COMP 4200 – Expert Systems

Calendar Description: Organization of expert systems; knowledge representation in expert systems; inference; knowledge engineering; tools for building expert systems; limitations of expert systems.

Prerequisite: COMP 3190

Outline

1) Introduction (1 week)
   What is expertise? Introduction to expert systems; advantages and disadvantages of expert systems

2) Logical Foundations (1 week)
   First-order logic; Prolog; limitations of FOL and Prolog

3) Rule-Based Systems (1 week)
   Representation, inference (pattern matching), JESS expert system shell

4) Uncertainty (1 week)
   Types of uncertainty, representing defaults, defaults and frame-based representations

5) Uncertainty (1 week)
   Representation and manipulation of certainty factors

6) Uncertainty (1 week)
   Fuzzy logic: crisp values, fuzzy values and fuzzy sets

7) Inference (1 week)
   Rete pattern-matching algorithm; conflict resolution: salience; refractory period; recency; specificity

8) Case-based reasoning (1 week)
   Fundamentals of CBR; comparison of rule-based and case-based systems

9) Expert-System Development Lifecycle (1 week)
   Rapid prototyping, knowledge acquisition techniques

10) Verification and Validation (1 week)
    Validation of knowledge bases; verification using solved problems

11) Business Rules (1 week)
    Representing business knowledge in a declarative form; business-rule systems

12) Seminars (1 week)
    Class seminars

13) Other Topics (1 week)
    Human factors; liability issues


Note: Specific topics may vary depending on the instructor.