Async Task: Representing Simple Facts in Logic

Propositional logic is a way of representing knowledge of the real-world system to an AI system.

It is very simple to deal with the propositional logic and a decision procedure for it exists in which we can easily represent the real-world facts in the form of logical propositions and well-formed formulas(wff).

But there are limitations of propositional logic rather than only being easy to use and understand real-world scenario representation.

To overcome the confusion that is created while using and representing the real-world facts and figures and the inconsistency in backtracking the information from the logic to the fact, the use of and need of variables and quantification became essential.

Hence there was the introduction of first-order predicate logic as a way of representing knowledge as it provides to represent things that cannot reasonably be represented in propositional logic.

In predicate logic, real-world facts are written and represented as statements of wff’s.

It provides a good way of reasoning with the knowledge, a way of deducing new from the old statements, but it does not have a decision procedure as propositional logic.

Hence, we can say that first-order predicate logic is not decidable but semi-decidable.

This process of production of a formal proof, reasoning backward from the desired goal, requires the search using an AND-OR graph, to consider the alternative ways of satisfying the individual goals.

In conclusion, we can say that there is ambiguity found in the formation of English sentences, and choosing the correct interpretation is difficult.

We have a choice on how to represent knowledge, it is usually desirable to have simple representations, but in doing so we sometimes neglect some of the subtle reasoning details.

It is hard to capture all the necessary information to reason about the topic, in addition, there are situations where we do not know in advance which statements to deduce.

One approach can be the branching factor used with axioms to arrive at an answer in some reasonable amount of time.

The second is to use some kind of heuristic rules to decide which answer is more likely and prove that one first, one can try to prove other one’s if there is a failure accounted in one.

One strategy might be to try both prove an answer and disprove it, and use the information that is gained from one process to guide the other process.