



CSE 315

Artificial Intelligence

Topic - 1: Introduction

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What Is AI?

- AI (Artificial Intelligence) is a branch of computer science concerned with the study and creation of computer systems that exhibit some form of intelligence:
 - systems that learn new concepts and tasks,
 - systems that can reason and draw useful conclusions about the world around us,
 - systems that can understand a natural language or perceive and comprehend a visual scene,
and
 - systems that perform other types of feats that require human types of intelligence.
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Few Definitions of AI

Systems that think like humans	Systems that think rationally
Systems that act like humans	Systems that act rationally



Foundations of AI

- ❑ Philosophy (428 B.C. – present)
 - ❑ Can formal rules be used to draw valid conclusions?
 - ❑ How does mental mind arise from a physical brain?
 - ❑ Where does knowledge come from?
 - ❑ How does knowledge lead to action?
 - ❑ Mathematics (800 B.C. – present)
 - ❑ How are the formal rules to draw valid conclusions?
 - ❑ What can be computed?
 - ❑ How do we reason with uncertain information?
 - ❑ Algorithms
 - ❑ Intractability
 - ❑ NP-completeness
 - ❑ probability
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Foundations of AI

- ❑ Neuroscience (1861 – present)
 - ❑ How do brain process information?
 - ❑ Neurons
- ❑ Economics (1776 – present)
 - ❑ How do we make decisions so as to maximize payoff?
 - ❑ How should we do this when others may not go along?
 - ❑ How should we do this when the payoff may be far in the future?
 - ❑ Decision theory (probability theory + utility theory)



Foundations of AI

- ❑ Computer Engineering (1940 – present)
 - ❑ How can we build an efficient computer?
 - ❑ Cybernetics (1948 – present)
 - ❑ How can artifacts operate under their own control?
 - ❑ Psychology (1879 – present)
 - ❑ How do human and animals think and act?
 - ❑ Linguistics (1957 – present)
 - ❑ How do languages relate to thought?
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History of AI

- The gestation of AI (1943 – 1955)
 - The birth of AI (1956)
 - Early enthusiasm, great expectations (1952 – 1969)
 - A dose of reality (1966 – 1973)
 - Genetic algorithm
 - Knowledge base systems (1969 – 1979)
 - AI becomes an industry (1980 – present)
 - The return of neural network (1986 – present)
 - AI becomes a science (1987 – present)
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The State of the Art

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- ❑ Autonomous planning and scheduling
 - ❑ Game playing
 - ❑ Autonomous control
 - ❑ Medical diagnosis
 - ❑ Logistic planning
 - ❑ Robotics
 - ❑ Language understanding and problem solving
 - ❑ etc.
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Introduction to Prolog

- Prolog: **P**rogramming in **L**ogic
 - Prolog is a logic programming language.
 - Programming in Prolog is accomplished by creating a data base of facts and rules about objects, their properties, and their relationships to other objects.
 - Queries can be posed about the objects and valid conclusions will be determined through a form of inferencing control known as resolution.
 - Facts: sister(sarah, bill).
 - parent(ann, sam).
 - parent(joe, ann).
 - male(joe).
 - female(ann).
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Introduction to Prolog

- Rules:
 - `Grandfather(X, Z) :- parent(X,Y), parent(Y,Z), male(X).`
 - For all X, Y, and Z:
 - X is the grandfather of Z
 - IF X is the parent of Y, and Y is the parent of Z and X is a male
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