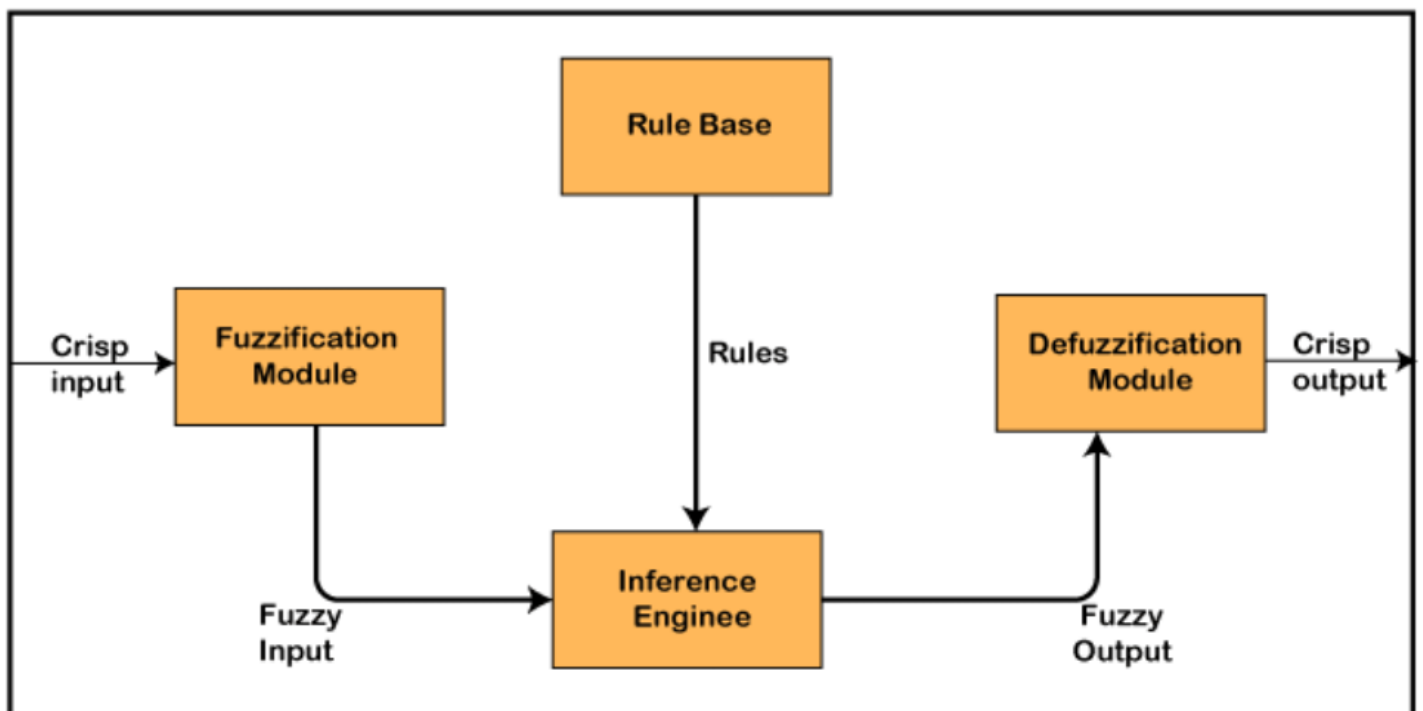


Architecture of a Fuzzy Logic System

In the architecture of the **Fuzzy Logic** system, each component plays an important role. The architecture consists of the different four components which are given below.

1. Rule Base
2. Fuzzification
3. Inference Engine
4. Defuzzification

The following diagram shows a fuzzy logic architecture.



- **Rule Base:** This contains the rules and membership functions that regulate or control decision-making in the fuzzy logic system. It also contains the IF-THEN conditions used for conditional programming and controlling the system.

- **Fuzzifier:** This component transforms raw inputs into fuzzy sets. The fuzzy sets proceed to the control system, where they undergo further processing.
- **Inference Engine:** This is a tool that establishes the ideal rules for a specific input. It then applies these rules to the input data to generate a fuzzy output.

- **Defuzzifier:** This component transforms the fuzzy sets into an explicit output (in the form of crisp inputs).

Defuzzification is the final stage of a fuzzy logic system.

Advantages of Fuzzy Logic System

- This system can work with any type of inputs whether it is imprecise, distorted or noisy input information.
- The construction of Fuzzy Logic Systems is easy and understandable.
- Fuzzy logic comes with mathematical concepts of set theory and the reasoning of that is quite simple.

- It provides a very efficient solution to complex problems in all fields of life as it resembles human reasoning and decision-making.
- The algorithms can be described with little data, so little memory is required.

Disadvantages of Fuzzy Logic Systems

- Many researchers proposed different ways to solve a given problem through fuzzy logic which leads to ambiguity. There is no systematic approach to solve a given problem through fuzzy logic.

- As fuzzy logic works on precise as well as imprecise data so most of the time accuracy is compromised.

- There is no single systematic approach to solve a problem using Fuzzy Logic. As a result, many solutions arise for a particular problem, leading to confusion
- Due to inaccuracy in results, they are not always widely accepted
- A major drawback of Fuzzy Logic control systems is that they are completely dependent on human knowledge and expertise

- You have to regularly update the rules of a Fuzzy Logic control system

- The systems require a lot of testing for validation and verification