

# Issues on Intelligent Electronic Agents and Legal Relations

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**Abstract.** computers have been looked as an instrument due to process and record information, but also as a means of automatically processing and transmitting information, and now as a means of autonomously thinking, deciding, acting. Recent trends in the field of what we are calling Artificial Intelligence, brought along new ways of expressing will and declarations – as an electronic behaviour that exteriorizes the content of a certain autonomous will. This leads us to a urgent need of rethinking many legal theories that we had since long ago already thought as definitely established, such as the theories of will, personality, consent and representation. In this paper we will question legal relations involving Intelligent Electronic Agents.

## 1. Introduction

Through the use of complex intelligent devices, capable of operating all alone and by themselves without any human intervention, “computer systems are now emerging that can operate not just automatically but autonomously”<sup>1</sup>. And the characteristics of the newest software agents are becoming so sophisticated, that we must already face the possibility of these expressing emotions, or manifesting certain features of true “personality”<sup>2</sup>. And the question is how far we may go in the consideration of computer intelligence and autonomy, in dealing with its acts<sup>3</sup>.

Computers totally lack legal personality and legal capacity, that is to say the possibility of being subjects of rights and obligations, of expressing a valid and binding will, of being liable for their own actions. However, as intelligent artifacts they become capable to learn from experience, modify its own behaviour, according

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<sup>1</sup> T. Allen and R. Widdison “Can Computer Make Contracts?”, Harvard Journal of Law and Technology, Volume 9, Number 1, Winter 1996, page 27.

<sup>2</sup> C. Analide, P. Novais, J. Machado, and J. Neves “Anthropopathy Societies of Virtual Entities”, in Proceedings of the IRMA 2004 International Conference, New Orleans, USA (2004) and G. Ball and J. Breese “Emotion and Personality in a Conversational Agent” in “Embodied Conversational Agents”, edited by Justine Cassel, Joseph Sullivan, Scott Prevost and Elizabeth Churchill, The Mit Press Cambridge – Massachussets – London, England, 2000.

<sup>3</sup> M. Wooldridge “An Introduction to MultiAgent Systems”, John Wiley & Sons 2002

to cognitive, reactive and pro-active processes quite similar to human acting<sup>4</sup>. And so, declarations of will and agreements “will therefore no longer be generated through machines but by them, without any intervention or supervision of an individual”<sup>5</sup>.

Of course, this operates a radical shift in the way we understand legal relations. And some possibilities must be analyzed: the possibility of considering the electronic devices as mere machines or tools, the daring possibility of considering the electronic device as a legal person and also a third possibility, the application of the rules of agency to electronic transactions: “when a principal uses a computer in the same manner that it uses a human agent, then the law should treat the computer in the same manner that it treats the human agent”<sup>6</sup>.

## 2. Computer Agent as a Machine or Tool

One possibility would be to consider the whole declarative process as indeed performed by a human. It would be like establishing a legal presumption that -- Allen and Widdison call it a “legal fiction”<sup>7</sup> -- “all transactions entered into by the computer would be treated as transactions entered into by the human trader”, thus putting the intention and the whole risk for the transactions “on the person best able to control them – those who program and control the computer”. This “fiction”, based in a presumption that a person assents to a declaration or to a contract, even though he may not be aware that something was declared or that a contract was celebrated, would perfectly comply with the USA’s UCITA regime (and intention), as it was pointed out by Jean-François Lerouge: “if a party creates a situation in which an electronic agent is to act on his behalf, then a party is bound by the actions of the “agents”<sup>8</sup>. In this regard, Weitzenboeck speaks of attribution: “the operations of an intelligent agent are attributed to the human who uses the agent”<sup>9</sup>. That is to say that this theory recognizing that the only valid and relevant consent must be the one of the person on whose behalf the agent acts, a connection must thus be established between the action (non-human) and the intention (human), in a similar way to what appears to be a conclusive behaviour of the declarer in automatic inter-systemic electronic communications, such as EDI: “ by initiating the electronic agent, the user is deemed to have accepted that contracts concluded by the agent will be binding on such user. The assent of the electronic agent will be inferred to be the assent of the (human) user of the agent”<sup>10</sup>. The acceptance of this theory would have an obvious impact – the risk

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<sup>4</sup> Tom Allen / Robin Widdison, op. cited, page 27 and E. Weitzenboeck “Electronic agents and the formation of contracts” in *International Journal of Law and Information Technology*, Vol. 9 Issue 3, Autumn 2001, Oxford University Press, pp. 204-234

<sup>5</sup> E. Weitzenboeck op cited.

<sup>6</sup> J. Fischer “Computers as Agents: a proposed approach to revised U.C.C Article 2” in *Indiana Law Journal*, vol. 72, number 2, Spring (1997), page 557.

<sup>7</sup> Tom Allen / Robin Widdison, op. cited, page 43.

<sup>8</sup> J. F. Lerouge, “The use of electronic agents questioned under contractual law. Suggested solutions on a European and American level” in <http://www.droit.fundp.ac.be/textes/lerouge2.pdf>, visited on 2003/9/8, page 31.

<sup>9</sup> E. Weitzenboeck op cited.

<sup>10</sup> E. Weitzenboeck op cited.

of transactions would entirely be put “on the persons who program, control or otherwise use an electronic agent” and these would eventually be assigned a sort of liability regime similar to the one relating to the use of cars or machines by the owner. “A party may be liable for a damage caused by an object”<sup>11</sup>. It is a well known principle of Civil Law’s liability regime that “a person to whose sphere machines can be assigned to is supposed to be liable for them. Thus, the one shall bear the risk that has the right and ability to control the machine and receives a (financial) benefit from its use”<sup>12</sup>.

But wouldn’t it be a terrible burden to put on programmers and users – who surely would not be “in such a condition to anticipate the contractual behaviour of the agent in all possible circumstances” and so would not be in position of “wanting” each and every “contract which the agent will conclude”?<sup>13</sup>.

Although this theory of considering electronic agents as a mere machines or tools is the most well accepted by legal authors, and besides it was contemplated by the US and Canada legislation -- the truth is that some authors have been looking for other possible solutions.

### 3. Electronic Agents as Legal Persons

The attribution of legal personality to intelligent software agents<sup>14</sup> would have at least two clear advantages: First, by the recognition of an autonomous consent – which is not a fiction at all -- it would solve the question of the validity of declarations and contracts enacted or concluded by electronic agents without affecting too much the legal theories about consent and declaration, contractual freedom, and conclusion of contracts<sup>15</sup>. Secondly, it would “reassure the owners-users of agents”, because, by considering the eventual “agents” liability, it could at least limit their own (human) responsibility for the “agents” behaviour<sup>16</sup>. This solution might look rather convenient in all aspects. But, nevertheless, its adoption will not be without difficulties. One of the difficulties relates to the identification of the agents? We would need technical answers to some questions. What constitutes the agent? The hardware? The software? Both? And “what if the hardware and software are dispersed over several sites and maintained by different individuals?”<sup>17</sup>. Besides that, agents may have the capability of dividing themselves “into the modules they include” or multiplying themselves

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<sup>11</sup> J. F. Lerouge op cited, page 28.

<sup>12</sup> Haentjens, O.: Shopping agents and their legal implications regarding Austrian law. Point 4.2 in <http://www.cirfid.unibo.it/~lea-02/pp/Vanhaentjens.pdf> , visited 2003/9/8.

<sup>13</sup> G. Sartor “Agents in Cyberlaw”, point 3 in <http://www.cirfid.unibo.it/~lea-02/pp/Sartor.pdf> , visited 2003/9/8.

<sup>14</sup> F. Andrade, J. Neves, P. Novais, J. Machado, “Software Agents as Legal Persons” in Proceedings of the PRO-VE 2004 - 5th IFIP Working Conference on Virtual Enterprises, Toulouse, França (2004).

<sup>15</sup> S. Felli, “Intelligent Agents and Consumer Protection” in [http://www.eclip.org/documentsII/elecagents/consumer\\_protection.pdf](http://www.eclip.org/documentsII/elecagents/consumer_protection.pdf) , visited 2003/9/8, note 17.

<sup>16</sup> G. Sartor op cited, point 3.

<sup>17</sup> Tom Allen / Robin Widdison, op. cited, page 42.

“into undistinguished copies”<sup>18</sup>. And if we consider mobile agents then we could speak of “ubiquitous agents” that can multiply themselves into undistinguished copies in order to distribute tasks among each other and to coordinate their own activities<sup>19</sup>. That would inevitably put a tremendous problem relating to the domicile of the electronic agent. In order to be a legal person, the agent must have a residence or domicile. But mobile agents “do not have an established physical location”<sup>20</sup>.

Another relevant question would relate to “patrimonial duties”. In order to exist, a legal person must have, or at least be capable of having a patrimony. But does it make any sense to attribute a patrimony to an electronic device? Can we imagine a situation of these electronic devices having “patrimonial rights and also be subject to liability for negligent acts or omissions, just as natural persons would”?<sup>21</sup> Is it possible for us to state that an electronic device acted in good faith, in bad faith, with “knowledge or ignorance of certain circumstances”?<sup>22</sup>. And how can electronic agents be sued in Court?

Of course some of these difficulties are possible to overcome. But laws would have to be prepared and approved accordingly. A non natural legal person surely must be object of a constitution / declaration act and eventually of registration<sup>23</sup>. Through registration procedure it could be attributed a physical location to the agent, and also a banking deposit, functioning as sort of an agent’s patrimony<sup>24</sup> in order to ensure that it could fulfill its financial obligations and liabilities. As Giovanni Sartor refers<sup>25</sup> “this fund would represent a warranty for the counterparties, who would need to know its amount before finalising a contract with the agent”. A minimum amount of “capital” should be established, similarly to what happens to commercial corporations. Besides that, maybe the law should establish also a compulsory Insurance regime for Intelligent Agent’s activities. And of course, the electronic agent should be attributed a way of being represented in case of legal actions in Court or legal executive procedures.

#### 4. Agents and Representation

It must be also considered the issue of the so-called “agency paradigm” and the possibility of its application to software agents. On this point, a first note must be

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<sup>18</sup> G. Sartor, op cited.

<sup>19</sup> G. Sartor, “Gli agenti software: nuovi soggetti del ciberdiritto?” in *Gli agenti software: nuovi soggetti del ciberdiritto? Contratto e impresa*: (2002), pages 57-91.

<sup>20</sup> G. Sartor, “Agents in Cyberlaw”, point 3.

<sup>21</sup> E. Weitzenboeck “Electronic agents and the formation of contracts”, page 9 and J. F. Lerouge op cited, page 6.

<sup>22</sup> F. Miglio, T. Onida, F. Romano, S. Santoro, “Electronic agents and the law of agency” in <http://www.cirfid.unibo.it/~lea-02/pp/DemiglioOnidaRomanoSantoro.pdf>, point 5. and E. Weitzenboeck, “Electronic Agents and Contract Performance: Good Faith and Fair Dealing” in . University of Oslo, Norway, Faculty of Law (2002).

<sup>23</sup> E. Weitzenboeck “Electronic agents and the formation of contracts”, page 9. and Tom Allen / Robin Widdison, op. cited, page 42.

<sup>24</sup> J. F. Lerouge op cited, page 11.

<sup>25</sup> G. Sartor, “Agents in Cyberlaw”, point 3.

expressed. The word “agent”, commonly used in American doctrine, has not necessarily correspondence to the Civil Law concept of “Agence”<sup>26</sup>. In Portugal, a contract of agency is defined as “contract by which one of the parties (the agent) is obliged to promote on behalf of the other (the principal) the celebration of contracts in a certain area or with a determined circle of costumers, in an autonomous way and under retribution”. So, the agent acts on behalf of the principal but, normally, will not have representation powers, and will not even sign contracts - those will be directly signed by the principal)<sup>27</sup>. So, to avoid word confusion, we will rather speak of representation, exposing a brief summary of its possibilities in order see whether its application to “human-electronic agents” relation is possible or not.

Several times, declarations with legal effects are not directly stated by those in whose legal sphere those effects are to be produced<sup>28</sup>. Someone acts in order to get legal effects produced in the legal sphere of someone else. Yet, under this broad concept of “representation” we can indeed imagine a whole lot of quite different situations.

To begin with, we must state the difference between “direct representation” and “indirect representation”. In the latter, the indirect representative acts in the interest, but not in the name, of someone else, contrarily to what happens in direct representation<sup>29</sup>. As a consequence of this, in indirect representation the legal effects are produced in the legal sphere of the representative. So, in order to transfer any rights to the principal, there must be “a second act of transmission” of rights between the “representative” and the principal<sup>30</sup>. Actually, indirect representation, while commonly used for commercial purposes, is not really “representation”. For there to be representation it is required that the declaration is effected in the name of someone else<sup>31</sup>. However, in commercial transactions, the idea of electronic intelligent agents acting as “indirect representatives” could be exploited, provided that these could in some way be considered as “legal persons”.

Different from representation is also the concept of the “messenger” or “nuntius”. This is the case of the declaration being effected by someone who acts as a mere instrument for a transmission, just operating mechanically a transmission of a previously disposed declaration of someone else<sup>32</sup>. Not having to reason or to decide anything, the “nuntius” does not have to have legal capacity at all, it is enough a “capacity to transmit the declaration of will of the dominus”<sup>33</sup>. An interesting

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<sup>26</sup> F. Miglio, T. Onida, F. Romano, S. Santoro, op cited, point 3.

<sup>27</sup> M. H. Brito, “O contrato de agência” in “Novas perspectivas do direito comercial”, Almedina, 1988 pages 114-115 and F. P. Jorge “O mandato sem representação” Almedina, 2001, page 238.

<sup>28</sup> M. D. Andrade “Teoria Geral da Relação Jurídica”. Coimbra Editora, vol. II, (1983), pág. 285.

<sup>29</sup> M. D. Andrade, op cited page 286.

<sup>30</sup> J. O. Ascensão “Direito Civil e Teoria Geral” in vol. II, Coimbra Editora (1999), page 219.

<sup>31</sup> M. D. Andrade, op cited page 301 and J. O, Ascensão, op cited page 242.

<sup>32</sup> M. D. Andrade, op cited pages 291-292 and H. E. Hörster “A Parte Geral do Código Civil Português – Teoria Geral do Direito Civil”, Livraria Almedina, Coimbra, 1992, page 479 and J. O, Ascensão, op cited pages 216-217.

<sup>33</sup> M. D. Andrade, op cited page 292.

question is whether a computer or electronic agent may be considered a “nuntius”. Within a functional analysis of the acting, it looks quite reasonable to consider that possibility.

Direct representation can be based either in law – legal representation -- or in the agreement of the parties – voluntary representation<sup>34</sup>. In voluntary representation, at least in civil law countries, it is not absolutely necessary that the representative has full legal capacity, but it surely is required that he portrays the “natural capacity of understanding and wanting”<sup>35</sup>, because the representative actuates the will of the principal. Anyway, the representative must have “the capacity of understanding and wanting required by the nature of the transaction to be effected”<sup>36</sup>. But, as full legal capacity is not required, the representative may intervene – in the name of someone else -- in legal acts that probably would not be effective in case of him intervening in his own name<sup>37</sup>. Anyway, the representative must however have a minimum of capacity to understand the configuration and possible consequences of the act to be performed. As Anthony Bellia Jr. puts it “A person with limited capacity, such as a minor, may be an agent, but a person with no capacity whatever may not”<sup>38</sup>. Of course one might wonder whether an intelligent software agent might have that minimum of capacity to perform representative acts. No doubt that this kind of devices will probably have a much greater capacity to foresee all the consequences of its acting than any minor. Nevertheless, there is still a difficulty impeding the consideration of intelligent software agents as real representatives: they have no legal personality. Although most legal systems allow “an incapable person to act as an agent, such an agent is a person nonetheless”<sup>39</sup> but that is not – for the moment – the situation of intelligent electronic devices.

For representation to exist there must be some requisites: the declaration or acting must be effected in the name of someone else and the representative must declare his own will – and not just transmit a will expressed by someone else<sup>40</sup> -- ; and furthermore the person acting as a representative must have powers of representation<sup>41</sup> or authority. “An agent has actual authority to contract on behalf of a principal when the principal has manifested consent to the agent that the agent do so”<sup>42</sup>. If those requisites are fulfilled, the declaration or acting will produce effects in the legal sphere of the principal – this one will be legally bound by the declaration<sup>43</sup>.

But if someone, acting as “representative” produces a declaration, in the name of someone else, but lacks the representation powers, the declaration will result

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<sup>34</sup> M. D. Andrade, op cited page 288.

<sup>35</sup> M. D. Andrade, op cited page 292.

<sup>36</sup> H. E. Hörster, op cited page 484.

<sup>37</sup> H. E. Hörster, op cited page 177.

<sup>38</sup> Bellia Jr. A.: Contracting with electronic agents. In: “Emory Law Journal”, vol. 50, Nr. 4, Fall (2001), page 1063, note 83.

<sup>39</sup> E. Weitzenboeck “Electronic agents and the formation of contracts”, pages 11-12.

<sup>40</sup> M. D. Andrade, op cited pages 291-292.

<sup>41</sup> M. D. Andrade, op cited page 302 and L. A. C. Fernandes, “Teoria Geral do Direito Civil” vol.II, 2ª edição, Lex, Lisboa (1996), page 168,

<sup>42</sup> A. Bellia Jr, op cited, page 1059.

<sup>43</sup> H. E. Hörster, op cited page 479.

ineffective towards the principal<sup>44</sup>. Yet, there is always a possibility for the principal to ratify the declaration. Through ratification, the legal effects of the declaration are produced since the moment of the declaration itself<sup>45</sup>. Ratification becomes thus a sort of “supervenient legitimating” of the act of representation<sup>46</sup>.

The consideration of a “representation without powers” and of ratification could lead us to some speculative inferences on the possibilities of having electronic agents as “not empowered” representatives, and so, of having the principal ratifying the declarations or contracts entered into by the electronic agent. The question is whether or not we might consider an intelligent electronic agent capable of representing someone in some act or contract, even without having the required powers – and the electronic device can not have powers of representation, not because of any lack of capacity for wanting and understanding<sup>47</sup>, but only because it is not yet considered as legal person. Emily Weitzenboeck<sup>48</sup> refers to a “theory of ratification” under which, in case of an electronic agent entering into an – obviously unauthorized – transaction with some third party, it would then be possible “that the person who initiated the electronic agent might later affirm its operations by ratifying them”. This has been suggested as a way of encompassing the difficulties in considering the acts of electronic agents as legal acts. But the point is very doubtful. How should the legal system consider an act or declaration enacted by an electronic agent? Most probably it would qualify it as non-existent. And how could a non-existent act be ratified?

In direct representation it must still be considered the possibility for the representative of delegating in someone else his powers, but only in case that it is allowed by the principal<sup>49</sup>, or that it might arise from the act of “procuración”<sup>50</sup> – the act by which “someone attributes to someone else, voluntarily, representative powers”. But the representative may well look for help from other agents – it is allowed for the representative to look for cooperation partners to help him fulfill his representative duties<sup>51</sup>.

All this could be very interesting when applied to electronic agents, having in mind the referred possibility of electronic agents cooperating among themselves or even multiplying or copying themselves in order to distributing or allocating tasks<sup>52</sup>. But this scenario also presents a great deal of difficulties, considering that this might precisely constitute one of the bigger difficulties in the identification of electronic agents and thus in their eventual personification. Anyway, if the agents could be considered as legal persons, it seems obvious that they would be empowered to look for the cooperation required for the fulfillment of its designed goals and finalities. But that would require legal personality for electronic agents. And, although it might look really exciting, the truth is that we are not yet there.

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<sup>44</sup> M. D. Andrade, op cited page 302.

<sup>45</sup> H. E. Hörster, op cited page 488.

<sup>46</sup> L. A. C. Fernandes, op cited page 180.

<sup>47</sup> F. A. Pires de Lima, J. M. Varela, “Código Civil Anotado”, vol. I, Coimbra Editora (1967), commentary on article 263.

<sup>48</sup> E. Weitzenboeck “Electronic agents and the formation of contracts”, page 13.

<sup>49</sup> J. O. Ascensão, op cited page 233.

<sup>50</sup> H. E. Hörster, op cited page 487.

<sup>51</sup> F. A. Pires de Lima, J. M. Varela, op cited, commentary on article 264.

<sup>52</sup> G. Sartor, “Gli agenti software: nuovi soggetti del ciberdiritto?”.

## 5 Conclusion

Anyway, if the agents could be considered as legal persons, it seems obvious that they would be empowered to look for the cooperation required for the fulfillment of its designed goals and finalities. But that would require legal personality for electronic agents. And, although it might look really exciting, the truth is that we are not yet there. For the moment it is not possible to consider the “electronic agents” as legal persons. And yet, they exist and become more and more available for autonomous work in the electronic trading. Should we accept the fiction of considering them as mere tools the humans are using, even knowing humans may not be able to control them? Or is there another solution? For the moment, and considering that European jurisdictions have not yet decided what regime to adopt concerning electronic agents, I would mention like to appoint the optimistic suggestion of Giovanni Sartor:

“An easier and less risky way for the agent to make contracts... and to limit the liability of the user (at least, to some extent) is available. This consists in creating companies for on-line trading, which would use agents in doing their business. Such agents would act in the name of a company, their will would count as the will of the company, their legally relevant location would be the company’s domicile, and creditors could sue the company for obligations contracted by those agents. The counterparties of an agent could then be warranted by the capital of the company and by the legal remedies available towards defaulting commercial companies”<sup>53</sup>.

Of course further possibilities may be exploited. For instance, to foresee a new legal approach of the contract itself, considering not the agreement of wills but the result of the acts of machines<sup>54</sup> or devices predisposed by human or corporate bodies. Or even to consider informatics systems as instruments capable of creating new forms of life<sup>55</sup>, maybe new germs of legal personhood, even a sort of limited personhood, as it happens with some legal “realities” not personified but, for instance, capable of some kind of “process legitimacy” to be in Court, to demand and to be sued, such as it happens with branches, agencies or other commercial establishments<sup>56</sup> or even condominium<sup>57</sup>.

It is obvious that the existing legal norms are not fit for such an endeavouring challenge as the appearance of intelligent electronic agents in legal relations<sup>58</sup>. The debate is still beginning. New developments are arising in the field of Artificial Intelligence such as the “embodying” of electronic “conversational agents”<sup>59</sup>. Virtual persons will get more and more sophisticated, but also more identifiable. An ultimate choice must be made between the fiction of considering agents acts as deriving from human’s will and the endeavour of finding new ways of considering the electronic devices own will and responsibility. And maybe in the virtual world – as it happened

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<sup>53</sup> G. Sartor, “Agents in Cyberlaw”.

<sup>54</sup> D. Bourcier “ De l’intelligence artificielle à la personne virtuelle: émergence d’une entité juridique? “ in *Droit et Société*, 49-2001.

<sup>55</sup> D. Bourcier op cited.

<sup>56</sup> Joakim S. T. Øren, “Electronic agents and the notion of establishment” in [http://www.eclip.org/documentsII/elecagents/notion\\_of\\_establishment.pdf](http://www.eclip.org/documentsII/elecagents/notion_of_establishment.pdf)

<sup>57</sup> L. A. C. Fernandes, op cited, vol. I page 436.

<sup>58</sup> F. Miglio, T. Onida, F. Romano, S. Santoro, op cited, point 5.

<sup>59</sup> G. Ball and J. Breese, op cited.



in the real world about corporate bodies – fictions will definitely be replaced by a more realistic approach of considering the challenging technical possibilities of software agents as new entities definitely requiring a particular legal approach in order to enhance the use of electronic commerce in a global world.

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