Intro to Neurosymbolic Methods

Façade Playthrough & Module 3 Paper Presentations

MODULE 3 - 10/24/2024
CMSC 491/691 - INTERACTIVE FICTION AND TEXT GENERATION
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Assignments

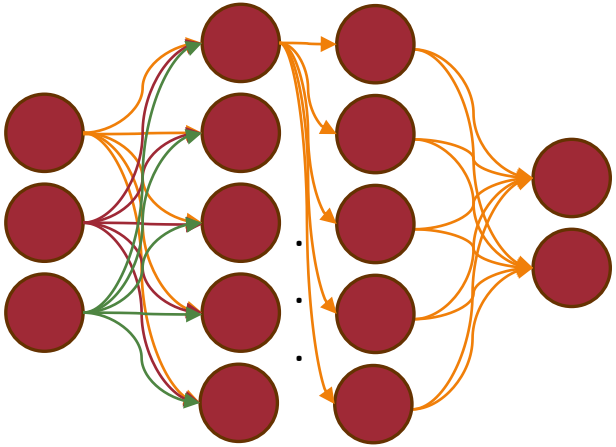
- Due Monday October 28, 2024
  - Project Milestone 2: Project Progress
  - HW 3: Guided Generation

Learning Objectives

- Define what neurosymbolic methods are
- Learn about neurosymbolic planning from peers
- Examine how planning is implemented in a playable game (Façade)

Neurosymbolic Methods

- The combination of neural networks (“**neuro**”) and older, **symbolic** AI methods



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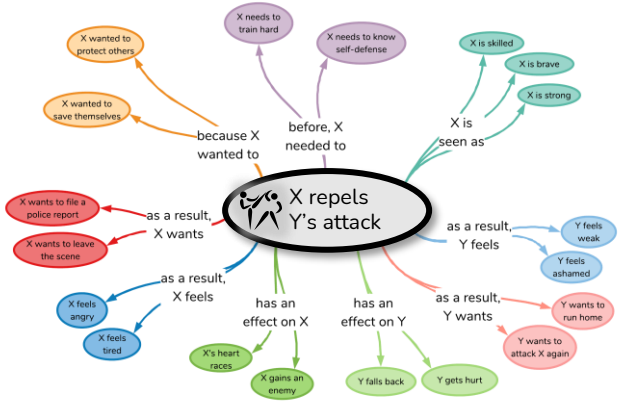

M. Sap *et al.*, “ATOMIC: An Atlas of Machine Commonsense for If-Then Reasoning,” *AAAI Conference on Artificial Intelligence (AAAI)*, vol. 33, no. 1, pp. 3027–3035, 2019, doi: 10.1609/aaai.v33i01.33013027.

Why combine them?

NEURAL NETWORKS

Statistical patterns over data

Easy to generate new text from

Need a lot of data to train (and might need to be labeled)

Hard to control

Examples: sequence-to-sequence networks, transformers (LLMs)

SYMBOLIC METHODS

Structured information

Easy for people to understand (interpretable)

Hard to make

- Need experts or a lot of time

Limited set of information

Examples: knowledge bases, planning domains/problems, scripts

Ways of combining them

- During training
  - Such as in reinforcement learning or retrieval-augmented generation (RAG)
- After training
  - Like a symbolic “wrapper” – helps validate what the NN is doing
- Others??

Questions about Façade (Blackboard)

- At the beginning of the semester, we talked about old text adventure games like Zork (1977) that have simple parsers for processing the user's input. Façade was made in 2003-2005. Based on how the game behaves, how does this parser differ from earlier parsers?

- Façade uses a type of planning that uses "beats" (major plot points). How does using beats (instead of a strict planner) help when making the story interactive?