

KBS

- KBS is a form of AI that aims to capture the human experts to support decision making.
- An intelligent machine is technologically advanced machine that respond to world.
- It can learn from its experiences
- It includes AI based software system such as chatbots.

characteristics

- Real time simulation
- Learning is based on AI
- Action based on sensing data.

Architecture

Interface - Enable user to query the KBS.

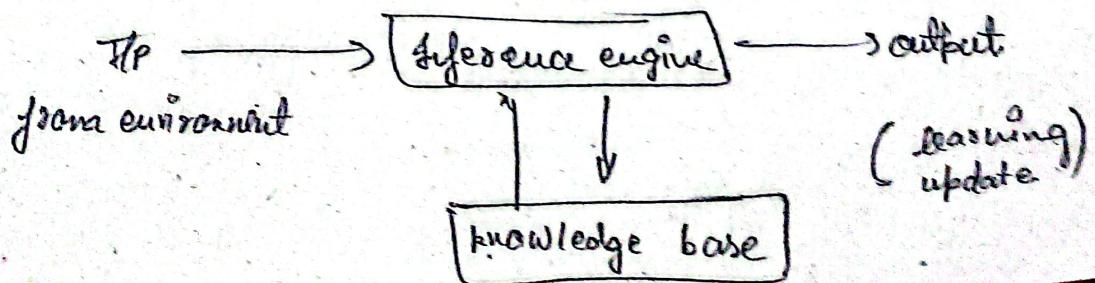
Inference engine - interact with KB to get insights to make some decision.

Knowledge base - expert knowledge encoded rules.

[rule to old problem are represented as cases]

uses

Healthcare - clinical decision, support, industrial equipment fault diagnosis, cash management



Types of Knowledge

- ① Declarative Knowledge — to know about something
 - includes concepts, facts and objects.
- ② Procedural knowledge —
 - responsible for knowing how to do something
 - includes rules, strategies, procedures etc
 - depends on task on which it can be applied.
- ③ meta-knowledge —
 - knowledge about other types of knowledge.
- ④ Heuristic knowledge —
 - it is representing knowledge of some experts in a field or subject.
- ⑤ Structural knowledge —
 - basic knowledge to problem solving.
 - describe the relationship b/w concepts or objects.

Knowledge representation

- Logical Representation.
- Semantic network representation.
- Frame representation.
- Production rules.

Characteristics of intelligent system

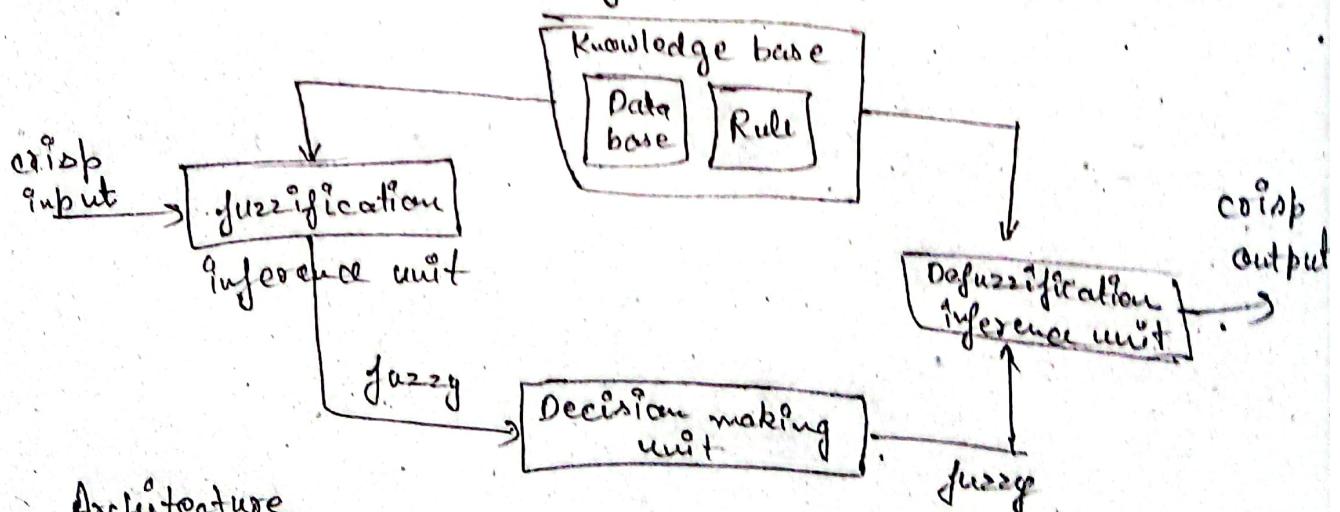
- ① Ability of simulate and emulate in near real time.
- ② Automated learning and machine learning functionalities
- ③ Digital feedback loops that influence product development.
- ④ Action based on sensory data and algorithms.
- ⑤ customized device algorithm experience in the cloud.
- ⑥ True compute on the far edge.
- ⑦ Ability to predict stresses and failures.
- ⑧ Detection and resolution of events.
- ⑨ Total automatic
- ⑩ Real time collaborative workflow platform.
- ⑪ Experimenting as a learning system.
- ⑫ Adapting tasks based on reprogramming, via cloud.

Fuzzy inference system

→ fuzzy inference system is the key logic unit of a fuzzy logic system having decision making as its primary work. It uses the "if then" rules along with connectors "OR" and "AND" for drawing essential decision rules.

Characteristics

- ① O/P is always a fuzzy set irrespective of its input which can be fuzzy or crisp.
- ② It is necessary to have fuzzy output when it is used as a controller.
- ③ A defuzzification unit would be there with FIS to convert fuzzy variables into crisp variables.



Architecture

Rulebase — contains set of rules, If then condition.

fuzzification — convert crisp quantities into fuzzy quantities.

Inference engine (Decision making unit) -

- It determines matching for the given current fuzzy input and decides which rule to be fired.

Defuzzification - convert fuzzy set obtained from inference engine to crisp set.

Advantages

- work with any type of input - imprecise, noisy.
- fuzzy logic is easy to understand.
- efficient soln to complex problem.
- comparison with mathematical concept of set theory

Disadv.

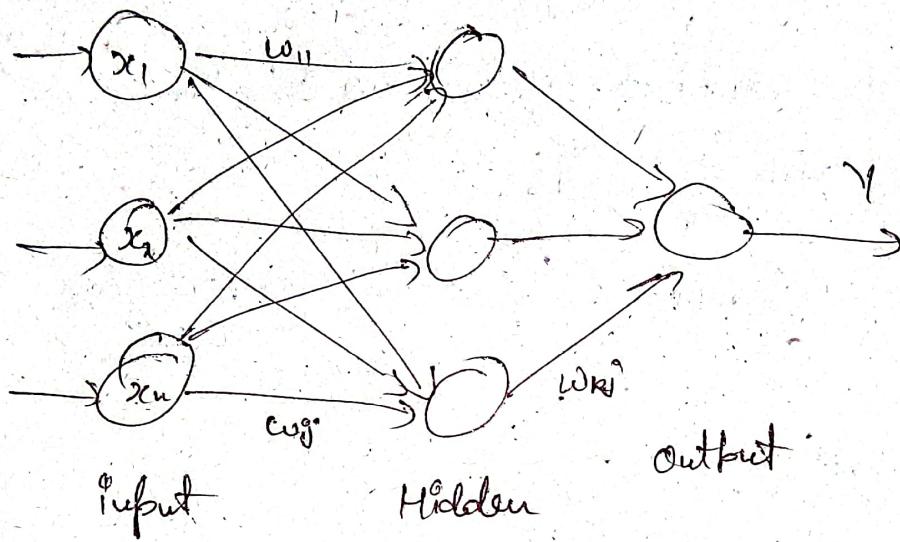
- different way to solve problem thus ambiguity.
- work on precise as well as imprecise data so inaccurate.

Application

- NLP
- expert system.
- Decision making.
- Neural network.
- Automotive system.

Multi layer feed forward

- MLFF neural network is an interconnection of perceptrons in which data and calculations flow in a single direction from the input to the outputs.
- The no. of layers in a neural network is the number of layers of perceptron.



- There are no feedback connection in which output are feed back to itself.

Limitations of MLP

- computations are difficult and time consuming.
- It is difficult to predict how dependent variable affect independent variable.
- The model function depend on quality of training.