SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107
Accredited by NAAC-UGC with 'A' Grade
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Department of Information Technology

Course Name – Software Engineering

II Year / III Semester

Unit-3 Reasoning Under Uncertainity

Why Use Temporal Logic?

Requirements of concurrent, distributed, and reactive systems are often phrased as constraints on *sequences of events or states* or constraints on *execution paths.*
Temporal logic provides a formal, expressive, and compact notation for realizing such requirements.
The temporal logics we consider are also strongly tied to various computational frameworks (e.g., automata theory) which provides a foundation for building verification tools.

Temporal Logic

• For a temporal representation to be successful, it must be embedded within a more general representation that can encode general assertions about the world.

Green(*frog1,t1)*

- *frog1* is green at time *t1*
- *frog1* is green over the time interval *t1*

• This technique does not work with all predicates

- sun rose over the interval *t1* is not equivalent to saying sun rose at every interval in the interval *t1*.

•Such predicates take intervals as arguments----*Rise(t1,t2)*

Temporal Knowledge Representation Systems

• The RHET system developed at Rochester integrates a temporal reasoner to a general purpose reasoning system.
• It is a horn based AI representation language that has as a subcomponent the TIMELOGIC temporal reasoning system developed by Koomen and based on Allen's interval logic.
• RHET is a hybrid system, rather than using a single uniform proof technique, each predicate defined in RHET could potentially use its own specialized techniques for computing its truthhood.

[A(x,y)] [B(x)] => [P(x,y)]

Temporal Knowledge Representation Systems (cont.)

•All temporal relations are represented as [TimeRel *t1 r t2*]
•If all variables are bounded then the temporal database is used directly.
•TIMELOGIC determines set of all possible bindings and this is passed to RHET.
•Once all the variables are bounded then this information is passed to TIMELOGIC which evaluates the consequences of this binding using constraint propagation.