Georgia Tech Research Institute

Lead Investigator
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With
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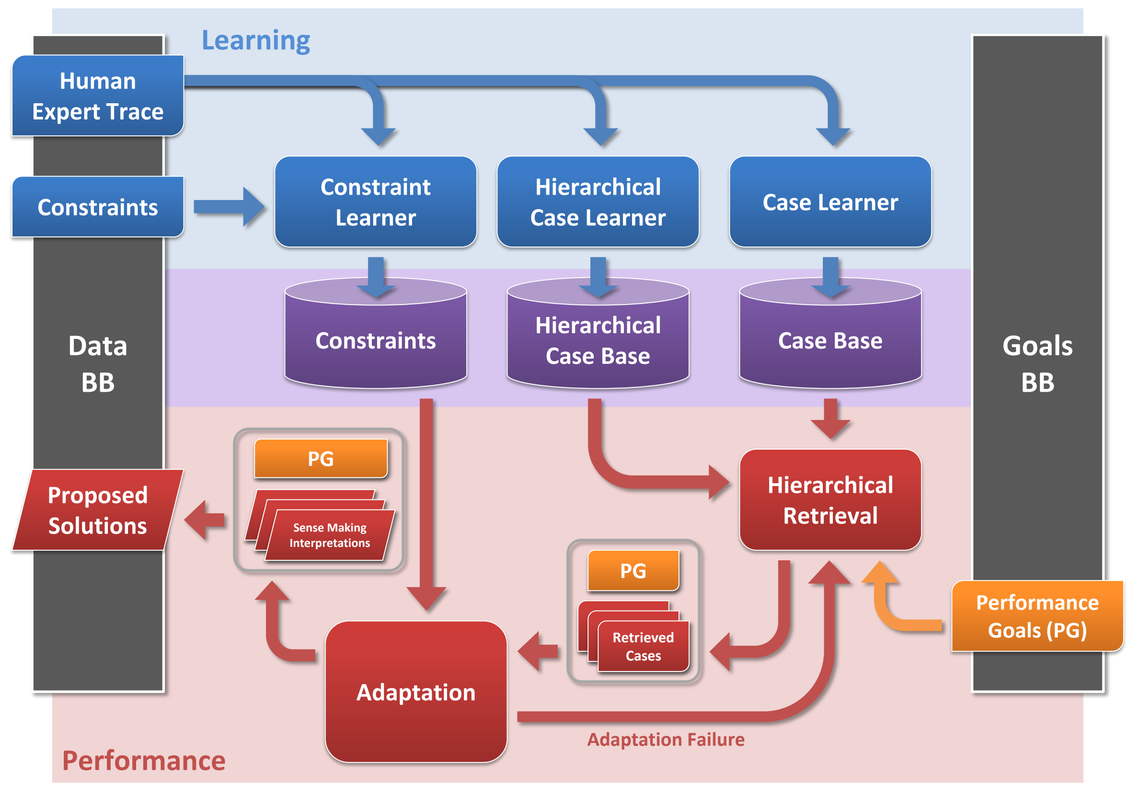
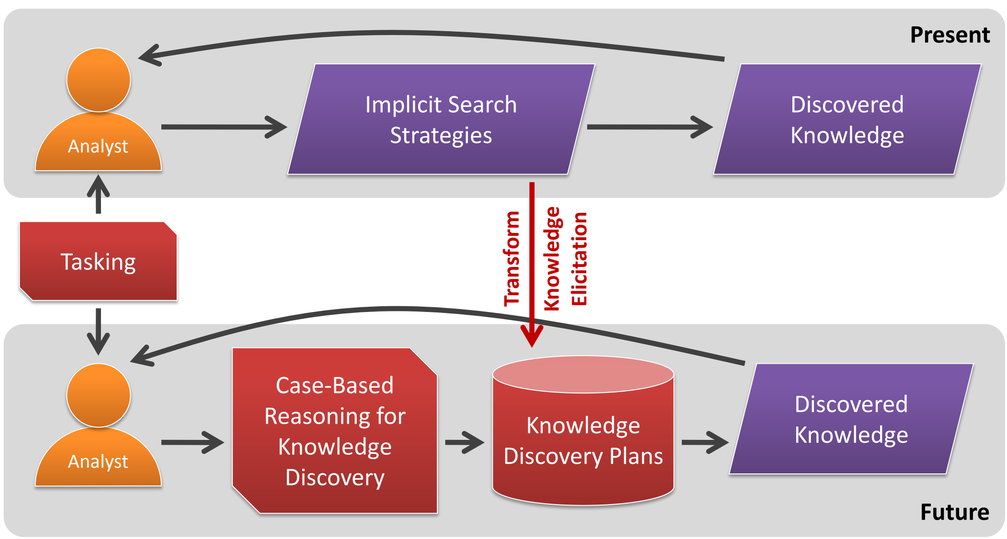
Qualifications and Capabilities



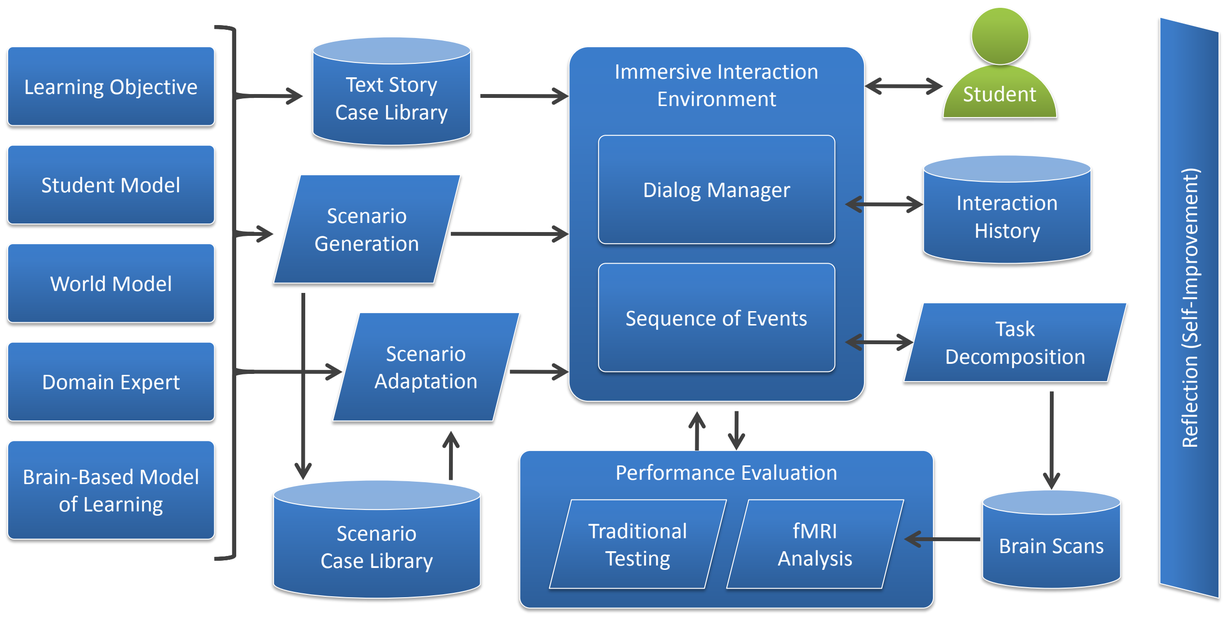
DARPA Integrated Learning Project

GTRI collaborated with a large team of researchers on the DARPA Integrated Learning project, which had as its goal to research the integration of multiple machine learning paradigms to learn to solve a problem by observing an expert in a single problem-solving session. GTRI, collaborating with the Georgia Tech College of Computing, developed a case-based learner & reasoner to perform as part of the integrated learning activity.



Case-based Reasoning for Knowledge Discovery

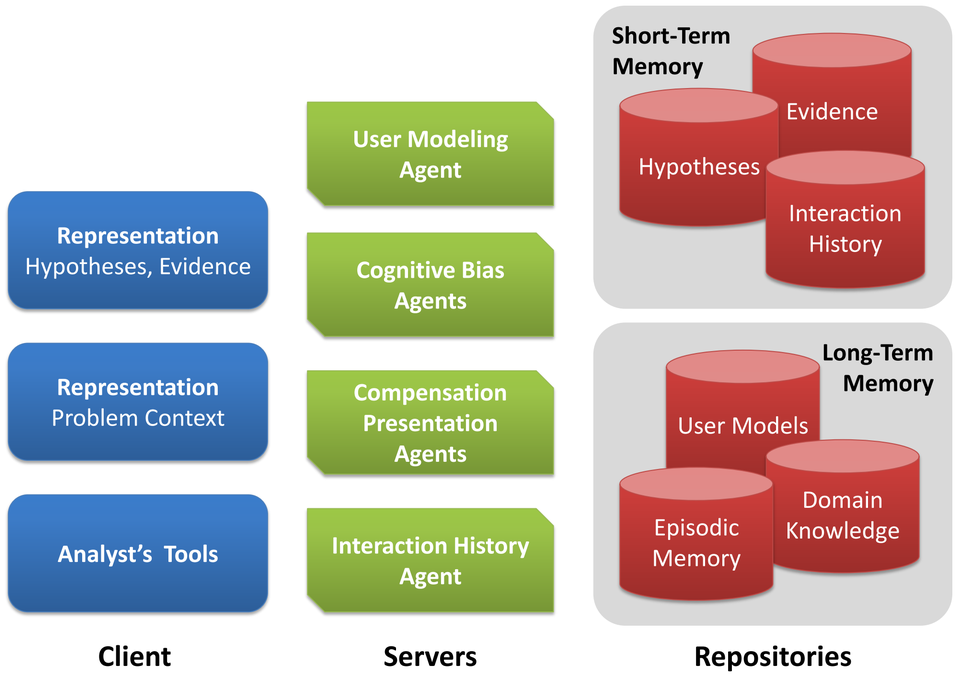
GTRI investigated analytic strategies used in the process of discovering new knowledge, as part of the ARDA/DTO Novel Intelligence from Massive Data (NIMD) program. We designed and prototyped a software tool for intelligence analysts that uses case-based reasoning and case-based planning to plan and execute complex interdependent Internet searches to aid analysts in discovering information relevant to a tasking. Our case-based reasoning approach represents best-practice analytic strategies in the form of domain specific search plans which are stored in a case library. The prototype matches an analyst's current problem with the most similar problem in the case library and adapts the associated search plan to solve the current problem.



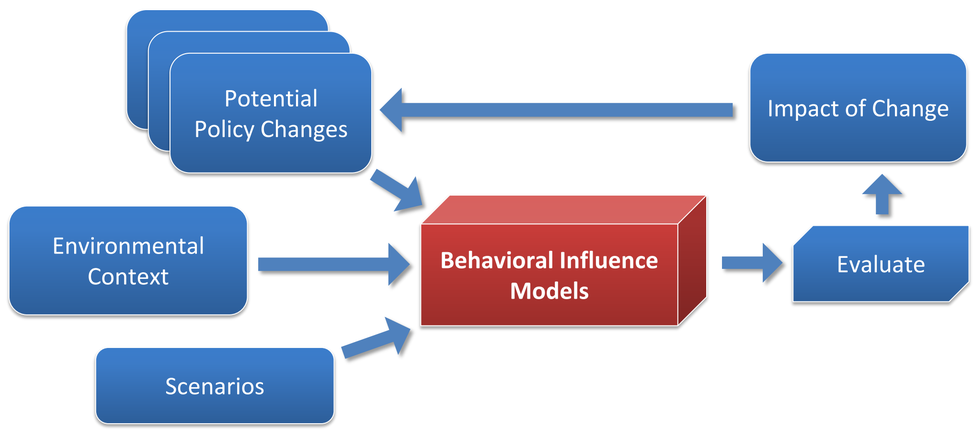
Brain-Based Cognitive Architecture for Training (BBCAT)

- An architecture based on neuro-scientific models of student reasoning, learning, and emotion.
- Integrate lessons from brain-based models of human learning and reasoning with student modeling, teaching and learning theories, and scenario generation
- Design of a system that can:
  - Assess an individual's learning and emotion
  - Dynamically adapt training activities to increase training effectiveness

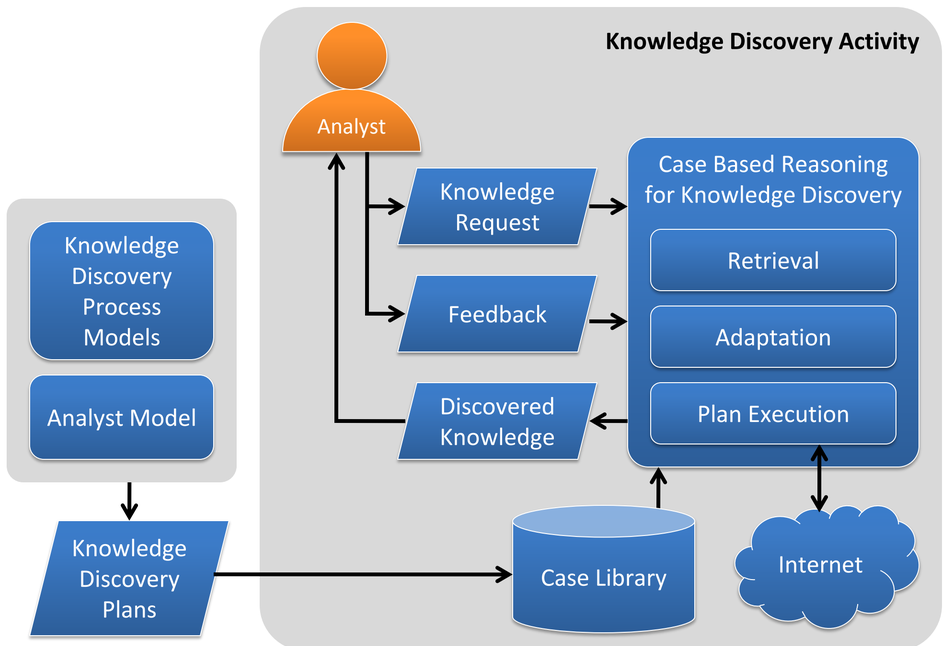
Research Areas of Interest



Monitoring for Cognitive Biases and Radicalization Influence



What-If Analysis of Policy Influence on Beliefs



Case-Based Reasoning for Knowledge Discovery (CBR for KD) Capabilities Cases

An analyst for a political party may have a task that involves predicting potential targets of organization *X* which produces ads against candidates it disagrees with. One aspect of this analysis may be to understand the views, beliefs and intent of this organization that may motivate the organization's choice of particular targets. The analyst may need to look at an organization from several points of view:

- What are the political beliefs and associations of the organization and its leaders?
- What are the religious beliefs and religious associations?
- What are the beliefs on particular issues of the organization's leaders?
- What are the financial associations of this organization, e.g., who provides funds to the organization and what causes or activities does this organization fund?
- What cultural factors influence the conceptual structures that lead to radicalization?
- What characteristics of conceptual structures permit resistance to influence?

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