

Position Statement:
KR + ML = SRL, the New AI

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About 25 years ago, research in machine learning broke firmly away from that in knowledge representation. ML took along most work in perception (language and vision), while KR was left to a rather mismatched assortment of people in automated planning, formal methods, cognitive science, and databases.

Fast forward to the recent past. Purely bottom up, ML-driven work in perception has reached a point of diminishing returns; progress is measured by fractions of a percent, and it becomes unclear whether there is much signal left to be wrested from the noise. Meanwhile, KR has been stymied by the scale and variety (both logical and probabilistic) of commonsense knowledge.

The way forward is the reunion of ML and KR – what is now called “statistical relational learning”, or SRL. We need not wait for ML to induce all the conceptual structures that brains developed over billions of years of evolution – much can manually encoded, and much can be extracted from natural language texts. At the same time, ML can fill in that which is difficult to estimate (e.g. precise probabilities) or not available to conscious introspection (e.g. low level perceptual processes).

SRL is not a finished thing. No current SRL language and associated reasoning and learning methods, for example, provide a fully satisfactory account of open or infinite domains, modal attitudes, or relevance. Still, a growing set of tools are in place, “prior knowledge” is no longer verboten at machine vision or computational linguistics conferences, and no one pretends that knowledge representation means only representing logical information.