

Summary of Generality in Artificial intelligence by John McCarthy

John McCarthy talks about representing behaviour by programme which would lead to generalisation of problem solving. Friedberg's approach to represent the behaviour of a machine using programme might lead to generality but if the program is modified, there will be loss of generality. So the concept of General Problem Solver (GPS) came into existence. According to this problem, one class of problem should be able to get transformed to another problem using some set of rules. In this paper McCarthy also talks about common sense knowledge which can be represented in terms of logic since it is general. According to him, generality can be represented using logic, reasoning and predicates. The idea of Non-Monotonicity is also discussed in this paper. Non-Monotonicity states that we don't consider exceptions while generalising any assertion. For example, If an assertion like "All birds can fly" is made, this has some exceptions like Ducks, Penguins etc.. which won't be considered while generalising. In addition to this, situation Calculus is described as Consequences of actions independent of the problem. For example if 'S' is a situation and E is an event which takes place in that situation, then the result of that situation S can be formulated as $S' = \text{result}(E, S)$ which denotes and generality using formalism. He mentioned about situational calculus axioms like Qualified result of-action-Axioms, Frame Axioms. Process of making objects out of sentences and other entities is called Reification is also a part of McCarthy's paper. Moreover, as expressed by McCarthy, Context also plays an important role in logic. For example, If an assertion like "the book is on the table" is made, we don't know whether there is anything between the book and the table. So, the context in this case is "ON" and we generally don't consider these type of cases while making assertions. It remains to determine how inheritance to more general contexts differs from inheritance to more specific contexts. Suppose a sentence p is present in the memory of a computer, we consider it as in a particular context and as an abbreviation for the sentence $\text{holds}(p, C)$, where C is the name of a context. Some contexts are very specific like Watson is a doctor in the context of Sherlock Holmes stories and a baritone is a psychologist in history. If C1 and C2 are two contexts and $C1 \leq C2$ this would mean that C2 context is more general than C1. If we talk about generalisation of a statement in a particular context then $\text{holds}(C1 \leq C2, C0)$ would mean even statements relating contexts can have contexts. So this paper mostly relied on ideas and approaches for obtaining generality.

