

SCR++: A Language Design for Real-Time Multi-Agent Systems

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Real-Time Multi-Agent systems are based on intelligent components and objects which are capable of self-governing actions in dynamic and heterogeneous environments. Designing software for practical Real-Time Multi-Agent Systems is a complex ordeal which involves analyzing, representing and reasoning about the discrete quantities that affect system behavior.

A programming framework for such agent systems should possess the features to support Learning, Communication, Logical Inference and Program Verification, none of which are available in any of the current Multi-Agent programming frameworks. The current research focuses on developing a language framework called SCR++ which is based on the four variable model of the software cost reduction techniques coupled with the elegance of constraint logic programming.

The Four Variable Model represents the required system behavior as a set of mathematical relations on four sets of variables which include monitored variables, controlled variables, input variables and output variables. These four sets of variables are in turn characterized by four relations called NAT, REQ, IN and OUT as shown in the figure.

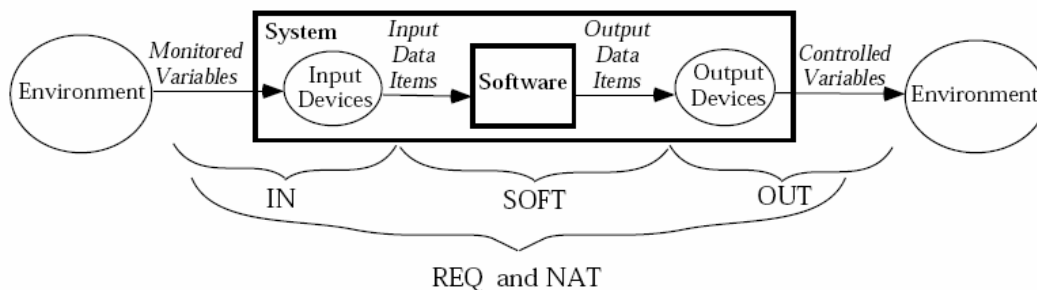


Figure: Four Variable Model

SCR++ is inherited from the Four Variable Model and has extensions to accommodate for features like Time, Learning and Communication and also has an inbuilt feature for automatic verification of range queries based on time which emanates from using the constraint timed automata model.

Reference: Vijay Halaharvi and Gopal Gupta, “SCR++: An Extensible Language for Multi-Agent Systems” – paper in progress