Overview of AI application areas

AI application areas

- Game Playing
  - Much of the early research in state space search was done using common board games such as checkers, chess, and the 15-puzzle
  - Games can generate extremely large search spaces. Theses are large and complex enough to require powerful techniques for determining what alternative to explore

AI application areas

- Automated reasoning and Theorem Proving
  - Theorem-proving is one of the most fruitful branches of the field
  - Theorem-proving research was responsible in formalizing search algorithms and developing formal representation languages such as predicate calculus and the logic programming language

AI application areas

- Expert System
  - One major insight gained from early work in problem solving was the importance of domain-specific knowledge
  - Expert knowledge is a combination of a theoretical understanding of the problem and a collection of heuristic problem- solving rules

AI application areas

- Expert System
  - Current deficiencies:
    - **Lack of flexibility**; if human cannot answer a question immediately, he can return to an examination of first principle and come up something
    - **Inability to provide deep explanations**
    - **Little learning from experience**

AI application areas

- Natural Language Understanding and Semantics

AI application areas

- Modeling Human Performance
  - Capture the human mind (knowledge representation)

AI application areas

- Robotics

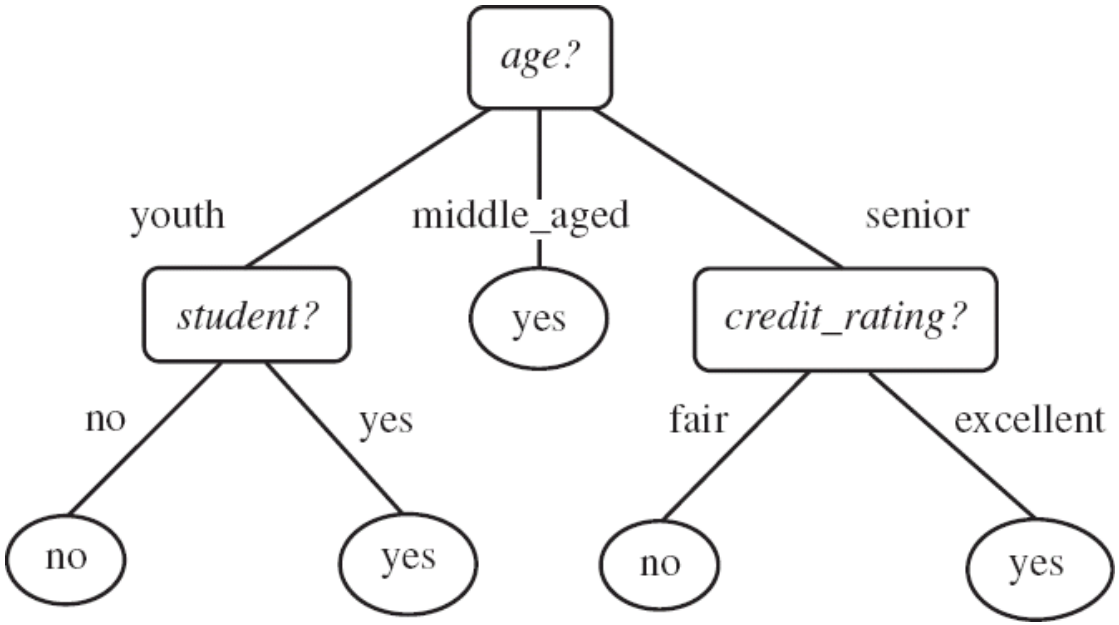
AI application areas

- Simon's definition of **"machine learning"**

  ``Learning denotes **changes** in the system that are **adaptive** in the sense that they enable the system to do the same task or tasks drawn from the same population **more effectively the next time"**

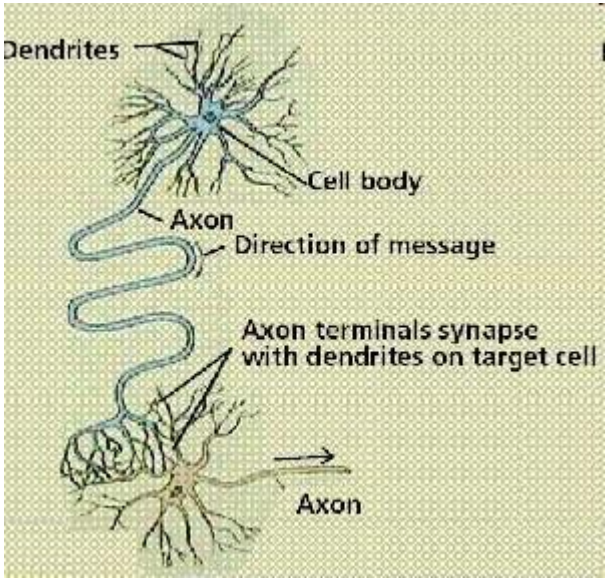
  -- Machine Learning I, 1993, Chapter 2.

Decision Tree Example



AI application areas

- Optimizations
  - ACO
  - Swarm intelligence
  - Genetic Algorithm



Demos

Demos

https://cis.k.hosei.ac.jp/~rhuang/

1.Searching Algorithm

2.Game Algorithm
3.Maze Robot 4.Wumpus World 5.Smart Garden
6.Automatic Chatting

Impact applications

1. Deep Blue was a chess-playing computer developed by IBM

2. Watson is an artificially intelligent computer system capable of answering questions posed in natural language, developed in IBM's DeepQA project.

3. Deep learning is a set of algorithms in machine learning that attempt to learn layered models of inputs, commonly neural networks

ASSESMENT

Please find the top 3 most impact AI applications.

Submission:

Submit your answers in summary