Asynchronous Reasoning and Learning in Real-Time AI Systems

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Abstract:
We present a novel AI architecture for resource-bounded intelligent agents, where reasoning and learning are performed in parallel, asynchronous processes. Instead of a reasoning step where the system solves a problem, followed by a learning step where the system learns from the experience, the system is continuously performing both functions at the same time. The reasoning process uses knowledge structures that encode the best available knowledge at hand, thereby making progress towards the system's goals. Simultaneously, the learning process modifies that knowledge *in situ*, even while it is being used for reasoning. A metareasoning system is used to reason about the system's performance and the reasoning/learning tradeoff, deciding when to learn and how to allocate its resources depending on available goals and deadlines. This idea is being developed within a Case-Based Reasoning framework. This is joint work with Prof. Charles Isbell of the College of Computing at Georgia Institute of Technology.