

CSCI 136: Fundamentals of Computer Science II

Artificial Intelligence 1

Michele Van Dyne

MUS 204B

mvandyne@mtech.edu

<https://katie.mtech.edu/classes/csci136>

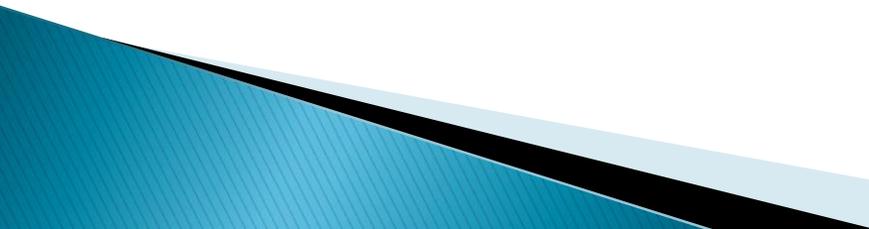
Outline

- ▶ What is Artificial Intelligence
 - ▶ How do People Learn?
 - ▶ Case Based Reasoning (CBR)
 - Where does CBR apply?
 - ▶ Rule Based Reasoning
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What is Artificial Intelligence?

- ▶ Autonomous
 - ▶ Ability to Learn
 - ▶ Could be a pathfinder, with respect to the maze
 - ▶ Solves problems that are “computationally impossible”
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How do People Learn?

- ▶ Record experiences
 - ▶ Watch other people (learn by example)
 - ▶ Read about it / be told
 - ▶ Multiple AI's teach each other
 - ▶ Trial and error
 - ▶ Download and learn from databases
 - ▶ When something goes wrong, an AI should:
 - Recover
 - Learn not to do that again
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Case Based Reasoning / Learning (CBR)

- ▶ Similar to how physicians and attorneys work
 - Look for similarities between the current situation and past cases
 - Find the n most similar past cases
 - For each case,
 - Look at what action was taken
 - Look at whether that action was successful or not
 - If successful, take that action in the current case
 - If not... perhaps a random action
 - Record the current situation and action taken
 - When results of the current action are known, record that also (success or failure)

Where Does CBR Apply?

- ▶ Record experiences (CBR)
- ▶ Watch other people (learn by example) (CBR)
- ▶ Read about it / be told (CBR or Standard Programming)
- ▶ Multiple AI's teach each other (CBR)
- ▶ Trial and error (Exploration Learning, but results can be recorded for use in CBR)
- ▶ Download and learn from databases (CBR if used directly, data mining if rules/patterns are extrapolated)
- ▶ When something goes wrong, an AI should:
 - Recover
 - Learn not to do that again (CBR)

Rule Based Reasoning

- ▶ Download and learn from databases (CBR if used directly, data mining if rules/patterns are extrapolated)
 - Data mining techniques exist to find patterns in data
 - These are often expressed as rules – sometimes fuzzy rules:
 - If <some condition(s) exist>
 - Then <take some action(s)>

Summary

- ▶ What is Artificial Intelligence
- ▶ How do People Learn?
- ▶ Case Based Reasoning (CBR)
 - Where does CBR apply?
- ▶ Rule Based Reasoning

