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Forthcoming Papers

G. Pinkas, Reasoning, nonmonotonicity and learning in connectionist networks that capture propositional knowledge

The paper presents a connectionist framework that is capable of representing and learning propositional knowledge. An extended version of propositional calculus is developed and is demonstrated to be useful for nonmonotonic reasoning, dealing with conflicting beliefs and for coping with inconsistency generated by unreliable knowledge sources. Formulas of the extended calculus are proved to be equivalent in a very strong sense to symmetric networks (like Hopfield networks and Boltzmann machines), and efficient algorithms are given for translating back and forth between the two forms of knowledge representation. A fast learning procedure is presented that allows symmetric networks to learn representations of unknown logic formulas by looking at examples. A connectionist inference engine is then sketched whose knowledge is either compiled from a symbolic representation or learned inductively from training examples. Experiments with large scale randomly generated formulas suggest that the parallel local search that is executed by the networks is extremely fast on average. Finally, it is shown that the extended logic can be used as a high-level specification language for connectionist networks, into which several recent symbolic systems may be mapped. The paper demonstrates how a rigorous bridge can be constructed that ties together the (sometimes opposing) connectionist and symbolic approaches.

M. Kaminski, A comparative study of open default theories

The paper examines the definitions of open default theories known from the literature. First it is shown that none of them is satisfactory either for formal or for intuitive reasons. Next a new approach is considered. It is free from the obvious deficiencies of the known definitions, but possesses their positive properties.

M. Shanahan, A circumscriptive calculus of events

A calculus of events is presented in which domain constraints, concurrent events, and events with nondeterministic effects can be represented. The paper offers a nonmonotonic solution to the frame problem for this formalism that combines two of the techniques developed for the situation calculus, namely causal and state-based minimisation. A theorem is presented which guarantees that temporal projection will not interfere with minimisation in this solution, even in domains with ramifications, concurrency, and nondeterminism. Finally, the paper shows how the formalism can be extended to cope with continuous change, whilst preserving the conditions for the theorem to apply.

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P.M. Dung, On the acceptability of arguments and its fundamental role in nonmonotonic reasoning, logic programming and *n*-person games

The purpose of this paper is to study the fundamental mechanism, humans use in argumentation, and to explore ways to implement this mechanism on computers.

We do so by first developing a theory for argumentation whose central notion is the acceptability of arguments. Then we argue for the "correctness" or "appropriateness" of our theory with two strong arguments. The first one shows that most of the major approaches to nonmonotonic reasoning in AI and logic programming are special forms of our theory of argumentation. The second argument illustrates how our theory can be used to investigate the logical structure of many practical problems. This argument is based on a result showing that our theory captures naturally the solutions of the theory on *n*-person games and of the well-known stable marriage problem.

By showing that argumentation can be viewed as a special form of logic programming with negation as failure, we introduce a general logic-programming-based method for generating meta-interpreters for argumentation systems, a method very much similar to the compiler-compiler idea in conventional programming.

V. Akman, Book Review of *Formalizing Common Sense: Papers by John McCarthy* (V. Lifschitz, ed.)

F. Giunchiglia, An epistemological science of common sense: a review of *Formalizing Common Sense: Papers by John McCarthy* (V. Lifschitz, ed.)

Special Volume on Vision
(N. Ahuja and R. Horaud, Guest Editors)

R. Basri and E. Rivlin, Localization and homing using combinations of model views

Z. Zhang, R. Deriche, O. Faugeras and Q.-T. Luong, A robust technique for matching two uncalibrated images through the recovery of the unknown epipolar geometry

A. Zisserman, D. Forsyth, J. Mundy, C. Rothwell, J. Liu, N. Pillow, 3D object recognition using invariance

J.K. Tsotsos, S.M. Culhane, W.Y.K. Wai, Y. Lai, N. Davis and F. Nuflo, Modeling visual attention via selective tuning

R.P.N. Rao and D.H. Ballard, An active vision architecture based on iconic representations

K.N. Kutulakos and C.R. Dyer, Global surface reconstruction by purposive control of observer motion

Y. Yang and A.L. Yuille, Multilevel enhancement and detection of stereo disparity surfaces

D.A. Reece and S.A. Shafer, Control of perceptual attention in robot driving

Il-Pyung Park and J.R. Kender, Topological direction-giving and visual navigation in large environments

N. Gupta and L. Kanal, 3-D motion estimation from motion field

A. Blake, M. Isard and D. Reynard, Learning to track the visual motion of contours

M. Otte and H.-H. Nagel, Estimation of optical flow based on higher order spatiotemporal derivatives in interlaced and non-interlaced image sequences

R. Mohr, B, Boufama and P. Brand, Understanding positioning from multiple images

H. Buxton and S. Gong, Visual surveillance in a dynamic and uncertain world

I.D. Reid and J.M. Brady, Recognition of object classes from range data