REPRESENTING TEMPORAL LOGIC IN PRODUCTION SYSTEM ARCHITECTURES

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Production systems (PS) provide a viable approach for organising and simulating intelligent systems. This paper proposes and analyses a methodology for enhancing the basic architecture of a PS by the inclusion of temporal logic, thereby allowing the PS approach to be adopted for simulating the behaviour of real time systems.

Issues such as concurrent resolution which occur in simulating real-time systems cannot be satisfactorilly dealt with by methodologies or languages based upon first order logic (eg. Prolog). Real-time systems are required to take into account the phenomena occurring in the real world by describing the state transitions of each process. For this purpose the notion of time is required.

An architecture in incorporating a formal temporal logic such as the following is examined:

a ==> O b	if a is true at some point in time then b is true at a consecutive point in time;
a ==> □ b	if a is true at some point in time then b is true forever from that point in time;
a ==> ◇ b	if a is true at some point in time then b will come true at some future point in time;
a ==> b until c	if a is true at some point in time then b is true at a censecutive point in time after which c will become true.

The formulae are extended to include processes which are mutually exclusive but concurrent.

The research examines the architectural requirements for representing such formulae, and the consequent problems of selecting and firing rules. An experiment is described that serves to establish the viability of the proposal.