William Bushell

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University of Saskatchewan

Using Deterministic Finite Automata and Large Language Models for Decision Analysis

I propose an intelligent program that will be able to create a “decision tree” based off a story, predict alternative routes that might have happened if there were different causes, and store this data to be used in future predictions. This “decision tree” will be a DFA.

**To put this into simpler terms, here are the steps this program will take to create the decision tree:**

1. User inputs a string describing a sequence of events, which I will refer to as a story.
   1. Program could also “interview” the user further, asking relevant questions to detail the story and fill in blanks (like emotional state).**\***
2. Program uses a LLM to parse the story and gets a list of “events” from this story, and also records causes and effects, connecting the events to each other.
3. Program uses the LLM, conferring with the programs database, to predict other effects based on different potential causes, collecting this in another list.
4. The program will then take these lists and create the decision tree as a DFA, which stays true to the deterministic nature of the program.
5. Stores this data in a database for later referral.

**The implications of this project is still to be discussed, but here are some potential applications I’ve thought of:**

* Integration with a psychological study, where the program can give useful information on the factors that affect a person’s decision making.
* Potentially has philosophical implication, discussing free will, the degree of determinism and the stochastic nature of humans.
* Use practically, for AI in role-playing video games, or for writers to keep track of character’s motives and have consistent character decisions.

**Potential challenges:**

* Humans are extremely complex, and the deterministic nature of DFAs may make this project impossible.
* Database structuring of all this information may be difficult and be a significant challenge of its own.
* Working with an LLM to get meaningful interpretation and accuracy will be difficult.