negotiate with other agents and automatically asks the marketplace (a closed system) to remove it from the list of “active” agents. Among other things, this ensures that other agents will not be able to send it messages. According to the rules of engagement built into the design of the closed system, it is then up to the human users to “physically consummate” the transaction.³⁷

One last example of the recent innovation in agent technology relevant to electronic commerce is Tete-a-Tete (T@T).³⁸ The feature that distinguishes this agent technology from its predecessors is that T@T negotiates in a cooperative rather than competitive style.³⁹ T@T can also negotiate across multiple terms of a transaction including “warranties, delivery times, service contracts, return policies, loan options, gift services, and other merchant value-added services.”⁴⁰

3. *Future Applications of Intelligent Software Agents in Electronic Commerce*

[I]t is often impossible to identify the effects of a technology. Consider the now ubiquitous computer. In the mid-1940s, when the digital computers were first built, leading pioneers presumed that the entire country might need only a dozen or so. In the mid-1970s, few expected that within a decade the PC would become the most essential occupational tool in the world. Even fewer people realized that the PC was not a stand-alone technology, but the hub of a complex technological system that contained elements as diverse as on-line publishing, e-mail, computer games and electronic gambling.⁴¹

It is unclear whether agent technology will appear in electronic commerce as part of an evolutionary or revolutionary process.⁴² As Hermans and others have pointed out,⁴³ much will depend on the future infrastruc-

37. *Ibid.* At the time of the original real-life experiment, the “Better Business Bureau” mechanism was not yet part of the system design. Consequently, the so-called “ratification” of agent-mediated transactions was left to the *bona fides* of their human users without the imposition of external norms.

38. T@T URL: <<http://ecommerce.media.mit.edu/tete-a-tete/>>. And see now <<http://www.frictionless.com>> (last modified: 19 February 2000).

39. Like Kasbah, described above, this negotiation takes the form of multi-agent, bilateral bargaining. But instead of using simple raise or decay functions, Tete-a-Tete follows what has been characterized as an “argumentative” style of negotiations. See e.g., S. Parsons, C. Sierra & N.R. Jennings, “Agents that Reason and Negotiate by Arguing” (1998) 8 *Journal of Logic and Computation* 261.

40. R. Guttman & P. Maes, “Agent-Mediated Integrative Negotiation for Retail Electronic Commerce” (Proceedings of the Workshop on Agent Mediated Electronic Trading (AMET’98), Minneapolis, Minnesota: May, 1998), online: MIT Media Laboratory <<http://ecommerce.media.mit.edu/papers/amet98.pdf>> (last modified: 25 March 1999).

41. G.P. Zachary, *Cyber-Seers: Through a Glass, Darkly* cited by Hermans, *supra* note 3 at c.6.

42. See Hermans, *supra* note 3 at c.6.

43. *Supra* note 3.

ture and architecture of the Internet, including the chosen agent standards,⁴⁴ whether a homogeneous⁴⁵ or heterogeneous⁴⁶ architecture is adopted, whether interoperability standards will be required,⁴⁷ etc. The extent to which agent technology will require an interoperability standard exemplifies but one of the many difficult choices faced by the developers of agent technology. Currently, there is much debate over the appropriate agent paradigm in electronic commerce: should its negotiation protocol be competitive or cooperative in nature?⁴⁸ Guttman et al. have recently rebuffed the use of competitive protocols in retail markets from economic, game theoretic, and business perspectives.⁴⁹ Because merchants tend to strive for highly cooperative, long-term relationships with their customers in order to maximize loyalty, customer satisfaction and reputation, Guttman et al. recommend more cooperative multi-agent decision analysis tools instead of competitive negotiation protocols such as online auctions. If this approach becomes the norm – which presently appears to be the case – an interoperability standard will indeed be necessary.

If it turns out that open standards are further developed and adopted, one might expect that electronic commerce will shift away from its current mode of interaction – a mode which is in many ways constrained by the fact that transactions take place within a closed system (e.g., MIT's Kasbah).⁵⁰ In the future, there will likely be a move towards more open, "public" systems. This will require much greater agent mobility.⁵¹ In the open marketplaces of the future, the specific negotiation protocols will likely not be predetermined. These negotiation protocols would be left to the predilections of those who design, create and employ the intelligent agents involved in particular transactions.

44. E.g., will *Agent Communication Language* [ACL] used in conjunction with *Knowledge Interchange Format* [KIF] and *Knowledge Query and Manipulation Language* [KQML] remain the standard?

45. I.e., a single, all-encompassing system which handles all transactions and functions.

46. I.e., a series of separate systems within which certain kinds of agents interact with other agents of the same kind.

47. I.e., a standard that enables an intelligent agent to engage in cooperative activities with other agents such as information searches. The Firefly technology described *supra*, note 26 operates on a cooperative paradigm.

48. See generally J.S. Rosenschein & G. Zlotkin, *Rules of Encounter: Designing Conventions for Automated Negotiation Among Computers* (Cambridge, Mass.: MIT Press, 1994).

49. R. Guttman & P. Maes, "Cooperative vs. Competitive Multi-Agent Negotiations in Retail Electronic Commerce" in M. Klusch & G. Weib, eds., *CIA 1998: Cooperative Information Agents II, Paris, France* (Springer, 1998), online: MIT Media Laboratory <<http://ecommerce.media.mit.edu/papers/cia98.pdf>> (last modified: 25 March 1999).

50. To partake in Kasbah, one must be registered as a member of the system.

51. J.E. White "Mobile Agents" in J.M. Bradshaw, ed., *Software Agents* (Menlo Park, Calif.: AAAI Press; Cambridge, Mass.: MIT Press, 1997).

The future shift towards more open systems will have a significant impact on the legal treatment of automated electronic commerce. The current closed systems have the commercial advantage of clarifying all of legal rules in advance. Recall, for example, that the gateway to Kasbah's marketplace requires human users to adopt certain predetermined rules of engagement, many of which were built directly into the system.⁵² In the open systems of the future – where intelligent agents will be free to roam the Net in search of transaction partners without any pre-existing commitment to the same rules of engagement as those preferred by agents encountered along the way – the threat of commercial uncertainty looms large. Unlike the original Kasbah marketplace, where the agents were purposely constrained to extremely simplistic negotiations in order to foster trust and confidence in the human users, consider the kind of legal clarification that might be required in the following future world:

Mary relies on a mobile agent to orchestrate her Friday evenings. Born months ago, the agent waits in a quiet corner of the electronic marketplace for most of the week; each Friday at noon it takes the following steps.

1. Mary's agent keeps a record of the films it selected on past occasions to prevent selecting one of those films again.
2. The agent travels from its place of repose to one of the many video places in the electronic marketplace. It uses the agent programming language's go instruction and a ticket that designates the video place by its authority and class.
3. The agent meets with the video agent that resides in and provides the service of the video place. It uses the meet instruction and a petition that designates the video agent by its authority and class.
4. The agent asks the video agent for the catalogue listing for each romantic comedy in its inventory. The agent selects a film at random from among the recent comedies, avoiding the films it has selected before, whose catalog numbers it carries with it. The agent orders the selected film from the video agent, charges it to Mary's Visa card, and instructs the video agent to transmit the film to her home at 7 p.m. The video agent compares the authority of Mary's agent to the name on the Visa card.
5. The agent goes next to the Domino's pizza place. It uses the go instruction and a ticket that designates the pizza place by its authority and class.
6. The agent meets with the pizza agent that resides in and provides the service of the pizza place. It uses the meet instruction and a petition that designates the pizza agent by its authority and class.

52. See, e.g., *Model Interchange Agreement for the International Commercial Use of Electronic Data Interchange*, UN/ECE Rec. 26, TRADE/WP.4/R11133/Rev. 1, (1995), online: UNECE <<http://www.unece.org/trade/rec/rec26en.htm>> (last modified: 20 April 1998).

7. The agent orders one medium-size pepperoni pizza for home delivery at 6:45 p.m. The agent charges the pizza, as it did the video, to Mary's Visa card. The pizza agent, like the video agent before it, compares the authority of Mary's agent to the name on the agent's Visa card.

8. Mary's agent returns to its designated resting place in the electronic marketplace. It uses the go instruction and a ticket that designates that place by its place name and network address, which it noted previously.

All that remains is for the agent to notify Mary and Paul of their evening appointment. This is accomplished in the following additional steps.

9. The agent creates two new agents of Mary's authority and gives each the catalogue listing of the selected film and Mary's and Paul's names. Its work complete, the original agent awaits another Friday.

10. One of the two new agents goes to Mary's mailbox place and the other goes to Paul's. To do this they use the go instruction and tickets that designate the mailbox places by their class and authorities.

11. The agents meet with the mailbox agents that reside in and provide the services of the mailbox places. They use the meet instruction and petitions designating the mailbox agents by their class and authorities.

12. The agents deliver to the mailbox agents electronic messages that include the film's catalogue listing and that remind Mary and Paul of their date. The two agents terminate and the mailbox agents convey the reminders to Mary and Paul.⁵³

It does not require much imagination to conceive of adaptations in the use of this technology which would generate transactions much more sophisticated than the straightforward consumer purchases envisioned above. Imagine, for example, a similar agent technology applied by an industrial manufacturer that, instead of ordering pizza and a video, supports a team of software agents, each of which is dispatched to perform a particular task that will be carried out in conjunction with the tasks performed by other agents on the team. For example, after an agent designed to monitor the manufacturer's supply of certain sub-components discovers that the supply is becoming low, it launches into action several merchant brokering agents which are then dispatched to search the Internet for the lowest prices for various sub-components needed to manufacture the ultimate product. Once the appropriate merchants sites have been discovered and evaluated, other agents would step in to negotiate the terms and conditions upon which those separate sub-components might be purchased (including product warranties, freight rates, delivery dates, exemption clauses, etc.). Other agents would assist with the information and communications pertaining to placing the orders and arranging for the shipping and receiving of the sub-compo-

53. *Supra* note 51 at 467-69.

nents, while a different agent would initiate electronic payment schemes. Still other agents would deal with the marketing and sales of the ultimate product, once manufactured. Notice that the advent of electronic cash mechanisms⁵⁴ – especially in cases where the goods bought and sold are information products not requiring a physical medium in order to execute the transaction – no longer requires human users to ratify or “physically consummate” agent-made agreements (as was necessarily the case in the original Kasbah experiment). Thus one ends up in a future world in which agreements are negotiated and entered into without any need for human traders to review or even be aware of particular transactions.

There is no doubt that a world such as this might create various advantages for human entrepreneurs. Such a world would spare human users from having to find, negotiate, and deal with buyers and sellers. A truly intelligent technology applied in this manner would depersonalize the process of negotiation, avoid misunderstandings resulting from language barriers and perhaps even free people to perform other important tasks or pursue more meaningful relationships.⁵⁵ These systems would also allow more accurate business records to be kept since software agents could build databases that, among other things, keep track of all interactions (whether or not the particular negotiation resulted in the formation of a contract). Some authors believe that the proper integration of the information on such databases would not only reduce transaction costs but would lead to pricing that is closer to optimal.⁵⁶

Of course, such a world would create disadvantages too.⁵⁷ As programmers of intelligent agent technology become more adept, it will become possible for them to design deceitful and perhaps even malicious

54. P. Panurach, “Money in Electronic Commerce: Digital Cash, Electronic Fund Transfer, and Ecash” 39:6 *Communications of the ACM* 45; S. L. Lelieveldt, “How To Regulate Electronic Cash: An Overview of Regulatory Issues and Strategies” (1997) 24 *Amer. Univ. Law Rev.* 1163; R.L. Field, “1996: Survey of the Year’s Developments in Electronic Cash Law and the Laws Affecting Electronic Banking in the United States” (1997) 46 *Amer. Univ. Law Rev.* 967; W. Powell, “Ecash: The New Coin of the World” 32:5 *CGA Magazine* (May 1998) 54; S. Chinoy, “Electronic money in Electronic Purses and Wallets” (1997) 12 *B.F.L.R.* 15; B. Crawford, “Is Electronic Money Really Money?” (1997) 12 *B.F.L.R.* 399.

55. See A. Chavez & P. Maes, “Kasbah: An Agent Marketplace for Buying and Selling Goods” (Proceedings of the First International Conference on the Practical Application of Intelligent Agents and Multi-Agent Technology (PAAM’96), London, UK, April 1996), online: MIT Media Laboratory <<http://ecommerce.media.mit.edu/papers/paam96.pdf>> (last modified: 25 March 1999).

56. *Ibid.*

57. See D. Lloyd, “Frankenstein’s Children: Artificial Intelligence and Human Value” (1985) 16 *Metaphilosophy* 307; J. H. Moor, “Are There Decisions Computers Should Never Make?” (1979) 1 *Nature & Sys.* 217; J. W. Snapper, “Responsibility For Computer Based Errors” (1985) 16 *Metaphilosophy* 289.

agent protocols. Some authors have suggested that there might be technological solutions to these technological problems: "We might have regulator agents roaming the marketplace to ensure that no illegal activity occurs."⁵⁸ It is difficult at present to know or even imagine whether agent technology could ever rise to the occasion. Even if such technology became possible, it is not clear that regulator agents could effectively operate in the open systems of the future where there would exist an indeterminate number of potential marketplaces. Nor is it clear that we would want them to.

Deceit aside, it is also possible for agent technology to malfunction or in some other way carry out decision processes that do not comport with the intentions or purposes of the human user who employed the particular agent or, for that matter, the human designer of the software agent. First, as Karnow points out, software is by nature unreliable.

The failure of a complex program is not always due to human negligence in the creation or operation of the program, although examples of such negligence are legion. But, in addition, there are problems with software reliability. While it is at least theoretically possible to check to see if a program output is correct in a given instance, it has not been proven that programs can be verified as a general matter; that is, that they are correct over an arbitrary set of inputs. In fact, it appears highly unlikely that even programs which successfully process selected inputs can be shown to be correct generally.

Software reliability generally cannot be conclusively established because digital systems in general implement discontinuous input-to-input mappings that are intractable by simple mathematical modeling. This is particularly important: continuity assumptions can't be used in validating software, and failures are caused by the occurrence of specific, nonobvious combinations of events, rather than from excessive levels of some identifiable stress factor.

The long-term operation of complex systems entails a fundamental uncertainty, especially in the context of complex environments, including new or unpredictable environments. That, of course, is precisely the situation in which intelligent agents are forecast to operate.⁵⁹

Beyond the difficulties inherent in testing and verifying the response of software before it is put onto the market, it is well understood by programmers and computer scientists that producing the perfect, error-free program is a statistically impossible exercise. Software instructions are propagated through computer system by means of a series of ones and zeros or "ons" and "offs," with each instruction creating a discrete state

58. *Supra* note 55 at 6-7.

59. C. Karnow, "Liability for Distributed Artificial Intelligences" (1996) 11 Berkeley Tech. L. J. 147 at 161-62.

within the computer. Each new instruction interacts with the instructions given before, producing new discrete states. With literally millions of lines of coding and the resulting combinations of instructions, it is possible to determine that any computer, while processing a piece of software, can exist in billions or even trillions of completely unique conditions. It is thus impossible to predict the computer's behaviour in all situations. In many cases, even if an error is found, a programmer will decide that its correction could lead to so many new complications that leaving the error in place and knowing of its existence is better than to attempt to correct the problem.⁶⁰

In addition to unreliability on the part of a software agent, the intentions of a human user are not always carried out even when the agent technology is performing reliably. For example, recent software technology developed and described by Hofstadter and Mitchell is designed specifically to handle radical shifts in context and to perform "unpredictable but pertinent results."⁶¹ Because mobile agent technology aims to allow agents to be cross-software compatible, human users often will not know when or even where their agents are executing. When one software agent operates in conjunction with others in a cooperative agent system across platforms and operating systems, as described above, it will become next to impossible to distinguish between them and determine

60. The following passage from Hecht, Herbert and Myron, "Software Reliability in the System Context" (1986)12 IEEE Transactions on Software Engineering 51 at 55, offers a general prediction of the number of faults found in the average piece of software based on an examination of programs in use:

Number of lines of code: 1 million
 number of faults in the initial software [2 percent of the total, based on a widely reported average]: 20,000
 faults remaining after testing [assuming that 90 percent of the faults are found and fixed]: 2000
 numbers of failures per year [10 percent of the faults, based on experience]: 200
 faults corrected after failures: 200
 remaining faults: 1800
 lines of code added or changed per year routine maintenance [estimated at 10 percent per year or]: 100,000
 number of faults added to system [2 percent of new code]: 2000
 number of new faults remaining after debugging new code [assuming 90 percent of new faults removed]: 200
 number of faults not discovered in previous year: 1800
 total number of faults: 2000: expected failure rate per year [based on prior failure assumption]: 200

61. D.R. Hofstadter, *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought* (New York: Basic Books, 1995) at 226.

which agent did not properly perform its task. As two authors recently described it,

We envision a world filled with millions of knowledge agents, advisers, and assistants. The integration between human knowledge agents and machine agents will be [seamless], often making it difficult to know which is which.⁶²

Other authors have made this point somewhat more starkly: “The biggest danger of any network-wide system that allows intelligent agents is that some of the agents will deliberately or accidentally run amuck. Agents have much in common with viruses: Both are little programs that get to seize control of a foreign machine.”⁶³ Another commonality between some software agents and viruses is that they will sometimes mutate in order to perform their tasks. As a result, both are subject to *polymorphism*, a phenomenon which makes it difficult to isolate a particular program since its identity is not always persistent over time.⁶⁴ Thus, if a particular intelligent agent carries out its function through a series of continuous mutations of specific bits of its program (“codelets,” as Hofstadter calls them), it is not long before that agent will become unrecognizable to the human user who created and employed it.

In addition to the phenomenon of polymorphism, a relatively new form of programming threatens to obfuscate matters further. “Neural networking” is an approach to software design that models itself after one conception of the human mind. Rather than tackling a problem through examination by brute computational force, the computer is instructed to find relationships between certain data and certain conclusions. The more often such a relationship is found to be true, the greater weight that relationship will be given. When faced with similar data later, the program uses its associations to leapfrog to the correct solution. Though this approach vastly increases the speed and sophistication of a computer’s response, the software’s ability to learn rapidly alters the software beyond its original parameters. Described as a “lack of transparency,” this phenomenon makes understanding its decision-making process quite difficult in retrospect. Such a program might eventually develop a better ability to make predictions about the behaviour of other intelligent agents than it would about its own.⁶⁵

62. F. Hayes-Roth & N. Jacobstein, “The State of Knowledge-Based Systems” (1994) 37:3 Communications of the ACM 27 at 35.

63. P. Wayner, “Agents Away” *Byte* 19:5 (May 1994) 113 at 116.

64. See Karnow, *supra* note 59 at 171.

65. G.J. van Opdorp & R.F. Walker, “A Neural Network Approach to Open Texture” in H. W. K. Kaspersen & A. Oskamp, eds., *Amongst Friends in Computer and Law: A Collection of Essays in Remembrance of Guy Vandenberghe* (Deventer: Kluwer Law & Taxation Publishers, 1990) 279 at 305.

The future is full of question marks. Although it is by no means clear precisely what software agents will look like or how they will operate in the years to come, it is virtually certain that software agents will play a major role in the next wave of electronic commerce. Agents will no doubt be employed to assist human interaction through the various stages of a transaction from product and merchant brokering through to negotiation, sale, distribution and payment. It is not unreasonable to predict that, in time, agent technology will become sufficiently sophisticated to perform many if not all of these sorts of tasks without human oversight or intervention. Such possibilities would perhaps require programmers to develop polymorphic systems capable of generating creative intelligence. Some of the decisions entailed by these systems would by nature be pathological, i.e., at least some of the outcomes generated by future agents would be unintended. Still, gazing through the window to the future, the technological and commercial promise of autonomous electronic devices is immediate and apparent.

Viewing the matter through the legal lens of the here and now, it is equally obvious that agent-driven commerce will run into doctrinal difficulties, in particular the formation of contracts. How the law responds to this technology is likely to have an important effect on the development and growth of electronic commerce. In order to fully enjoy the benefits of automation, legislation must include a mechanism that will adequately cure contractual defects so as to ensure that the transactions generated by and through computers are legally enforceable. To do so, it is necessary to examine in greater detail the doctrinal difficulties associated with automated transactions.

II. Doctrinal Difficulties Associated with Automated Electronic Commerce

1. Only Legal Persons Can Contract

In order for electronic commerce to skyrocket in the manner predicted by its enthusiasts, human and corporate traders will need to be sure that automated transactions are perceived and understood as contractual in nature. As Fridman and others have pointed out,

Since a contract is an agreement between two or more persons, and involves the idea of *consent*, only those who have the power to give consent can contract.⁶⁶

66. G.H.L. Fridman, *The Law of Contract in Canada*, 3rd ed. (Scarborough: Carswell, 1994) at 138.

Inextricably tied to the notion of contractual consent is the idea that the *consenting person* has signified an intention to be bound by the terms of the agreement. As Fridman puts it,

[a] contract can only arise if there is the *animus contrahendi* between the parties. Without the expressed or implicit intention that a contract should emerge as a result of the language or conduct of the alleged parties, no contractual obligations can be said to exist and be capable of enforcement. Hence the offer that is made must be an offer to contract involving the creation of legal relations.⁶⁷

Although the law has extended the scope of juristic personality so as to create limited rights and obligations for human artifacts such as corporations, electronic devices are not legal persons. Since they are not persons, electronic devices do not have the legal power to give consent. Nor can such devices be said in any meaningful legal sense to form the necessary *animus contrahendi* – the intention to create legal relations. Of course, this does not preclude the possibility that electronic devices might play an *instrumental* role in the formation of contracts. For example, an electronic device might be used to offer for sale a number of products ranging from candy bars or soda pop to drivers' licenses and insurance policies. Contracts that arise from such transactions are not generally analyzed as contracts between a machine and the person who plugs in the coins, bills or tokens. In these instances, the contractual offer is understood as a unilateral offer made by the human or corporate owner or operator of that machine. The nature of the offer is the sale of a product at a stipulated price and the offer is thought to be accepted by the conduct of the individual who responds to it by depositing the stipulated *quid pro quo* into the machine. Although it is true that the human or corporate offeror will not oversee or even be aware of particular transactions when utilizing machines of this sort, it is also true that the offeror will always be said to have intended and consented to the precise terms of the contract and the quantity of the product available for sale (subject, of course, to any malfunction or misuse), since machines of this sort are not sufficiently intelligent or autonomous to alter the terms or generate additional product without further human interaction.

Thus what distinguishes the electronic transactions contemplated above in Part I from a purchase through a vending machine is that the agreements of tomorrow will be generated *by* the machines, not merely through them. It is only when electronic devices become sufficiently *animated* that doctrinal difficulties begin to arise. Once electronic de-

67. *Ibid.* at 26.

vices are able to initiate contractual offers autonomously, there will be situations where it will be disingenuous and perhaps even conceptually disadvantageous to characterize those transactions as unilateral offers made by the human users of those devices. Once electronic devices are no longer mere conduits for commercial transactions, it will become necessary to determine how best to treat those devices. Although some academics have offered the radical suggestion that the electronic devices of the future be included among the category of legal persons – a suggestion which will be subject to investigation in Part III below – it is clear that electronic devices do not currently enjoy the status attributed to legal persons. Consequently, an autonomous electronic device cannot be said to be a party to a contract.

2. *Contractual Capacity*

Even if autonomous electronic devices somehow achieved the status of persons in law, it is not clear that every such device would be capable of entering into a contract. As stated by Cheshire and Fifoot, “[i]f all of the elements of contract exist between two parties, the agreement may nevertheless lack legal effect if one or both of the parties lack capacity to contract.”⁶⁸ In other words, prior to giving legal effect to their agreements, the common law has traditionally required of all persons that they are capable of demonstrating a certain degree of intellectual capacity. To take a typical example, there exists a well established distinction in law between the legal treatment of agreements entered into by persons who are minors and agreements entered into by those said to be of a mature age. This distinction has had the effect of limiting the extent to which minors can enter into contracts. A similar rule exists to limit the contractual capacity for those are said not to be of sound mind. As Fridman puts it, “[o]nce a person has been found by a court to be wanting in intellect, then it would seem to follow that such a person lacks contractual capacity. He or she is not able to consent.”⁶⁹

Before a determination can be made as to whether it is possible for an autonomous electronic device to have the legal capacity to contract, it is important to recognize that the doctrine of contractual capacity serves a function beyond the determination of who is in fact able to consent to an agreement. As Waddams has made clear, one of the central reasons underlying the capacity doctrine is the aim of protecting weaker parties

68. J.G. Starke, N.C. Seddon & M.P. Ellinghaus, eds., *Cheshire and Fifoot's Law of Contract*, 6th Australian ed. (Sydney: Butterworths, 1992) at 545.

69. *Supra* note 66 at 158.

during the bargaining process.⁷⁰ According to Waddams, “[f]rom the basic desire to protect minors from exploitation arose a general rule that minors’ contracts were voidable at the minor’s option.”⁷¹ If Waddams is right to link the issue of contractual capacity to the general desire to protect weaker parties when entering into agreements, this adds a wrinkle to the question about whether an electronic device should be said to have the capacity to contract.⁷² In any event, even the most intelligent and autonomous of the electronic devices currently utilized in electronic commerce would seem to lack the capacity to contract.

3. *Consensus Ad Idem*

The traditional view of contract includes not only an exchange of promises but also a mutual concordance between the parties as to the nature and scope of the rights and obligations that coincide with that exchange of promises.⁷³ That is, the parties must be said to have formed an agreement with each other. The metaphor which has taken hold throughout the common law to describe this phenomenon is the idea of a *consensus ad idem*—a meeting of the minds. Historically, this metaphor was based on the paradigm of face-to-face interactions between two human beings. Bearing in mind this historical point, it is not difficult to see that automated transactions do not easily fit within this conceptual framework. In what sense could it be said that electronic devices can exchange promises, or that two devices can reach a meeting of the minds?

It is essential to recognize that the notion of a *consensus ad idem* does not merely signify the mutual concordance between two parties. The agreement requirement also underscores the *voluntary* aspect of contract. After all, the traditional understanding of what makes such an exchange of promises special, what makes such an agreement binding both in law and in moral theory, is the underlying idea that the parties to the agreement have each exercised free will; each person freely chose to

70. S. M. Waddams, *The Law of Contracts*, 3rd ed. (Toronto: Canada Law Book, 1993) at 447.

71. *Ibid.*

72. The capacity issue, as conceived by Waddams, would become extremely complicated in a world where computers are said to have the capacity to contract. Neural net programming, discussed above in Part I, raises the spectre of vast inequalities between the various competing electronic devices. Intelligent agent technology is bound to grow in power and sophistication to the point where the more advanced agents will likely be able to predict the actions and thus take advantage of older, more obsolete versions. It is also likely that only large corporations and wealthy individuals will have access to state of the art agent technology. If the law of contract is to protect weaker parties, it might somehow have to take steps to level the playing field. Should situations such as this be conceived of as analogous to that of sophisticated parties contracting with the infirm?

make representations about the future that created both trust and reliance in the mind of the other and each person thereby assumed obligations not otherwise existent in law.⁷⁴ Aside from a few fairly radical computer scientists,⁷⁵ most of us do not presently conceive of electronic devices as having free will or as capable of making voluntary undertakings meant to limit future freedom of action.

One potential response to the claim that computers are unable to act voluntarily and are therefore unable to reach a meeting of the minds is that the common law has for centuries been premised on an objective theory of contract. As long ago as 1477, the courts recognized that “the intent of a man cannot be tried, for the Devil himself knows not the intent of a man.”⁷⁶ As Lord Eldon later realized, it must therefore follow that the proper role of the courts in determining the parties’ private obligations is not “to see that both parties really meant the same precise thing, but only that both gave their assent to that proposition which, be it what it may, *de facto* arises out of the terms of their correspondence.”⁷⁷ Perhaps the most famous articulation of the objective theory of contract in the common law was put forth by Blackburn J. in *Smith v. Hughes*:

If whatever a man’s real intention may be, he so conducts himself that a reasonable man would believe that he was assenting to the terms proposed by the other party, and that the other party upon that belief enters into a contract with him, the man thus conducting himself would be equally bound as if he had intended to agree to the other party’s terms.⁷⁸

As Atiyah has argued, this approach can be understood as a manifestation of the reliance theory of contract.⁷⁹ To construct the intentions of one person by determining the reasonable beliefs of another, the courts have seemed to be less concerned with the fact that someone freely and

73. *Supra* note 66 at 5.

74. See, e.g., C. Fried, *Contract as Promise: a Theory of Contractual Obligation* (Cambridge Mass.:Harvard University Press, 1981); Fuller & Purdue, “The Reliance Interest in Contract Damages” (1936) 46 *Yale L.J.* 52. For an exhaustive criticism of this point of view, see P.S. Atiyah, *The Rise and Fall of Freedom to Contract* (Oxford: Clarendon Press, 1979); R.K.L. Collins, ed., *The Death of Contract by Grant Gilmore* (Columbus: Ohio State University Press, 1995).

75. M. Minsky, “Will Robots Inherit the Earth?” *Scientific American* 271:4 (October 1994) 108; W. D. May, *Edges of Reality: Mind vs. Computer* (New York: Insight Books, 1996); G. Simons, ed., *Are Computers Alive?* (Boston: Thetford Press, 1983) c. 6; F. George, *Machine Takeover* (Oxford: Pergamon Press, 1977) at 93-113.

76. *Anon* (1478), Y.B. 17 Edw IV, Pasch fol. 1, pl. 2.

77. *Kennedy v. Lee* (1817), 3 Mer 441 at 451; 36 E.R. 170 at 174; [1814-23] All E.R. Rep. 181 at 185-6.

78. (1871) L.R. 6 Q.B. 597 at 607.

79. P.S. Atiyah, “Contracts, Promises and the Law of Obligations” (1978) 94 L.Q. Rev. 193 at 203.

intentionally chose to bind himself to a particular course of action than with the fact that the other party reasonably relied on the perception that he was conducting himself as such.

If Atiyah is right about this, then it might appear as though the actual internal workings of the electronic device and the question about whether such a device could ever form an actual intent to enter into an agreement (rather than merely communicating a representation that there exists mutual concordance) is unimportant or irrelevant. After all, so long as the relevant legal determination is simply whether a reasonable person would believe that the electronic device was assenting to the terms proposed, all that would seem to matter is the external appearance of an agreement. This might be correct in so far as the transaction is understood as an agreement that is merely *mediated* by one or more electronic devices. In such case, whatever his real intention may be, the party employing the electronic device would be conducting himself in such a way that a reasonable man would believe that he was assenting to the terms proposed by the other party.

But the above analysis is incorrect in circumstances where an offer can be said to be *initiated* by the electronic device *autonomously*, i.e., in a manner unknown or unpredicted by the party employing the electronic device. Here it cannot be said that the party employing the electronic device has conducted himself such that a reasonable person would believe that he was assenting to the terms proposed by the other party. As odd as it may seem to us – given our primitive state of agent technology – there will come a time when *an electronic device* will appear to conduct *itself* such that a reasonable person would believe that *the device* was assenting to the terms proposed by the other party. Still, despite the fact that it is easy to imagine a computer-generated representation causing reliance in the mind of some unknowing human recipient of that communication, it remains difficult to grasp how an electronic device, absent any human interaction, might be said to create undertakings and thereby bind itself to a representation made about the future in the same way that people bind themselves when making promises. This yields an important point. It is crucial to remember that the objective theory of contract will not allow *autonomous* electronic devices to escape doctrinal difficulties: sophisticated technologies notwithstanding, electronic devices are not legal persons; they lack the intellectual capacity to intend legal relations and cannot meaningfully be said to enter into agreements voluntarily.⁸⁰

80. Whether we should allow persons to escape from contractual liability when they employ electronic devices to deceive others by representing a transaction as though it is between two persons is quite another matter, one that will be further considered under the heading of Disclosed and Undisclosed Principals in Part V below.

III. *Curing Doctrinal Difficulties by Treating Electronic Devices as Independent Legal Persons*

1. *Artificial Persons*

One possible means of curing these doctrinal defects would be to deem autonomous electronic devices to be legal persons and develop a theory of liability on that basis.⁸¹ Although this approach may sound strange to the uninitiated, it is a well known technique in legal reasoning. As John Chipman Gray put it:

In books of Law, as in other books, and in common speech, “person” is often used as meaning human being, but the technical meaning of a “person” is a subject of legal rights and duties.⁸²

Once the concept of a legal person is understood not as body or soul but as “a subject of legal rights and duties,” one can begin to comprehend the law’s long history of conferring legal personality on several human artifacts including not only corporations⁸³ but ships⁸⁴ and even temples.⁸⁵ It is by virtue of the legal attribution of rights and duties to such entities that they become capable of owning property, owing duties of care and having the capacity to sue or be sued. Some authors, including Gray, have been critical of the idea of attributing legal personality to such artifacts. After all, what is the point of making an artifact – which can neither understand the law nor act upon it – the subject of a legal duty?⁸⁶ This criticism becomes especially relevant when the so-called “acts” of complex artificial persons such as corporations are reducible to relations between human individuals. This critical (though somewhat rhetorical) observation will serve as a useful point of departure for the ensuing discussion. Following Gray, it is suggested that the conferral of legal personality on an artificial entity is justified if and only if there is good reason to do so.

81. See, e.g., Karnow, *supra* note 59; L. Wein, “The Responsibility of Intelligent Artifacts: Toward an Automation Jurisprudence”(1992) 6 Harv. J. L. & Tech. 103; L. Solum, “Legal Personhood For Artificial Intelligences”(1992) 70 N.C.L. Rev. 1231.

82. J.C.Gray, *The Nature and Sources of the Law* (New York: Macmillan, 1921) at 27.

83. *Salomon v. Saloman*, [1897] A.C. 22, 66 L.J.Ch.35, 75 L.T. 426, 35 W.R. 193, 41 Sol. Jo. 63 (Eng. H.L.). See e.g., D. Millon, “Theories of Corporation” (1990) 2 Duke L.J. 201.

84. See *supra* note 82 at 46-48.

85. *Bumper Development Corp. v. Commissioner of Police*, [1991] 1 W.L.R. 1362 (C.A.).

86. See *supra* note 82 at 50-51.

2. *The Justification for Deeming Electronic Devices Legal Persons*

There are at least three different kinds of reasons usually offered as justification for attributing legal personality to an entity: (1) moral entitlement, (2) social capacity, and (3) legal convenience.⁸⁷ The criterion for achieving moral entitlement most often requires that the entity in question is in some sense conscious or sentient. Although there exists a substantial literature on the possibility of machine-generated consciousness,⁸⁸ a detailed examination of this issue is unnecessary for our present purposes. Given the current state of agent technology, as Allen and Widdison have pointed out, “[w]e are concerned with the protection of those who trade through the computer, rather than the protection of the computer itself. The computer has no interest in these transactions.”⁸⁹ When we refer to electronic devices as intelligent agents, we are *not* ascribing moral agency to them. The electronic devices contemplated here are no more moral agents than are our toasters and fridges. As discussed above, electronic devices are not capable of consenting, making promises, etc. Even if such devices can be described as intelligent or as acting autonomously, we are nowhere near the point where these devices can be said to be making conscious, moral decisions of their own. The devices are not contracting for themselves. Consequently, they cannot presently be ascribed legal personality on the basis of moral entitlement.⁹⁰

What about ascribing legal personality on the basis of exhibiting a social capacity? Since at least the time of Turing, many philosophers, cognitive psychologists and computer scientists have held that the relevant question is not whether an electronic device exhibits moral consciousness but whether it could successfully interact with a human

87. See, e.g., T. Allen & R. Widdison, *supra* note 9 at 35.

88. See, e.g., D.C. Dennett, *Consciousness Explained*, 1st ed. (Boston; Toronto: Little, Brown and Co., 1991) at 33-39; R.S. Jackendoff, *Consciousness and the Computational Mind* (Cambridge, Mass.: MIT Press, 1987) at 275-327; C. McGinn, *The Problem of Consciousness: Essays Toward a Resolution* (Oxford, UK; Cambridge, Mass., USA: B. Blackwell, 1991) at 202-13.

89. See, Allen & Widdison, *supra* note 9 at 36.

90. Although this does not entail that we cannot attribute responsibility to these devices. See, e.g., Snapper, *supra* note 57; W. Bechtel, “Attributing Responsibility to Computer Systems” (1985) 16 *Metaphilosophy* 296; Wein, *supra* note 81.

questioner so as to convince him or her that it does.⁹¹ The focus here is not on outward appearances *simpliciter* but, rather, on the manifestation of social behaviour. Applying Turing's approach to the issue of whether electronic devices should be considered legal persons for the purposes of commerce, we would focus on whether the behaviour manifested by such a device is sufficiently similar to the behaviour manifested by a legal person who understands that his or her actions may result in the formation of a contract. According to those who favour this approach, once people who interact with an electronic device begin to regard it, rather than its human controllers, as the source of an offer or its acceptance, we might say that the electronic device has achieved the requisite social capacity to confer upon it the status of legal person.⁹² As Allen and Widdison put it:

For example, we are now inclined to say that the most advanced chess computers play chess on their own; we might also say that autonomous computers make agreements on their own. In this practical, extra-legal sense, we attribute the actions to the computer itself. Hence, it makes sense to think of conferring legal personality on the computer.⁹³

However, the fact that it makes sense to think of conferring legal personality on the computer by no means implies that doing so would be a good idea, nor does it entail that we are legally or morally compelled to do so. As will be discussed in greater detail in Parts IV and V below, there are conceptual means by which we might understand computer-initiated agreements as legally binding without any need to personify electronic devices. If this is correct, the pressing question is whether there would be any additional value in conferring personality on such devices. In other words, are there sound commercial reasons for treating electronic devices as independent legal subjects capable of holding rights and owing duties?

If the future development of agent technology resembles the predictions offered above in Part I, there is at least one reason in favour of treating electronic devices as independent legal persons under certain circumstances. Given the polymorphic nature of some electronic devices, holding liable the human user who created the agent – whether in contract or in tort – will lead to injustices in situations where the electronic device puts forth an offer (or accepts an offer) in a manner that no human user could ever have reasonably foreseen. In such situations, treating the electronic device as an independent legal person would serve to absolve of contractual liability the human user who created the device through a

91. A.M. Turing, "Computing Machinery and Intelligence" (1950) 59 *Mind* 433. See also J.R. Searle, *Minds, Brains and Science* (London: British Broadcasting Corporation, 1984) at 28-41.

92. Allen & Widdison, *supra* note 9 at 39.

93. *Ibid.*

recognition of the fact that some other “person” put forth the offer. Alternatively, to put it in the language of tort law, the operations of that device would be seen as a *novus actus interveniens*.

In this instance, the commercial reason in favour of treating the electronic device as an independent legal person is that no human has done anything that specifically resulted in the creation of expectation, reliance or harm. As Karnow has pointed out, “just as we are not liable for the consequences of a human agent’s unforeseeable pathological actions, so too humans should be absolved of liability from the unforeseen results of machine intelligence’s pathology.”⁹⁴ It is important to recognize that this is not to suggest that human users are not accountable for the consequences of reasonably foreseeable computer errors. But, according to Karnow, the “rationale for imposing liability fails when no particular human has the ability to prevent the injury, short of banning the use of intelligent agents altogether.”⁹⁵

Of course, this reason in favour of treating electronic devices as legal persons must be weighed against competing considerations. One theoretical counter-consideration is that legal personality is usually understood as a two-sided coin. If we are to say that electronic devices are subject to duties (e.g., the duty owed to an offeree upon acceptance of an agreement unintended by the human creator or, perhaps, the duty owed to the human creator not to enter into unintended agreements), should we not also say that electronic devices are owed certain rights? It is odd to think of a legal person who is subject to legal duties but enjoys no independent legal rights.⁹⁶

Even if it could sensibly be said that electronic devices are legal persons who owe duties, though they are owed no rights, it is not exactly clear how individuated personality could be ascribed to such devices, given their polymorphic nature.

In an eternally changing context, agents have no inherent substantiality or persistence. They are polymorphic. The agents’ roles change from centrally active, to sustaining context, to inactive or absent altogether from the processing environment.⁹⁷

94. Karnow, *supra* note 59 at 189.

95. *Ibid.* In this respect, the systemic choice to adopt agent technology invokes a cost-benefit analysis similar to our choice to drive cars: the convenience afforded by both technologies are adopted in spite of a known risk of harm.

96. Wein considers this possibility, *supra* note 81. Such a description is reminiscent of slavery and perhaps the early master-servant relationship, concepts that will be investigated in Part V below.

97. Karnow, *supra* note 59 at 191.

How, then, are we to identify the liable electronic device? “Is it the hardware? Is it the software? What if the hardware and software are dispersed over several sites and maintained by different individuals?”⁹⁸

It could perhaps be argued that this problem of identification is not unique to electronic devices. Such problems are also experienced with corporate entities whose constituents and control mechanisms are also subject to change over time. As is the case with corporations, one possible identification procedure involves some form of registry. Thus we might require of all human traders who want to create electronic devices for use in electronic commerce that they register an identifiable device name and some form of digital signature for the device, as well as identify themselves as the party standing behind the silicon veil. Karnow proposes one such system which he refers to as the “Turing Registry”:

Just as insurance companies examine and certify candidates for life insurance, automobile insurance and the like, so too developers seeking coverage for an agent could submit it to a certification procedure, and if successful would be quoted a rating depending on the probable risks posed by the agent. That risk would be assessed along a spectrum of automation: the higher the intelligence, the higher the risk, and thus the higher the premium and vice versa. If third parties declined to deal with uncertified programs the system would become self-fulfilling and self-policing. Sites should be sufficiently concerned to deal only with certified agents. Programmers (or others with an interest in using, licensing or selling the agent) would in effect be required to secure a Turing certification, pay the premium and thereby secure protection for sites at which their agents are employed.⁹⁹

Karnow goes on to describe his version of the registry in detail. Although his proposed registry procedure is thorough and clearly explicated, what is unclear is why anyone would go to the trouble and expense of devising and implementing such a system when there exist far less expensive and less demanding mechanisms of achieving the same result, i.e., the adoption of a few statutory adjustments to the law of contract. Since it is not yet known how frequently electronic devices will produce unintended agreements of consequence,¹⁰⁰ it is not clear whether the

98. Allen & Widdison, *supra* note 9 at 42.

99. Karnow, *supra* note 59 at 193-94.

100. To be fair to Karnow, his impetus for implementing a registry has more to do with his concern for issues arising from tort liability (specifically, the difficulties associated with proving causation in negligence) than with contractual liability. Karnow may be right to think that there will come a time when a registry is needed to deal with the negligence claims associated with the malfunction of computer equipment. But that day has not yet arrived. Even less urgent is the need for such a system to deal with computer malfunctions that generate unintended agreements.

added complication and expense that would be required to develop such a system is justified – especially when one takes into account the fact that many electronic transactions will be inter-jurisdictional.¹⁰¹ As well, unlike a corporate registry, a system which ascribes personality to electronic devices would not necessarily solve all of the identification problems since polymorphic devices are continuously evolving.

Given all of these practical uncertainties, as well as the theoretical problems enumerated above, it seems relatively clear that a cost-benefit analysis of the legal and economic advantages of an electronic device registry would lead to the conclusion that the doctrinal difficulties associated with electronic devices should not be cured by treating them as independent persons. As at least two critics have pointed out,

it seems superfluous from the business perspective. If traders would go to the trouble of registering a computer for network use, then why would they not go through the trouble of signing an interchange or network agreement, which would serve the same purpose of guaranteeing the enforceability of agreements?¹⁰²

IV. Curing Doctrinal Difficulties by Treating Electronic Devices as Extensions of Human or Corporate Interaction

Concluding that it is not advisable to treat electronic devices as independent legal persons is consistent with the current approach adopted by the *UNCITRAL Model Law on Electronic Commerce*, the proposed *Uniform Electronic Transactions Act*, the proposed *Uniform Computer Information Transactions Act*, the proposed *Uniform Electronic Commerce Act* and other similar legislation.¹⁰³ Instead of treating electronic devices as independent legal persons, the relevant provisions in each of these codes utilizes a mechanism that attributes the interactions of electronic devices to the legal persons utilizing those devices. On this style of approach, one simply disregards the autonomy demonstrated by the electronic device in the formation of the agreement and pretends that it is nothing more than a communication tool. This technique has been described by some

101. Imagine the expense associated with an international registry. Who would govern it? Where and how would disputes be resolved?

102. Allen & Widdison, *supra* note 9 at 43.

103. *Model Law*, *supra* note 10; *UETA*, *supra* note 12; *UCITA*, *supra* note 14; *UECA* *supra* note 13. See also the *Electronic Transactions Act 1999*, online: <<http://scaleplus.law.gov.au/html/pasteact/3/3328/top.htm> [hereinafter *ETA*]; *Electronic Transactions Act 1998* (enacted July 1998), online: Government of Singapore_<<http://www.cca.gov.sg/eta/index.html>> (last modified: 11 June 1999).

authors as the adoption of a legal fiction: we pretend that anything issuing from the computer really issues from its human controller.¹⁰⁴

For example, the “Guide to Enactment” accompanying the UNCITRAL *Model Law* states that “[d]ata messages that are generated automatically by computers without human intervention should be regarded as ‘originating’ from the legal entity on behalf of which the computer is operated.”¹⁰⁵ The typical justification for this kind of approach is exemplified by comments that were made during a meeting of the *UETA* Drafting Committee, which underscored “that the key aspect of this term is its function as a tool of a party.”¹⁰⁶ The *UETA* Reporter’s Notes go on to say that

As a general rule, the employer of a tool is responsible for the results obtained in the use of that tool *since the tool has no independent volition of its own*. . . . This Act (S. 114) provides that a person is responsible for the actions taken and accomplished through electronic agents in the absence of human intervention.¹⁰⁷

According to the annotations accompanying the Canadian *UECA*, “[t]he use of the term ‘electronic agent’ is widespread. The law of agency, however, plays no part in this discussion. An electronic agent is a tool, not an agent in law.”¹⁰⁸ Similarly, the “Reporter’s Notes” in the *Uniform Commercial Code-2B* (the precursor to the *UCITA*) state that the electronic agent “is in effect a mere extension of the person utilizing it and its actions constitute the actions of the individual.”¹⁰⁹

The viewpoints expressed in each of the above policy statements have led to the formulation of attribution rules in each of the respective proposed statutes.

104. See Allen & Widdison, *supra* note 9 at 43. For a general discussion of legal fictions see I.R. Kerr, *Legal Fictions* (Ph.D. Dissertation, The University of Western Ontario 1995) (London, Ont.: Faculty of Graduate Studies, The University of Western Ontario, 1995).

105. See Reporter’s Note 35, *Model Law*, *supra* note 10.

106. See Reporter’s Note under Section 102(5) Electronic Device, *UETA* (July 24, 1998 Draft), online: National Conference of Commissioners of Uniform State Laws <<http://www.law.upenn.edu/library/ulc/uecicta/98am.htm>> (last modified: 24 April 1999).

107. *Ibid.* (emphasis added).

108. See Comments under Section 19 *UECA*, *supra* note 13.

109. See Reporter’s Note under Section 202 *Uniform Commercial Code-2B* (March 10, 1998 Draft), online: National Conference of Commissioners of Uniform State Laws <<http://www.law.upenn.edu/library/ulc/ucc2/2b398.htm>> (last modified: 23 April 1999).

1. Attribution Rules in the Proposed and Enacted Legislation

a. The UNCITRAL Model Law on Electronic Commerce¹¹⁰

Among the first bodies to formulate legislation¹¹¹ on electronic commerce was the United Nations Commission on International Trade Law (UNCITRAL). This initiative was undertaken partly in response to the fact that many countries have inadequate or outdated legislation governing the communication and storage of information. Perhaps more importantly, it was felt that many countries' existing laws actually impede the potential growth of electronic commerce by prescribing rules which impose restrictions on the use of modern media of communication.¹¹² The aim of the *Model Law* was not simply to enhance global trading by removing legal barriers such as these, but to do so in a manner that would result in certainty and uniformity in international trade.¹¹³

Art. 2 of the *Model Law* sets out a number of key definitions. Although it does not define or even refer to autonomous electronic devices, it permits such devices to perform operations on an originator's behalf. An "originator" of a data message is defined as "a person by whom or *on whose behalf*"¹¹⁴ the message was sent. This terminology provides an implicit recognition of the use of autonomous electronic devices as it does not limit an intermediary to a "*person*," while allowing for circumstances in which a message might be sent on some person's behalf.¹¹⁵ Indeed, the "Guide to Enactment" states that "[d]ata messages that are generated automatically by computers without direct human intervention are intended to be covered by subparagraph (c)."¹¹⁶

In art. 13 of the *Model Law*, not only is the use of such a device recognized, its operations are attributed to the person using it. According to the *Model Law*, a data message is deemed to be the originator's "if it was sent - (a) by a person who had the authority to act on behalf of the originator . . . ; or (b) *by an information system programmed by, or on behalf of, the originator to operate automatically.*"¹¹⁷ Thus, the deeming

110. *Supra* note 10.

111. Strictly speaking, it is incorrect to characterize the code produced by UNCITRAL as legislation. Rather, it is a Model Law which was drafted to facilitate the development of uniform legislation to be adopted by member States.

112. Typical examples include the requirement that certain agreements must be "in writing" or "signed."

113. *Supra* note 10.

114. *Model Law*, art. 2, *supra* note 10 (emphasis added).

115. According to Article 2 of the *Model Law*, "Intermediary," with respect to a particular data message, means a person who, on behalf of another person, sends, receives or stores that data message or provides other services with respect to that data message.

116. *Model Law*, "Guide to Enactment" at para. 35, *supra* note 10.

117. *Model Law*, art. 13, *supra* note 10 (emphasis added).

provision in art. 13 attributes to the originator both the acts of traditional agents, (i.e., persons conferred with the authority to act by some principal) and the operations of information systems. Although the provision goes on to assign limits to the circumstances under which an addressee¹¹⁸ is entitled to regard a data message as being that of the originator,¹¹⁹ nowhere in art. 13 or in any of the other provisions are there specified limitations with regard to the power of an information system to bind the person on whose behalf the system was operating. In other words, information systems programmed by or on behalf of the originator to operate automatically – though they are not meant to be made the subject of rights and obligations¹²⁰ – are treated in precisely the same manner as persons who have been given the authority to act on the originator’s behalf. That is, they have the power to bind the originator. As stated in its “Guide to Enactment,” “[d]ata messages that are generated automatically by computers without human intervention should be regarded as ‘originating’ from the legal entity on behalf of which the computer is operated.”¹²¹

b. *The Proposed Uniform Electronic Transactions Act*¹²²

The *UETA*, which was recently adopted by the National Conference of Commissioners on Uniform State Laws, deals with electronic devices in a more sophisticated manner than the *Model Law* by expressly recognizing that such devices can operate independent of any human review.¹²³

S. 14 of the *UETA* expressly permits contracts to be formed by electronic agents. According to the Reporter’s Notes in an earlier draft, “[t]his is in keeping with the purpose of the Act to deal with removing barriers to electronic transactions while leaving the substantive law, e.g., the law of mistake, law of contract formation, unaffected to the greatest extent possible.”¹²⁴ S. 14 permits a contract to be formed by the interac-

118. According to Article 2 of the *Model Law*, the addressee of a data message “means ... the person to whom the originator’s message was dispatched.”

119. In essence, these are circumstances in which the addressee complied with an agreed upon authentication procedure.

120. See the *Model Law*, “Guide to Enactment” at para. 35, *supra* note 10.

121. *Ibid.*

122. *UETA*, *supra* note 12.

123. *Ibid.* see s. 2(2) definition of “Automated transaction” and s. 2(6) definition of “Electronic agent.” The Reporter’s Notes in the July, 1998 Draft indicate that this Act favours the use of the term *electronic agent* over the term *electronic device* (which had been used in previous drafts). The motivation behind this change is based largely on the desire for uniformity with UCC-2B (precursor to the *UCITA*), as well as the recognition that the term *electronic agent* has become a “near term of art.”

124. *UETA*, s. 13, Reporter’s Notes at para. 3, *supra* note 12.

tion of electronic agents or the interaction of an electronic agent and an individual.¹²⁵ In addition to enabling electronic agents to contract, the section provides a mechanism for click-through transactions. Part of its effect is to validate online transactions, such as where a consumer effects a purchase by interacting with an electronic agent on a commercial Web site. It will likely also affect other informational transactions, such as agreements in which one party enables another to use information contained on a Web site for personal purposes in exchange for a promise to agree to the Web site owner's terms and conditions.¹²⁶

Despite a recognition that electronic devices can operate autonomously and can enter into contracts without human oversight, the operations of such devices are still treated in *UETA* as nothing more than the extensions of human action. According to s. 9(b), "[t]he effect of an electronic record or electronic signature attributed to a person . . . is determined from the context and surrounding circumstances at the time of its creation, execution, or adoption, including the parties' agreement, if any, and otherwise as provided by law."¹²⁷

Two other provisions in the *UETA* are involved in its attribution process. S. 9(a) has the effect of attributing an electronic record or electronic signature to a person when that record or signature resulted from the operations of his or her electronic agent. This section is an elegant version of art. 13 of the *Model Law*. In addition to attributing the operations of electronic agents to the persons utilizing them, s. 9(a) highlights the important role to be played by security procedures in the electronic environment. It allows the act of a person to be shown in any manner, "including a showing of the efficacy of any security procedure applied to determine the person to which the electronic record or electronic signature was attributable."¹²⁸ Not surprisingly, reliable authentication mechanisms will become necessary as electronic agents are used more and more to create electronic records and electronic signatures.

One further similarity between s. 9 *UETA* and art. 13 of the *Model Law* is that neither provides for the possibility that an autonomous electronic agent might operate in a manner unknown, unforeseen or unauthorized by the person who initiated its use. Currently, both provisions would attribute liability to the person who initiated the electronic agent even if

125. *UETA*, s. 14, *supra* note 12.

126. For example, a promise not to use the information for certain prohibited purposes.

127. *UETA*, s. 9(b), *supra* note 12.

128. *UETA*, *supra* note 12 (emphasis added).

it malfunctioned or performed operations unintended by the person on whose behalf it was operating. This is highly problematic and will be further addressed below in Parts V and VI.

The final relevant provision in the *UETA* is s. 10. Although this section deals primarily with the legal effect of changes or errors in an electronic record, subsection (2) contains a special provision for mistakes that occur in the contract formation process as between an individual and an electronic agent.

10(2) *In an automated transaction* involving an individual, the individual may avoid the effect of an electronic record that resulted from an error by the individual made in dealing with the electronic agent of another person *if the electronic agent did not provide an opportunity for the prevention or correction of the error* and, at the time the individual learns of the error, the individual:

- (A) promptly notifies the other person of the error and that the individual did not intend to be bound by the electronic record received by the other person;
- (B) takes reasonable steps; including steps that conform to the other person's reasonable instructions, to return to the other person or, if instructed by the other person, to destroy the consideration received, if any, as a result of the erroneous electronic record; and
- (C) has not used or received the benefit or value of the consideration, if any, received from the other person.¹²⁹

Such a provision is premised on a recognition that the process of automation may generate a number of unexpected results in the form of keystroke errors and other human mistakes. This provision is therefore necessary to make up for the fact that, in an automated transaction, it will not always be possible for an individual to communicate to the electronic agent after the fact that he or she had not meant to enter into the transaction. The section seeks to accomplish these things without otherwise disturbing the law of mistake. In fact, s. 10(3) specifically refers to the substantive law and indicates that it applies, as always, with the exception of the circumstances contemplated in subs. (1)¹³⁰ and (2). The section also seeks to provide an incentive for the implementation of error correction mechanisms.

129. *Ibid.* s. 10 (emphasis added).

130. Subsection (1) applies when the parties have agreed to use a security procedure but one of the parties has not conformed to the procedure.

In the context of consumer purchases, s. 10(2) is an important provision. According to it, an individual will be precluded from avoiding a transaction on the basis of a mistake in situations where the electronic agent has provided an opportunity for the individual to prevent or correct the error. Although this seems fair enough, it is sure to create a disadvantage for the average consumer who has by now become accustomed to clicking-through a Web site rapidly and without carefully inspecting its terms and conditions. Such consumers are likely to click “yes” on the “Are you sure?” screen long before giving pause to consider whether they had made any mistakes along the way.

The focus of s. 10(2) is solely on human errors in automated transactions. However, in addition to situations where an individual transmits an offer or an acceptance by accident, it is also possible that an electronic agent might malfunction or, even more likely, function properly though unpredictably to transmit an offer or acceptance that was unintended, unforeseen or unauthorized by the person on whose behalf the electronic agent was operating. It is important to note that nothing in this provision or in any other section of *UETA* contemplates this possibility. Aside from its potential to yield unjust results, the failure to include electronically generated mistakes in this section might provide a disincentive to merchants in electronic commerce, who would be hesitant to utilize autonomous agent technology if that technology is given an unlimited power to bind them, regardless of the circumstances of the transaction.

*c. The Proposed Uniform Electronic Commerce Act*¹³¹

Though the *UECA* was designed to implement the principles underlying the *Model Law* in Canada, its scope extends beyond electronic commerce. *UECA* also contemplates a number of other legal relationships that rely on documentation, e.g., the transaction of information between individuals and government. In order to facilitate the resolution of disputes relating to the formation of contracts or, more generally, disagreements about when an informational transaction is said to have taken place, Part 2 of the proposed *UECA* sets out default rules for the communication of documents. Among other things, Part 2 contemplates the communication of information by means of an electronic document or by electronic interactions, such as clicking on an appropriately designated icon on a computer screen.¹³² Part 2 also contemplates automated communications

131. *UECA*, *supra* note 13.

132. See section 20 *UECA*, *supra* note 13.

accomplished through the use of electronic agents. S. 19 defines an electronic agent as “a computer program or any electronic means used to initiate an action or respond to an electronic documents [sic] or actions [sic] in whole or in part without review by a natural person at the time of the response or action.”¹³³ S. 21 provides that, “[a] contract may be formed by the interaction of an electronic agent and a natural person or by the interaction of electronic agents.”¹³⁴

The Canadian approach is elegant in that it avoids the need for a distinct attribution rule. Rather than attributing the operations of the electronic agent to the acts of its human or corporate initiator, the *UECA* simply permits contracts to be performed by the interaction of electronic agents. Although the provision does not expressly contemplate the possibility that an electronic agent might operate more like an intermediary than an instrument, s. 21 is drafted in a manner that is sufficiently flexible to accommodate such a possibility.

S. 22 of the *UECA* contains an error provision that renders certain transactions between a natural person and an electronic agent of no legal effect. The error provision is practically identical to *UETA* section 10 (2) discussed above. If a natural person makes a material error¹³⁵ while transacting with an electronic agent but notifies the other person of the error as soon as practicable and takes reasonable steps in responding to instructions concerning the return (or destruction) of the consideration prior to receiving any material benefit, the transaction will be unenforceable. The section applies only if the electronic agent did not provide a method of preventing or correcting the error. As the annotation to this section indicates, “[t]his provision gives online merchants a way of giving themselves a good deal of security against allegations of mistake, and encourages good business practices in everybody’s interests.”¹³⁶

Like s. 10(2) of the *UETA*, the mistake provision in s. 21 of the *UECA* restricts its focus to mistakes made by a person while interacting with an electronic agent. With the aim of producing straightforward legislation, the drafters of the *UECA* chose to avoid altogether the difficult issue of mistakes generated by electronic agents. The failure to address this issue is sure to become problematic for the very reasons articulated above in the analysis of s. 10(2) *UETA*.

133. *UECA*, *supra* note 13.

134. *UECA*, *supra* note 13.

135. E.g., clicks “Yes” when she meant “No”, or ordered “10,000,000” units of product instead of “10”.

136. *UECA*, *supra* note 13.

d. *The Proposed Uniform Computer Information Transactions Act*¹³⁷

The National Conference of Commissioners on Uniform State Laws (NCCUSL) and the American Law Institute have been working for several years on a set of coherent legal standards to support electronic transactions. Originally, it was thought that the proposed legislation would be incorporated into the *Uniform Commercial Code* as art. 2B. However, on 7 April 1999 it was announced that the NCCUSL would promulgate legal rules regarding computer information transactions as a separate act entitled *Uniform Computer Information Transactions Act (UCITA)*. Like the *Model Law, UETA* and *UECA*, *UCITA* is being created in response to the tremendous growth in the information industry. It too is intended to address the need for uniformity and clarity in the online environment. The act purports to deal with three issues of contract law that apply to electronic commerce: (1) the authentication of electronic records, (2) the manifestation of assent, and (3) the attribution of electronic messages. The newly proposed draft was presented at the meeting of the NCCUSL in Denver, Colorado in July 1999. It was adopted in principle and is now is subject to revision by the NCCUSL Committee on Style. *UCITA* has been targeted for enactment in all fifty states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.

Like the *Model Law* and *UETA*, the *UCITA* deems the operations of electronic agents as an extension of human action. According to the Reporter's Notes (that accompanied the former *UCC-2B*), "[p]arties who employ electronic agents are ordinarily bound by the results of their operations."¹³⁸ However, on 2 June 1999 a newly revised version of the *UCITA* was released which includes a number of modifications to this general rule.

In spite of the Reporter's Note that electronic agents are not fully equivalent to the common law notion of an agent, *UCITA* does define computer programs that operate independent of human review as "electronic agents."¹³⁹ The definition of "electronic agent" and "automated transaction"¹⁴⁰ are not all that different here from those of *UETA*. *UCITA* does add some sophistication by considering the fact that the contract law notion of "conspicuous terms" will have a particular meaning in the context of automated transactions.¹⁴¹

137. *UCITA*, *supra* note 14.

138. This statement can still be found in *UCITA*, s.102, Reporter's Notes at para.18, *supra* note 14.

139. *Ibid.* s. 102(27), *supra* note 14.

140. *Ibid.* s. 102(7), *supra* note 14.

141. *Ibid.* s. 102, *supra* note 14. "Conspicuous" is defined in paragraph (14). A conspicuous term, with regard to an electronic agent, will include a term displayed or placed in such a way that the agent cannot proceed without taking some action with respect to that term.

S. 202 contains a general provision on contract formation which validates transactions entered into by electronic agents. The language contained in subs. (a) is somewhat different than the language found in the *Model Law* and *UETA*. It implies that a contract will be formed through the operations of electronic agents only if the transaction demonstrates the existence of an agreement between the parties using the electronic agents. This requirement is effective and important. It furthers the objective of creating a media neutral environment while, at the same time, harmonizes electronic commerce with the traditional approach to contract formation.

S. 213(a) of the newly released *UCITA* is perhaps the most important provision relevant to this study. It prescribes the circumstances under which an electronic event will be attributed to a person. Though the first sentence in subs. (a) is generally meant to parallel art. 13 of the *Model Law* and s. 9 of the *UETA*, it contains a major addition. The provision now attributes the operations of an electronic agent to the person using it where he or she is otherwise “bound by it under the law of agency or other law.”¹⁴²

As will be discussed below in Part V, some of the principles of agency law are well-suited to operate in conjunction with an attribution rule and should be used in electronic commerce legislation. However, there are several respects in which the provision in s. 213 is problematic. First, it is not clear that a person would be otherwise “bound by [an electronic agent] under the law of agency.” The doctrinal difficulties enumerated in Part II preclude the possibility of invoking the law of agency without an additional deeming provision that would make it applicable to electronic agents. The above provision does no such thing. Second, s. 213(a) fails to articulate the relevant principles of agency to be applied in electronic commerce. What of the rules in agency dealing with the relationship between agent and principal or between agent and third party? Can agency law be invoked to the effect that duties are owed to the electronic agent by the person using it or *vice versa*? And what about the possibility of duties owed by an electronic agent to the third party? By referring to the law of agency without articulating which aspects of it are said to be relevant, the above provision confuses the law of electronic commerce rather than clarifies it.

142. *UCITA*, s. 213(a), *supra* note 14.

The rest of s. 213 pertains to the rules surrounding an attribution procedure chosen by the parties themselves. Many of these rules are similar to the *UCITA* predecessor and to the other proposed statutes discussed above.

UCITA s. 107 sets out the conditions under which a person will be bound by the operations of an electronic agent. It is important because it specifically contemplates the possibility of *autonomous* electronic agents by stipulating “even if no individual was aware of or reviewed the agent’s operations or the results of the operations.”¹⁴³ It enumerates three uses of electronic agents in electronic commerce. First, electronic agents can be used to authenticate records either by electronically signing documents on a person’s behalf or otherwise. Second, an electronic agent can be used to perform certain contractual duties. If the transaction involves an exchange of information, or information in exchange for something else, there are circumstances in which an electronic agent can perform some or all of the obligations undertaken by the person for whom it is operating. For example, a Web-based music provider can employ an electronic agent in conjunction with MP3 technology to fill orders without human oversight or intervention.¹⁴⁴ Third, in addition to authenticating records and performing contractual duties, electronic agents can be used to manifest a person’s assent. Although it is presently nonsensical to say that an electronic agent has the capacity to consent to contract, it makes perfect sense to say that an electronic agent can be used to manifest the assent of the person using it.

UCITA goes further than any of the other proposed legislation by defining the contractual notion of a “manifestation of assent” in the context of electronic commerce. S. 112 stipulates that an electronic agent manifests assent on behalf of the person using it if, “after having an opportunity to review”¹⁴⁵ a record or term, the electronic agent authenticates it or “engages in operations that the circumstances indicate constitute acceptance.”¹⁴⁶ This provision seeks to make it clear that the

143. *UCITA*, s. 107(d), *supra* note 14.

144. H.D. Rafter et al., “Streaming into the Future: Music and Video on the Internet” in *Patent, Copyrights, Trademarks, and Literary Property Course Handbook Series* (New York: Practising Law Institute, 1999) at 547; N.A. Bloom, “Protecting: Copyright Owners of Digital Music - No More Free Access to Cybertunes” (1998) 45 *Journal of the Copyright Society of the USA*. 179; R. Harris, “Consumer Friendly Music Technology Threatens Industry Profits” *Nando Times* (Dec. 11, 1998) online: Nando Media <http://www.techserver.com/newsroom/ntn/info/121198/info6_2962_noframes.html> (last modified: 11 December 1998); J. Alderman, “Composing Music’s Future Form” *Wired* (July 2, 1998), online: *Wired* <<http://www.wired.com/news/news/culture/story/13444.html>> (last modified: 11 June 1999).

145. *UCITA*, s. 112(b), *supra* note 14.

146. *Ibid.* s. 112(b)(2).

manifestation of assent requires circumstances that constitute a person's acceptance of an offer.¹⁴⁷ The section would be improved if it more clearly indicated that the manifestation of a person's assent is sometimes made *through* an electronic agent, though never *by* an electronic agent. Thus the statutory language "electronic agent manifests assent" ought to be rewritten. After all, the whole point of the provision is to indicate that an electronic agent can be used by a person to manifest *his or her* assent. Besides improving the language, such a change would allow for contractual liability to be limited to only those instances in which a person intended to manifest assent through the electronic agent. This would justly accommodate situations in which an electronic agent's manifestation of some person's assent is unreliable.

Like *UETA*, *UCITA* also recognizes that electronic commerce is likely to generate errors that will not be immediately detected by electronic agents. It therefore contains a similar attribution procedure for the detection of changes and errors.¹⁴⁸ Unlike s. 10 of the *UETA* cited above, *UCITA* s. 214 applies only in the case of consumer transactions. Still, it will not permit a consumer to avoid an automated transaction merely because he has changed his mind. Although the section appears to contemplate "errors created by a consumer using an information processing system", it fails to provide a mechanism that would allow the party using an electronic agent to avoid transactions where a machine generated error has occurred.

Fortunately, such a mechanism is contemplated in *UCITA* s. 206. This section states that a contract may be formed by the interaction of electronic agents and that the contract's existence is indicated when performance commences but not if "the operations resulted from fraud, electronic mistake or the like."¹⁴⁹ A provision that contains a mechanism for limiting contractual liability in the case of computer generated mistakes is extremely important, yet this seems to be the only proposed legislation that addresses the issue. Unfortunately, the term "electronic mistake" is nowhere defined.

147. Presumably, there is no reason to think that the manifestation of assent could refer to an offer as well.

148. Like the *UETA*, if the parties have adopted a commercially reasonable attribution procedure, the provision operates against the nonconforming party. See *UCITA*, s. 214, *supra* note 13. "Attribution procedure" is defined in paragraph 102(5) as a "procedure to verify that an electronic authentication, display, message, record or performance is that of a specific person or to detect changes or errors in the information. The term includes a procedure that requires the use of algorithms or other codes, identifying words or numbers, encryption, callback or other acknowledgment." "Commercial reasonableness" is described in section 212.

149. *UCITA*, s. 206(a), *supra* note 14. The rest of section 206 serves to prevent a human being from altering or vitiating a contract by engaging in conduct to which the electronic agent cannot react.

S. 111 provides an additional safeguard. S. 111(a) stipulates that when a contract or term is found, by a court, to be unconscionable, the court can refuse to enforce the contract, or excise the term, or limit the terms application in order to avoid an unconscionable result.¹⁵⁰ According to the Official Comments, “the unconscionability doctrine may invalidate a term of the contract because of a procedural breakdown in the automated contracting process that produces unexpected and oppressive results in the term of the agreement.”¹⁵¹ Although this section provides a useful safety valve, it is not clear why breakdowns in the automation process would lead to “unconscionable” transactions, as that term is traditionally used.

e. Other Relevant Proposed and Enacted Legislation

Several other jurisdictions have either proposed or enacted legislation that deals with the use of electronic devices in electronic commerce.¹⁵² Singapore’s *Electronic Transactions Act*¹⁵³ contains a number of relevant sections, many of which are borrowed from and are therefore similar to the various provisions of the *Model Law*, *UETA* and *UCITA* cited above.¹⁵⁴ Recently, the Commission of the European Communities has put forth its own *Proposal for a European Parliament and Council Directive On Certain Legal Aspects Of Electronic Commerce In The Internal Market*.¹⁵⁵ Its intention is to put in place a legal framework by 2000. Recognizing that, “the particular acts performed by parties with a view to concluding electronic contracts may result in considerable legal uncertainty as to the conclusion of electronic contracts,” the *Proposal* contains an article which deals with the treatment of electronic contracts. Art. 9 requires that Member States ensure “that their legislation allows contracts to be concluded electronically.”¹⁵⁶ Such a provision is in

150. *UCITA*, *supra* note 14.

151. *UCITA*, s. 111, Official Comments at para. 3, *supra* note 14.

152. E.g., Singapore’s *ETA* and Australia’s *ETB*, *supra* note 103. For more information regarding recent initiatives see “Summary of Electronic Commerce and Digital Signature Legislation”, online: McBride Baker & Coles <<http://www.mbc.com/ecommerce.html>> (last modified: 8 June 1999); “Digital Signature Law Survey”, online: Simone van der Hof <<http://cwis.kub.nl/~frw/people/hof/DS-lawsu.htm>> (last modified: May 1999); “What’s New”, online: Internet Law and Policy Forum <<http://www.ilpf.org/>> (last modified: 9 June 1999).

153. *ETA*, *supra* note 103.

154. Section 2 provides relevant definitions, section 13 prescribes an attribution rule, section 18 provides a series of presumptions relating to secure records and signatures, and paragraph 6 of section 13 addresses transmission errors.

155. EC, *Proposal for a European Parliament and Council Directive On Certain Legal Aspects Of Electronic Commerce In The Internal Market*, COM (1998) 586 final [hereinafter *Proposal*], online: Commission of the European Communities <<http://www.ispo.cec.be/ecommerce/docs/enWord6.doc>> (last modified: 18 November 1998).

156. *Ibid.*

keeping with the approach adopted in the proposed legislation discussed above. Though the details remain to be worked out, the “Executive Summary” accompanying the *Proposal* states that “Member States will . . . not prevent the use of certain electronic systems as intelligent electronic agents. . . .”¹⁵⁷

The last example of legislation to be discussed in this Part is Australia’s *Electronic Transactions Act 1999*.¹⁵⁸ The *ETA* was prepared by the Attorney General’s Department of Australia on the basis of recommendations from its Electronic Commerce Expert Group, as part of the Australian government’s strategic framework on electronic commerce. Though based on the *Model Law*, the *ETA* contains several important exceptions. Like many of the other legislative materials cited above, the *ETA* sets out default rules which parties can alter by way of contract. Although the *ETA* contains no specific mention of electronic agents, it creates a unique attribution rule based on the agency law notion of “authority.” It is unclear whether the words “or with the authority of the purported sender” found in s. 15(1) of the *ETA*¹⁵⁹ include electronic communications sent by an electronic agent. Part of the difficulty with interpreting this provision is that it does not contain any express language such as, “or by an information system programmed by, or on behalf of, the originator to operate automatically.” In fact, it is important to note that the “Explanatory Paper” indicates that such language contained in the parallel section of the *Model Law*¹⁶⁰ was specifically rejected by the Electronic Commerce Expert Group.¹⁶¹

If s. 15(1) is indeed meant to include electronic communications sent by electronic agents, the attribution rule in the *ETA* is radically different from the approach adopted in all of the proposed or enacted legislation discussed thus far with the exception of the most recent version of *UCITA*. If electronic agents are meant to be included, s. 15(1) would require that the relevant question to be asked in a particular case is whether an electronic agent had the authority to operate on behalf of the purported sender. If this is correct, the Australian approach, like the most recent version of *UCITA*, takes the electronic agent metaphor seriously. That is, it imports aspects of the law of agency into electronic commerce. What makes this different from the attribution rules of most of the other proposed or enacted legislation is that, in Australia, the operations of an electronic

157. *Ibid.* Annex at c. 1 s. 3 art. 9.

158. *ETB*, *supra* note 103.

159. *ETB*, *supra* note 103.

160. I.e., *Model Law*, art. 13, *supra* note 10.

161. *ETB*, *supra* note 103. Unfortunately, the “Explanatory Paper” does not indicate why *Model Law*, Article 13 was rejected in favour of the current provision.

agent will not always be attributed to the person using the electronic agent. The common law concept of authority will act as a limiting principle. Assuming that s. 15(1) of the Australian *ETA* was meant to include electronic agents, the purported sender will not be liable in situations where an electronic agent has exceeded its authority. This is an extremely creative strategy and one that will be further explored in Part V.

It is important to note that s. 213 of *UCITA* will not necessarily achieve the same effect. S. 213(a) of *UCITA* refers to agency law only to the extent that agency law might be applicable to attribute the operations of an electronic agent to the person using it. Nowhere in *UCITA* are agency principles referred to or utilized as a mechanism for setting limits on the contractual liability of the person using an electronic agent. The agency concept of “authority” is not specifically mentioned, as it is in the *ETA*.

2. *The Rationale Underlying the Attribution Rules*

As mentioned previously, it has been said that the attribution rules discussed above involve the adoption of a legal fiction. Generally, one pretends that anything issuing from the computer really issues from its human controller.¹⁶² One might therefore ask: Why pretend? Is there no rationale underlying these attribution rules?

One need not pretend. There is a rationale. It is perhaps best understood as a simple extension of the widely accepted contract principle stated in *L’Estrange v. Graucob*: a person who signs a contract without reading it is normally bound by its terms.¹⁶³ Of course, this principle is itself based on a more fundamental principle in the law of contract, namely, the notion of reliance. As Atiyah once put it in the context of signed but unread contracts:

The truth is (a party) is bound not so much because of what he intends but because of what he does. . . . The man who signs a written contract is liable because of what he does rather than what he intends. And he is liable because what he does for the good reason that other parties are likely to rely upon what he does in ways which are reasonable and even necessary by the standards of our society.¹⁶⁴

By analogy, those who operate devices that have the ability to create reliance in the minds of others ought to be bound by the agreements generated by the devices – whether or not those agreements were specifically intended. If an electronic agent authenticates a record,

162. See Allen & Widdison, *supra* note 9 at 43. For a general discussion of legal fictions, see I.R. Kerr, *supra* note 104.

163. [1934] 2 K.B. 394.

164. See P. Atiyah, *Essays on Contract*, (Toronto: Oxford University Press, 1986) c. 2. See also R. Samek, “The Objective Theory of Contract and the Rule in *L’Estrange v. Graucob*” (1974) 52 Can. Bar. Rev. 351.

manifests (a person's) assent, commences or promises performance, the result will be that a reliance interest is created in the person on the receiving end. Admittedly, the analogy loses some of its initial plausibility when one contemplates transactions between two electronic devices. In what sense could an electronic device be said to rely on the agreement in situations where no human was ever aware of the particular transaction?

Still, there is some merit in this approach. By holding liable the person using an electronic agent for what *it does* rather than what he or she intends, the risk of producing unpredicted obligations is placed on the person who is best able to control that risk. If the risks are allocated in this manner, a strong incentive is provided to those who use electronic agents to ensure that they are properly programmed and frequently monitored.¹⁶⁵ There is, however, a certain danger inherent in attributing each and every computer communication to the human or corporate operator of the electronic device. For example, the liability for an unintended transaction might in some circumstances be more appropriately attributed to the developer of the electronic device rather than to its user. This is so in cases where the device malfunctions.¹⁶⁶

One can also imagine situations in which a transaction or series of transactions initiated by an electronic device are not the result of a malfunction but were nonetheless unintended and perhaps even unforeseen by its operator. As contemplated above in Part I, once electronic agents become more intelligent, their use in non-consumer, commercial enterprise is bound to develop. Instead of employing small programs limited to individual elements of business activity such as information search agents, inventory tracking, customer support or book-keeping, single integrated agents will preside over multiple functions. For instance, in a manufacturing business, a "super-agent" might monitor the in-house stocks of manufacturing supplies, keep track of the rate of consumption, determine the need for new supplies, communicate with a number of suppliers, and be responsible for the bidding, contracting and ordering of those supplies.

Because of its multiple functions, such a system would have to contain some form of decision making capacity which would include a program that prioritizes its various functions. A system such as this could be

165. See Allen & Widdison, *supra* note 9 at 51.

166. Since the third party with whom the electronic device has transacted is not privy to any contract that might exist between the developer of the electronic device and the person using it, such liability would not be contractual in nature. For a general discussion of tort liability in this context, see J. J. Fossett, "The Development of Negligence in Computer Law" (1987) 14 N. Ky. L. Rev. 289; G.S. Takach, *Computer Law* (Toronto: Irwin Law, 1998) 288-304.

sufficiently complex so as to make it difficult if not impossible for the average user to predict how the super-agent would resolve a particular series of conflicts in a given set of circumstances. As supplies dwindled, the need to bid for new supplies might become more urgent, something that might be programmed as an element of the software's bidding style. At the same time, however, the super-agent might have been programmed to include as a priority the limiting of in-house stocks to conserve warehouse resources. Further priorities might include keeping the rate of factory consumption at a certain level, the preference of certain suppliers over others, and so on.

An incredibly complex balancing act would follow, and any given outcome would depend on the way in which the priority structure is assigned to the super-agent. It is inevitable that such a program, if sufficiently complex, will occasionally make decisions that are perfectly logical though completely unintended by its users. Certain combinations of priorities might lead the software agent to form contracts that would never have been anticipated by its principal. Given the complexity of the demands made upon the machine, this is bound to happen as easily with mechanized employees as with human ones. What should happen in such a situation if an unintended offer is quickly snapped-up by some third party who is completely aware of the fact that the person using the device would never have consented to any such transaction? If the law simply attributes the communication initiated by the electronic device to its operator without in any way accounting for the *intermediary events* initiated by the electronic device, the result will surely be unjust since the failure to recognize the intermediation will render inapplicable equitable relief that would have otherwise been available via the law of contract.¹⁶⁷ Recall, as well, that the error provisions in each of the proposed statutes (except *UCITA*) did not apply to persons using an electronic agent.

The success of the approach articulated in most of the proposed and enacted statutes considered above will therefore depend on the adoption of a flexible principle that can operate in conjunction with the attribution rules. The role of such a principle would be to set limits on the contractual liability of persons using electronic agents so that people will not necessarily be signing their lives away simply by choosing to initiate devices that have the potential to generate transactions that were unintended, unforeseen or unauthorized. Without some sort of limiting prin-

167. Because of the attribution rule, the person using the device will not be said to have been mistaken. Only if the device was recognized as an *intermediary* would the law of mistake apply.

ciple, electronic agents will have an unlimited power to bind those who use them. Not only is this unjust, it is impractical. Strict or even absolute liability simply will not foster the growth of electronic commerce.

V. *Curing Doctrinal Difficulties by Treating Electronic Devices As Agents*

The general approaches examined in Parts III and IV (with the possible exception of the recent *UCITA* and the *ETA*) appear to turn on a dichotomy: either we treat autonomous electronic devices as independent legal persons or else we treat the operations of those devices as the extended acts of the persons using them. It should be pointed out that this is a false dichotomy. One need not catapult from one extreme to the other. The choice not to treat electronic devices as independent legal persons does not entail a singular rule which attributes every transaction generated by an electronic device to the person who initiated its use. As discussed above, the use of an electronic device *as an intermediary* is sure to result in some transactions that are unintended, unforeseen or unauthorized by the person using it. Consequently, in certain circumstances, it might be unjust to attribute those transactions to that person. How, then, should we treat electronic devices, recognizing that they sometimes operate more like intermediaries than instruments?

1. *The Electronic Slave Metaphor*

It is worth keeping in mind that the problem of intermediaries in commercial transactions is by no means novel. To take an ancient example, the Romans dealt with similar difficulties in the context of slavery law. In fact, there is a certain similarity in the legal status of Roman slaves and that of autonomous electronic devices.¹⁶⁸ Like autonomous electronic devices, Roman slaves possessed valuable skills and could independently perform various important commercial tasks upon command. Still, Roman slaves were not recognized as legal persons according to the *ius civile*.¹⁶⁹

Although they were not considered to be legal persons and therefore lacked the power to invoke the law for their own protection, Roman slaves were not treated merely as chattels either.¹⁷⁰ There were a number of legal

168. See Wein, *supra* at note 81 at 110-111.

169. *Institutiones Iustiniani* 2. 14. 2.; 3. 17. *pr.*; *Novellae Theodosius* 17. 1. 2.: *quasi nec personam habentes*. See also W.W. Buckland, *The Roman Law of Slavery* (New York: AMS Press, 1962) at 2-5.

170. As was generally the case with slaves in the southern United States. "Slaves, from their nature, are chattels, and were put in the hands of executors . . . declaring them to be personal estate": *Walson's Ex'r v. Payne*, Fall T., 1794; *Wash. Rep.*, 1.8.; *Hawkins Adm'r. v. Craig*, 6 Monroe's Rep. 254. See generally B. Hollander, *Slavery in America: Its Legal History* (London: Bowes & Bowes, 1962).

rules that made it possible for slaves to participate in commerce in a meaningful way, sometimes even with the power to alter the legal positions of Roman citizens. For example, Roman slaves were permitted to enter into contracts.¹⁷¹ Given that slaves in Rome were without rights, such contracts could only be enforced through their masters. Still, this meant that a slave could enter into a contract and thereby bind a third party on his master's behalf. It is worth noting that the slave's power to bind both parties was asymmetrical. According to Roman law, a master would be bound to the third party only if the master had given his slave prior authority to enter into the contract on his behalf.¹⁷² This meant that a Roman citizen who wished to contract with another Roman citizen through the instrumentality of the other's slave had to be careful to make sure that the other citizen actually held a similar intent. If that other citizen had not expressly authorized the deal made by his slave, that other citizen could escape liability. Notice the effect of this rule. It allowed cunning citizens (or at least those who were unafraid of sharp practice) to build an escape clause into slave-made contracts. By sending slaves out to make contracts without authorizing any of the particulars, citizens could bind third parties without binding themselves. The effect of such a rule is obviously unfair to third parties. Although there is no evidence that this was a well established practice, this example illustrates the kind of complexities that can arise once intermediaries are allowed to take part in business transactions. It also illustrates the kind of rule that should be avoided.

In order to protect the various parties to a transaction involving slaves as intermediaries, Roman commercial law ultimately became honey-combed with a number of legal fictions, i.e., *ad hoc* formulas through which exceptions could be generated without threatening the existence of the general rule that allowed slaves to act as intermediaries in contractual transactions.¹⁷³ Despite the challenge that such a system would offer to legal taxonomists at that time and ever since, one thing is certainly clear: "Roman commerce was mainly in the hands of slaves."¹⁷⁴

171. *Institutiones Iustiniani*, Tit. XVII *De Stipulatione Servorum*; *Institutiones Iustiniani*, D. xlv. 1. 130; See also Hadley, *Introduction to Roman Law, In Twelve Academical Lectures* (New York: D. Appleton and Company, 1873) at 114.

172. *Digesta Iustiniani* 4. 4. 3. 11, 23.; See also Buckland, *supra* note 169 at 158.

173. See Buckland, *supra* note 169, c. 6-9; R. Sohm, *The Institutes: A Textbook of the History and System of Roman Private Law* (New York: Augustus M. Kelly, 1970), Part II: The System of Roman Private Law, Book I: The Law of Persons, c.1, ss. 32 (Slavery). For a general discussion of the historical development of legal fictions, see I.R. Kerr, c. 1, *supra* note 104.

174. For example, a slave might carry on a bank, with or without orders, the master's rights varying according as it was or was not with the *peculium*: *Digesta Iustiniani* 2. 13. 4. 3.; A slave might be a member of a firm: *Digesta Iustiniani* 17. 2. 63. 2.; See Buckland, *supra* note 169 at 131.

If predictions turn out to be accurate and electronic commerce falls mainly in the hands of intelligent agent technology, the electronic slave metaphor could turn out to be more instructive than typical metaphors used to describe intelligent agent technology such as the “personal digital assistant.”¹⁷⁵ Although they are not presently considered to have the status of person in law, if the promise of this technology is fulfilled and these devices begin to display high levels of autonomy and intelligence then there might be good reason to treat these devices more like intermediaries rather than as mere instruments. The aim of doing so is not to confer rights or duties upon those devices. Rather it is simply the first step in the development of a more sophisticated and appropriate legal mechanism that would allow persons interacting through an intermediary to be absolved of liability under certain circumstances. To this extent, the Roman law of slavery offers a valuable lesson to legislators who are considering how best to treat autonomous electronic devices. Instead of viewing the alternatives as a dichotomy – either we attribute legal personality to electronic devices or else we impose strict liability on those who initiate their use – the electronic slave metaphor reveals a third option. As in ancient Rome, the legislators of electronic commerce might decide that it is appropriate to enact a special set of rules that define the parameters of liability for those who choose to conduct commerce through the use of intermediaries, recognizing that the acts of an intermediary are not always identical to those contemplated by the person initiating the use of that intermediary. To this end, it is useful to consider certain principles of the modern law of agency.

2. *The Electronic Agent Metaphor*

Following in the footsteps of the law of master and servant, the modern law of agency also “recognizes that a person need not always do things that change his legal relations himself: he may utilise the services of another to change them, or to do something during the course of which they may be changed.”¹⁷⁶ In the law of agency, an intermediary has the power to affect the legal relations of the person who has authorized the intermediary to act on his behalf. The original expression of this idea is founded upon the Roman law formula: *qui facit per alium facit per se* (he who acts through another acts himself). Interestingly, this Roman fiction bears some similarity to the general attribution rule contemplated by the *Model Law*, the proposed *UETA*, *UECA* and *UCITA*. Its formula is one of identity: the agent’s acts are the acts of the principal.

175. See P. Maes, *supra*, note 3.

176. F.M.B. Reynolds, *Bowstead & Reynolds on Agency*, 16th ed. (London: Sweet and Maxwell, 1996) at 3.

Of course, our modern law of agency is much more sophisticated and subtle. Agency law has developed a number of discrete principles for dealing with complex transactions involving intermediaries. For example, a person can give her agent a general authority so that he can act on her behalf according to his own discretion. This could result in circumstances where the person who granted authority to the agent (the principal) is unaware of the fact that she has entered into particular commercial transactions. Still, the law of agency will impose limits on the acts performed by her agent. Only in certain circumstances are the acts of the agent deemed to have the same legal effect as if they were acts performed by the principal. But before investigating the relevant agency principles, it is important to recognize that agency law by itself would be insufficient to cure the doctrinal difficulties enumerated above in Part II, since agency law applies only to legal persons. In order to invoke the principles of agency law it is therefore necessary to include electronic devices within the set of rules that form the external aspect of agency.¹⁷⁷

A provision that would deem an electronic device to be an agent for the purposes of electronic commerce would not be altogether farfetched. After all, it is a well established principle in the law of agency that one need not have the capacity to contract for oneself in order to be competent to contract as an agent.

For example, an infant . . . even though incompetent to be a principal in respect of a particular contract, may none the less act as an agent in the making of such a contract. It is irrelevant to his capacity to act as an agent that, because of his infancy, he may not be liable to the third party on the contract, where an adult agent would have been personally liable.¹⁷⁸

Likewise, courts have held that corporations which are not legally capable of carrying on a particular type of business (e.g., insurance) might still act as the agent of a principal who is licensed to carry on in such a business.¹⁷⁹ As Bowstead and others have pointed out, “[T]he rationale of this seems to be that the agent is a mere instrument and that it is the principal who bears the risk of inadequate representation.”¹⁸⁰ Although

177. The external aspects of agency are discussed in the text surrounding note 183.

178. G.H.L. Fridman, *Fridman's Law of Agency*, 6th ed. (London: Butterworths, 1990) at 50-51. See also *Smally v. Smally* (1700), 1 Eq. Cas. Abr. 6, 283; *Re D' Angibau* (1880), 15 Ch. D. 228 at 246.

179. *Commonwealth Trust Co. v. Dewitt* (1974), 40 D.L.R. (3d) 113.

180. Reynolds, *supra* note 176 at 41. See also Müller-Freienfels, “Law of Agency” (1957) 6 Am. J. Comp. L. 165 at 180-81; *Norwich and Peterborough B.S. v. Steed*, [1993] Ch. 116 at 128.

this statement is clearly hyperbolic,¹⁸¹ it suggests an important contractual point. When a principal authorizes an agent to contract on her behalf, the relevant contractual intent belongs in fact to the principal and not her agent. Where the principal has expressly authorized a transaction, her agent is, legally speaking, the instrument through which the principal's contractual intent is expressed. Consequently, the agent's capacity and intent are superfluous to the transaction, so long as the agent is able to manifest the principal's assent to contract.¹⁸² As Bowstead put it:

The basic justification for the agent's power as so far explained seems to be the idea of a unilateral manifestation by the principal of willingness to have his legal position changed by the agent. . . . There is certainly no conceptual reason which requires a contract between principal and agent to achieve this creation of power, and it is indeed clear that no contract is necessary, for a person without juristic capacity may be an agent. Further, if only the relations between principal and third party are in issue, it may not be necessary for the agent to have agreed to, or perhaps even to have knowledge of, the conferring of authority at all, if it can be established that the principal had conferred it; though such a situation would be an unusual one.¹⁸³

Although Bowstead clearly did not have electronic commerce in mind when he wrote this passage, electronic devices comport well with the scenario envisioned. Since disputes in electronic commerce will involve only the relations between principal and third party, there is no need for the '*agent*'¹⁸⁴ (i.e., the electronic device) to have agreed to or to have knowledge of the conferring of authority at all. So long as it can be established that the '*principal*' (i.e., the person initiating the electronic device) did confer '*authority*' in one way or other, the '*agency*' relationship will be established and the '*principal*' will be bound by the operations of the electronic '*agent*'. Although, as Bowstead acknowledges, it would be unusual for an agent not to have agreed to or not to have known about the conferral of authority in situations where the agent has juristic capacity, the same cannot be said of '*agent*' mediated electronic commerce.

Having established a credible basis for the electronic agent metaphor, it is important to determine which of the various principles of agency law are relevant to electronic commerce.

181. Given that agents have rights and obligations, and given that the concept of "authority" sets limits on the potential liability of a principal, it is hyperbole to say that the agent is *merely* an instrument and that the principal bears *all* of the risk associated with inadequate representation.

182. Assuming, of course, that the principal has contractual capacity.

183. Reynolds, *supra* note 176 at 3-4 (emphasis added).

184. For the sake of clarity, *italics* and 'single quotation marks' are meant to indicate unconventional uses of the terms agent, principal, authority, agency, etc. in the context of electronic commerce.

3. *Relevant Principles in the Law of Agency*

Agency law is sometimes characterized as having an *internal* and an *external* aspect.

The external aspect is that under which the agent has the powers to affect the principal's legal position in relation to third parties. The internal aspect is the relationship between principal and agent, which imposes on the agent (subject to contract) special duties vis-à-vis the principal, appropriate to the powers which he can exercise on the principal's behalf.¹⁸⁵

Obviously, given that electronic devices are not presently the subject of rights or duties, only the external aspects of agency law are relevant to electronic commerce. In other words, the only aspects of agency law relevant to electronic commerce are those that pertain to the relationship between the person who initiates an electronic device and third parties who transact with that person through the device.¹⁸⁶

a. *Authority*

As Fridman has stated, "[t]he question of the authority of an agent is at the very core of agency. It is complex and difficult, but it must be understood, if the nature of agency is to be comprehended."¹⁸⁷ One might begin by thinking of authority as a special kind of legal power held by an agent, a power to perform some act which affects the principal's legal relations. In cases where that power is voluntarily conferred by the principal to her agent, the agent is said to be "authorized" or to "have the authority" to act on the principal's behalf.¹⁸⁸ Although consent is the paradigmatic mechanism by which authority is conferred, in some cases an agent will obtain the power to affect the principal's legal relations without her consent. In such cases, the agency relationship is not the result of the unilateral manifestation by the principal of a willingness to have his legal position changed by the agent. Rather, it is the result of the application of the common law principle of estoppel. Fridman characterizes the application of estoppel as follows.

[A] person who by words or conduct has allowed another to appear to the outside world to be his agent, with the result that third parties deal with him as his agent, cannot afterwards repudiate this apparent agency if to do so would cause injury to third parties; he is treated as being in the same position as if he had in fact authorised the agent to act in the way he has done.¹⁸⁹

185. Reynolds, *supra* note 176 at 8.

186. Keeping in mind the fact that such a transaction might be further complicated by the use of an electronic device on the other end as well.

187. Fridman, *supra* note 178 at 15.

188. See Reynolds, *supra* note 176 at 6.

189. Fridman, *supra* note 178 at 99.

The fact that authority can in some instances be conferred in the absence of a manifestation of consent demonstrates that the agency relationship results as an operation of law. Authority that is the result of a principal's consent is often referred to as "actual authority," whereas authority said to result from an operation of law, in this case the rule of estoppel, is often referred to as "apparent authority" (sometimes "ostensible authority").

Applying the first of these two types of authority to the electronic commerce scenario, the person initiating an electronic device might voluntarily confer a power by the unilateral manifestation of a willingness to have her legal position changed through the operations of the electronic device. This power shift would allow the operations of an electronic device to alter the legal position of that person. As is the case with infants and corporations under certain circumstances, it matters not that the device lacks the juristic capacity to perform certain acts.¹⁹⁰ All that matters is that the person initiating the device had in fact consented to the operations performed by that device. If a willingness to have her legal position changed through the operations of the electronic device has been made manifest or is implied by the circumstances, one might say that the device has an actual authority to operate on behalf of the person who initiated its use.

The second type of authority can also be applied to the electronic commerce scenario. In some instances, the person initiating an electronic device will make things appear to the outside world as though the electronic device is operating under her authority. In situations where a representation is made which makes it appear as though a person has initiated an electronic device to operate on her behalf and another person relies on the representation in a manner that results in the alteration of his position, the person initiating the device effectively confers a power which allows the device to alter her legal position. On the basis of the estoppel principle, this is true even if that person has not voluntarily conferred a power to the device. To describe this process in the language of agency, one might say that the device has an apparent authority to act the behalf of the person who initiated its use.

The authority concept, as applied to electronic commerce, can be used to set limits on the liability of persons utilizing electronic devices. In other words, authority can be used in conjunction with an attribution rule to set parameters that will help to determine when a person is liable for transactions generated by her electronic devices and when she is not. Essentially, a person will not be liable for the transactions generated by

190. Reynolds, *supra* note 176 at 166-67.

her electronic device where the operations of that device have exceeded her consent. Likewise, she will not be liable in situations where the operations of the device did not result in representations that allowed it to appear to the outside world as though the device was operating on her behalf.

Since electronic devices are programmed (for the moment, at least), it is safe to say that there will be no occasions in electronic commerce where the authority of an agent is conferred in such ambiguous terms or where the instructions are so uncertain as to be capable of more than one construction. Consequently there is no need, in electronic commerce, to determine whether an electronic '*agent*' is said to have acted "reasonably" or "in good faith."¹⁹¹ However, as the technology becomes more refined, one might expect issues to arise in the context of whether an electronic '*agent*' has operated in excess of its implied actual authority when it functioned in a particular manner so as to execute the instructions of the person who initiated its use. For example, assume that an electronic '*agent*' is '*authorized*' to buy certain shares. If so, the device would also have the '*implied authority*' to operate within the scope of that which is necessary in the usual course of business to complete the transaction.¹⁹² Is the '*agent*' authorized to open a line of credit in order to pay for the shares? What if the '*agent*' arranged the line of credit through an illegitimate lender? Given that intelligent devices might one day soon '*do business*' in a completely unpredictable and unconventional manner, the scope of that which is "necessary in the usual course of business to complete the transaction" might undergo a radical shift. Part of the problem, as highlighted above in Part I, is that the operations of these devices will not always be dictated by those who program them. The electronic devices of tomorrow will '*learn for themselves*' what is necessary in the usual course of business to complete the transaction.

Another authority issue that could become problematic is whether and when an electronic device may delegate its '*authority*' to another device and, if so, to what extent is the person who initiated the original device responsible for the operations of the device to which a task was delegated. As discussed above in Part I, the technologies of tomorrow will likely incorporate collaborative electronic devices that operate in a collaborative manner across an open, interoperable platform. It is quite likely that when people '*authorize*' devices to undertake complex transactions, they will do so without knowing that those devices will delegate portions of the

191. That is, the internal aspects of the agency relationship (i.e., the relationship between the principal and agent) are not relevant to electronic commerce.

192. This example is in part borrowed from Reynolds, *supra* note 176 at 118.

task at hand to other devices. ‘*Sub-agency*’ problems could arise if those other devices engage in transactions that are not sufficiently related to the task as conceived by the person who initiated the original device.

b. *Ratification*

In cases where an electronic device is said to enter into ‘*unauthorized*’ transactions with some third party, it is possible that the person who initiated the device might later affirm its operations notwithstanding the want of authority. In such instances, it will be important to determine whether the traditional agency principle known as “ratification” applies and, if so, under what circumstances. Ratification has been defined in the American Restatement as,

The affirmation by a person of a prior act which did not bind him but which was done or professedly done on his account whereby the act, as to some or all persons, is given effect as if originally authorised by him.¹⁹³

Some authors have referred to ratification as “subsequent authority.”¹⁹⁴ By this it is meant that the doctrine of ratification makes it possible in certain circumstances for authority to be conferred *ex post facto*.¹⁹⁵ Where a principal is said to have ratified the acts of his agent, he will be bound by those acts, as if it had been antecedently authorized, “whether it be for his detriment or his advantage.”¹⁹⁶ However, the doctrine of ratification can be invoked only under certain circumstances. According to Bowstead,

The only person who has the power to ratify an act is the person in whose name or on whose behalf the act purported to be done, and it is necessary that he should have been in existence at the time when the act was done, and competent at that time and at the time of ratification to be the principal of the person doing the act; but it is not necessary that at the time the act was done he was known, either personally or by name to the third party.¹⁹⁷

The doctrine of ratification aims to complete the relationship between a principal and third party by seeking to accomplish what both parties had actually intended.¹⁹⁸ In the case of electronic commerce, the third party’s intentions are satisfied in the sense that she or he had always intended to contract with the person in whose name the device purported to be operating. Likewise – notwithstanding the fact that the device in question ‘*exceeded its authority*’ – the ‘*principal*’’s ultimate intentions are also

193. *Restatement (Second) Agency* §82 (1957).

194. See, e.g., S.J. Stoljar, *The Law of Agency* (London: Sweet & Maxwell, 1961) at 177.

195. See, e.g., B.S. Markesinis & R.J.C. Munday, *An Outline of the Law of Agency*, 3rd ed., (London: Butterworths, 1992) at 67.

196. Per Tindal CJ in *Wilson v. Tumman* (1843), 6 Man & G 236 at 242.

197. Reynolds, *supra* note 176, art.15 at 71.

198. Markesinis & Munday, *supra* note 195 at 68.

satisfied through the doctrine, though not until the moment of ratification. It is important to underscore the fact that, in order to satisfy the actual intentions of the parties, the doctrine of ratification will only apply in situations where a third party is contracting with a device that is purportedly operating on behalf of some '*principal*'. It will not apply in situations where the third party is unaware of the existence of a person who initiated the device.

c. Disclosed and Undisclosed Principals

By requiring third parties to know that the intermediary is purporting to transact on another's behalf, the law of agency is said to distinguish between disclosed and undisclosed principals. A disclosed principal is one whose interest in the transaction as principal is known to the third party at the time of the transaction in question.¹⁹⁹ An undisclosed principal is one whose existence is not known to the third party at the time of the transaction.²⁰⁰ When a third party contracts with an agent who is acting for some undisclosed principal, the third party will, by definition, do so under the mistaken impression that he is in fact contracting with the agent alone. Mistakenly, the third party believes that the agent is the principal.

The third party's mistaken impression is theoretically unproblematic in situations where the agent is authorized to transact on the undisclosed principal's behalf. Where the undisclosed principal has authorized the agent to act, the law will treat the agent as though he or she is the principal. The same cannot be said, however, when the agent of an undisclosed principal acts in excess of his or her authority. In such a case, if the principal is undisclosed, it will not be possible for that principal to invoke the doctrine of ratification. Since the third party was unaware of the existence of the real principal, the third party cannot be said to have intended to contract with that person. Because the third party did not have the requisite contractual intent *vis-à-vis* the undisclosed principal, the two parties were never *ad idem*. Consequently, the undisclosed principal will be precluded from ratifying an unauthorized transaction entered into by his or her agent.

The rule that precludes undisclosed principals from ratifying unauthorized transactions could have a useful application in electronic commerce. It could indirectly encourage those who initiate a device to make conspicuous the fact that the third party is transacting with a device and not a person. In other words, the '*principal*' will come to recognize it as

199. Reynolds, *supra* note 176 at 30.

200. *Ibid.*

a good business practice to disclose the fact she is transacting through an electronic 'agent' so that she will not be precluded from enforcing agreements made by the 'agent'. If such a business practice does become accepted and the standard use of electronic devices is conspicuous rather than transparent, this will without a doubt result in fewer mistaken transactions in electronic commerce. To take a simple example, if a third party knows full well that he is ordering certain goods through an electronic device, the third party will be less inclined to attempt counter-offers or other sorts of negotiations that one might reasonably attempt if dealing with a human being at the other end; the third party will likely be aware of the fact that the device might not be able to 'read' or 'understand' certain kinds of responses.²⁰¹ In essence, the application of the rule that precludes undisclosed principals from ratifying unauthorized transactions would seek to ensure that the 'principal' and 'third party' have in fact reached a *consensus ad idem*, as is required by the law of contract.

Conclusion

One of the central themes expressed throughout this article is that the devices that automate electronic commerce will soon be able to animate it. These devices will cease being mere conduits of communication. They will soon begin to look and feel more like intermediaries than like instruments. And as they do, it will become more and more difficult to determine how the law should treat them.

The temptation amongst academics, lawyers and legislators alike is to treat this problem as turning upon a dichotomy. Accordingly, electronic devices are either legal beings or they are nothing. Either they possess rights and owe duties or else they have no independent legal power whatsoever. The reason some have adopted this dichotomy is that, if it were anything but either of these two extremes, allowing those devices to function in electronic commerce would interfere with our doctrinal understanding of the law of contract. Such an interference, it is thought, is not to be tolerated since the success of electronic commerce will depend on its ability to comport with established ways of doing business.

In this article it has been suggested that such reasoning exemplifies a false dichotomy. If it is true that the legal ontology of an electronic device falls somewhere in between that of a piece of office equipment and a living business person, this causes no new problem for the law. Our law can and does accommodate for intermediaries in a transaction, even where those intermediaries are said to lack the juristic capacity to contract

201. Or, at least, his awareness of this possibility might make it unreasonable for him to rely on such attempts.

for themselves. Consequently, an absolute attribution rule that considers the operations of an electronic device to be the acts of the person using it is not the only option that follows from a recommendation against deeming such devices to be independent persons.

Situating these rather conceptual points within the context of the proposed electronic commerce regimes, the question becomes one of limitation. If it is incorrect or unjust always to attribute the operations of an intermediary to the person who employs it, what mechanism is most properly suited for carving out the appropriate bounds of contractual liability? The proposed statutory buzz words are "the manifestation of assent." Indeed, this sounds like good, solid contract doctrine. The problem is that, in the context of agent mediated electronic commerce, this phrase turns out to be a misnomer. Although the phrase is meant to signify the requirement of an assent by the person who is a party to the agreement, in the case of electronic commerce, it is the electronic device operating on his or her behalf that usually does the manifesting. In fact, it is contemplated that persons using electronic agents will often be unaware that any such transaction has taken place. As is the case with human intermediaries, when an electronic agent makes manifest something other than what the person using it would have manifested had she or he reviewed the proposed transaction, it is unclear whether it can truly be said that there has been a "manifestation of assent." If it were a person and not a device playing the role of intermediary, the law of agency would require that we look either to the intentions of the principal or else to the representations made by the principal to the third party to see whether there was indeed a manifestation of assent. But, according to the majority of proposed electronic commerce regimes, we need not bother with any such investigation in the case of agent mediated electronic commerce. The proposed attribution rules generally provide that anything made manifest by an electronic agent will be attributed to the person using it. It is suggested that such a rule is too removed from traditional common law principles and would not promote or foster the development of electronic commerce.

Consequently, drafters of any new legislation should carefully consider the way that our law treats other intermediaries. It is suggested that the law of intermediaries is a promising place in which to find the appropriate set of limiting principles to accompany an attribution rule of the sort found in the proposed and enacted legislation. Although the devices of intelligent agent technology might not yet appear to be sufficiently "intelligent" to require an application of the law of intermediaries, the promise of agent technology will likely make an application of the law of intermediaries necessary in the near future. An application

of the external aspects of agency law would furnish a useful set of limiting principles which could operate in conjunction with fundamental principles of contract law to help determine whether there has in fact been a “manifestation of assent” in particular electronic transactions.