Automated Knowledge Engineering

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Overview

▸ Definition

▸ Expert System Architecture

▸ Knowledge Representation

▸ Production systems

▸ Research problem

▸ Approach

▸ Questions

Expert system

- Definition:
  - Computer program to **mimic decision-making** ability of **human expert** in a **specific domain** of knowledge
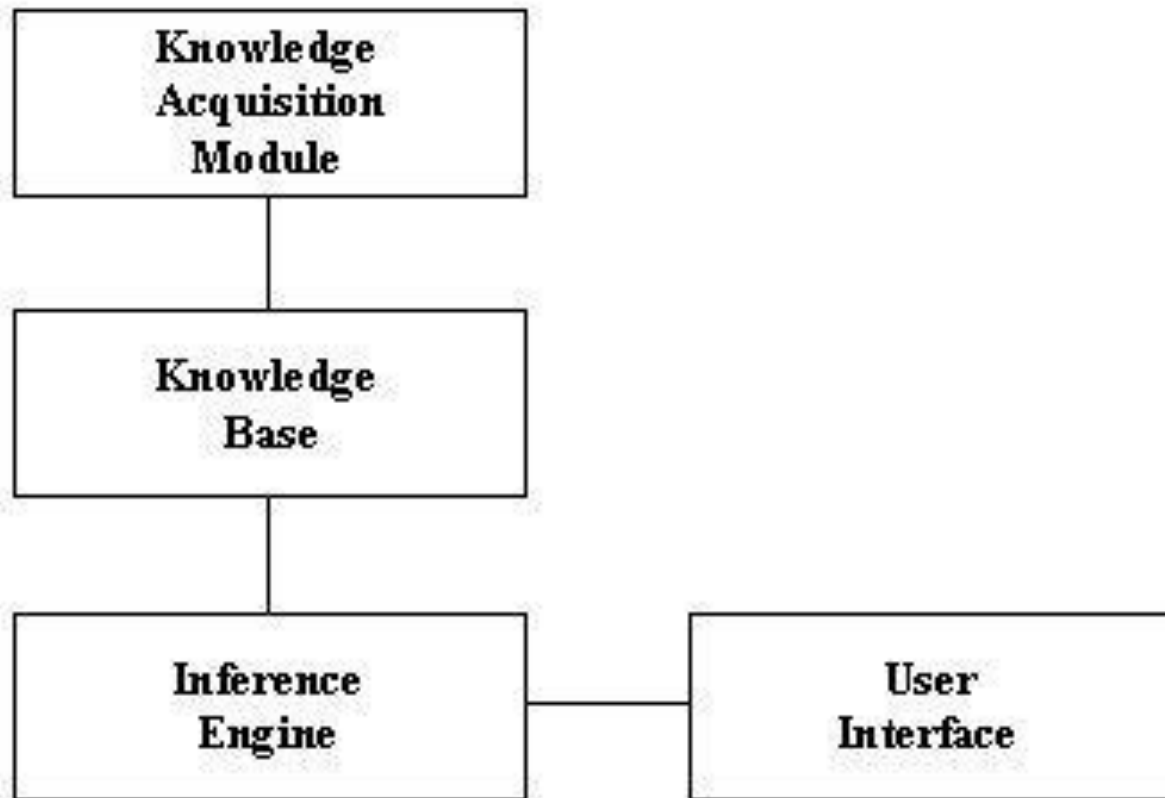- Apply theory to practice

- Three main subsystems:
  1. User interface
  2. Knowledge base
  3. Inference Engine

Architecture of Expert System

Source: http://www.cobblestoneconcepts.com/ucgis2summer2002/choi/choi.htm

Knowledge Representation

▸ The use of formal symbols to represent information in a computer system

▸ Schemes
- Semantic networks
- First-order logic
- Frames
- Rules
- Hybrids

Production Systems

‣ Production rules

‣ condition-action pairs

```
IF (condition)
THEN (action)
```

‣ Rule matching

‣ Certainty factors to handle uncertainties

‣ Benefits:
   ‣ Acquisition and maintenance
   ‣ Explanation
   ‣ Reasoning

Problem
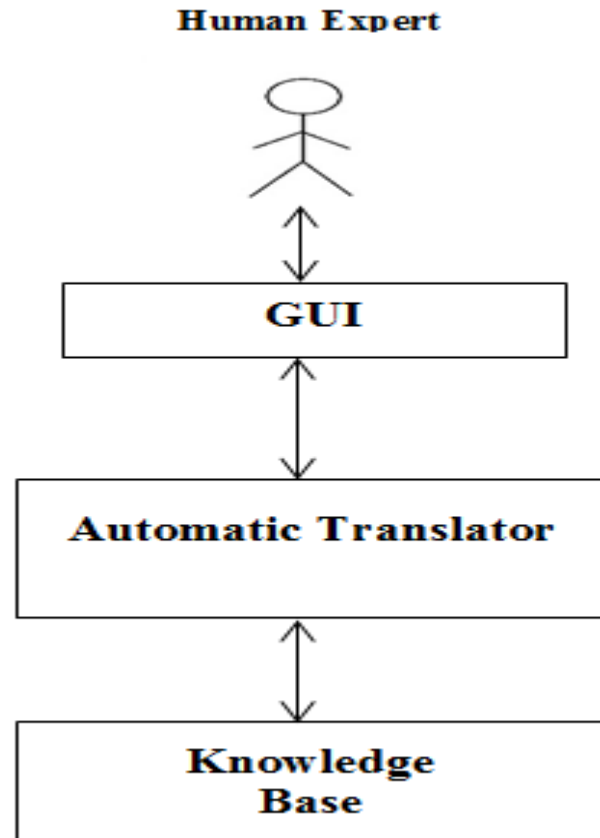
‣ Knowledge representation: a common problem in expert systems development

‣ Time constraints

‣ Lack of communication (between expert and engineer)

‣ Constant reconfiguration of KB costly and tedious

‣ Solution: Automated knowledge engineering

Automated Knowledge Engineering

Approach

- Research on tools and techniques
- Analyze existing system architecture
- Build web interface for input of facts
- Build translation tool
- Integration and testing

Possible extensions

‣ Dynamic knowledge acquisition

‣ Hybrid approach

‣ Alternative ways of data input

Questions

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