Learning-Reasoning Lattices in Tele-health

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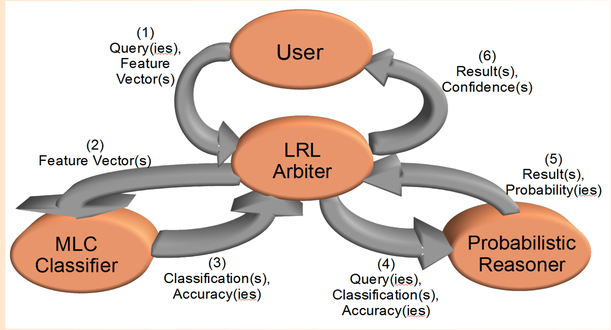
1. What is a Learning-Reasoning Lattice?

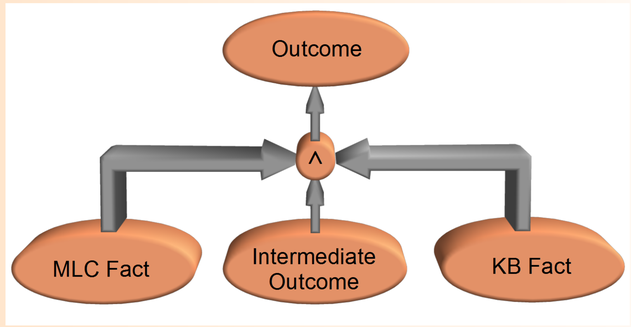


- Methodology for interaction between Machine Learning and Representation and Reasoning Systems

- Dynamically developed for any number of MLC and PRR subsystems needed

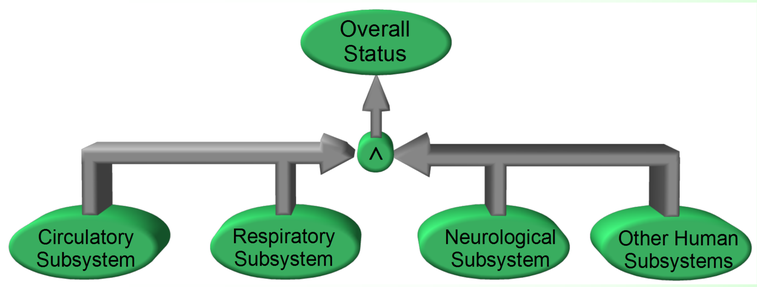
- Reduces errors incurred from cross system development

2. The LRL Isomorphic Theorem



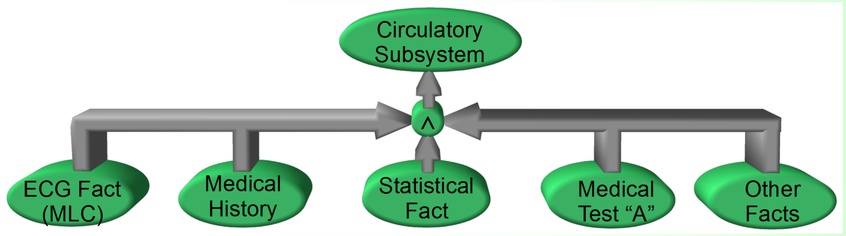
- Proves that an LRL has a computational complexity less than or equal to the most complex machine learning classifier used.
- When a level has an MLC Fact, either that fact, or the Intermediate Outcome is the more difficult to solve. (KB Facts are constant time on a level, as they are provided)
- The previous can be reapplied until a level is reached without an intermediate outcome. On that level, if an MLC Fact is present, it's the more difficult. The most difficult MLC Fact is system difficulty.

3. The Tele-health LRL



- Capture the status of a patient's overall health by combining the work of many specialists.
- System by medical professionals, for medical professionals
  - Specialists develop the rule systems
  - Current medical devices are attached and readings taken
  - MLC Facts fire rules previously developed
- Move from corrective to preventative care.
- Develop cross-system medical testing.
- Remove the requirement for a professional's visual inspection

4. The ECG LRL Isomorph



- From the LRL Iso. Theorem, the solution to a Telehealth system is only as difficult as the MLC systems it uses. ECG's use Support Vector Machines, with difficulty $O(n^2)$
- A heart specialist would develop the rules invovled in this sub-system.
- Diagnoses gathered here are intermediate outcomes for the overall personal health. Professionals determine actions based on this and other possible diagnoses in other subsystems.