

# A Rule-Based Expert System For Mental Disorder Diagnosis

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## Introduction

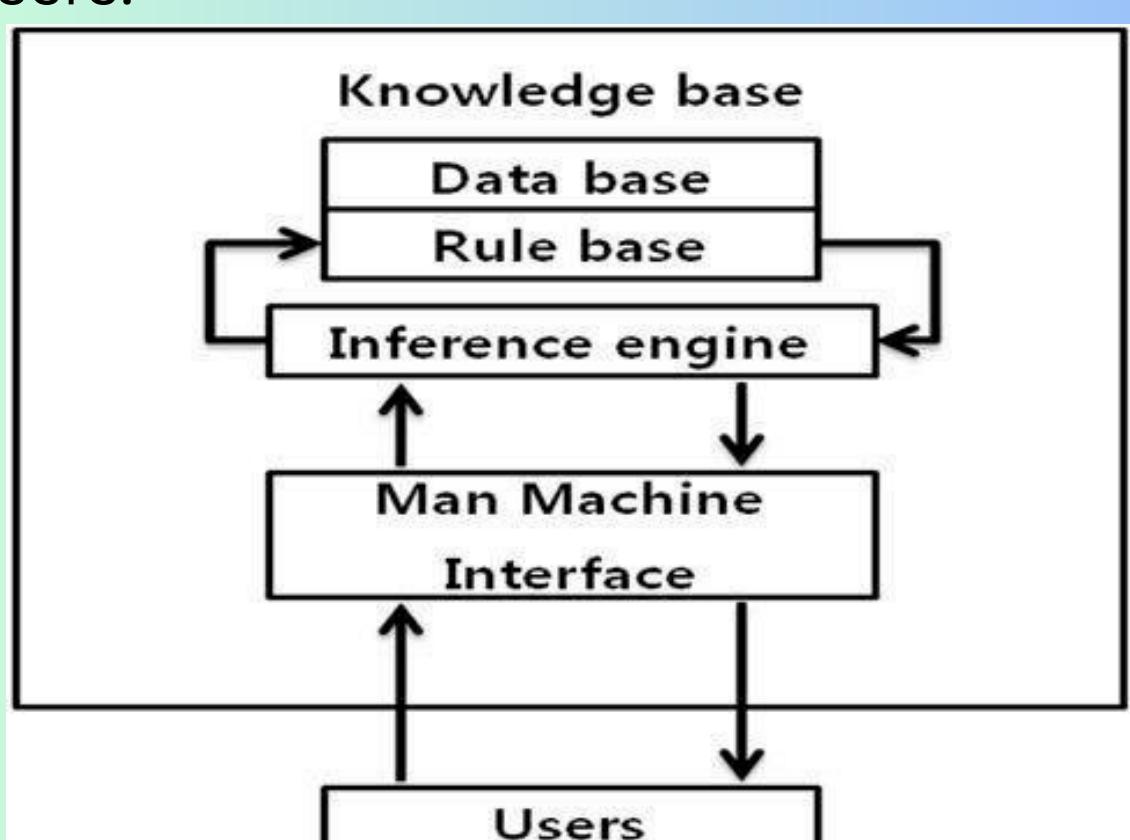
Mental disorders affect millions worldwide, yet accurate diagnosis remains a challenge due to the complexity and variability of symptoms. Expert systems offer a solution by automating the diagnostic process through structured knowledge and rule-based reasoning, assisting medical professionals and caregivers in identifying mental illnesses efficiently. The proposed system, built using Prolog's logical reasoning and backward chaining, focuses on diagnosing six mental disorders: depression, anxiety, bipolar disorder, schizophrenia, OCD, and PTSD. It engages users by asking yes/no questions about symptoms, applying predefined rules to deduce the most likely diagnosis. This approach ensures a transparent, reliable, and structured process for preliminary mental health evaluations.

The primary objective of this expert system is to support mental health diagnosis by:

- Automating the evaluation process to save time providing a diagnostic tool accessible to both professionals and non-experts, particularly in underserved areas.
- Offering preliminary, rule-based insights to minimize the risk of misdiagnosis

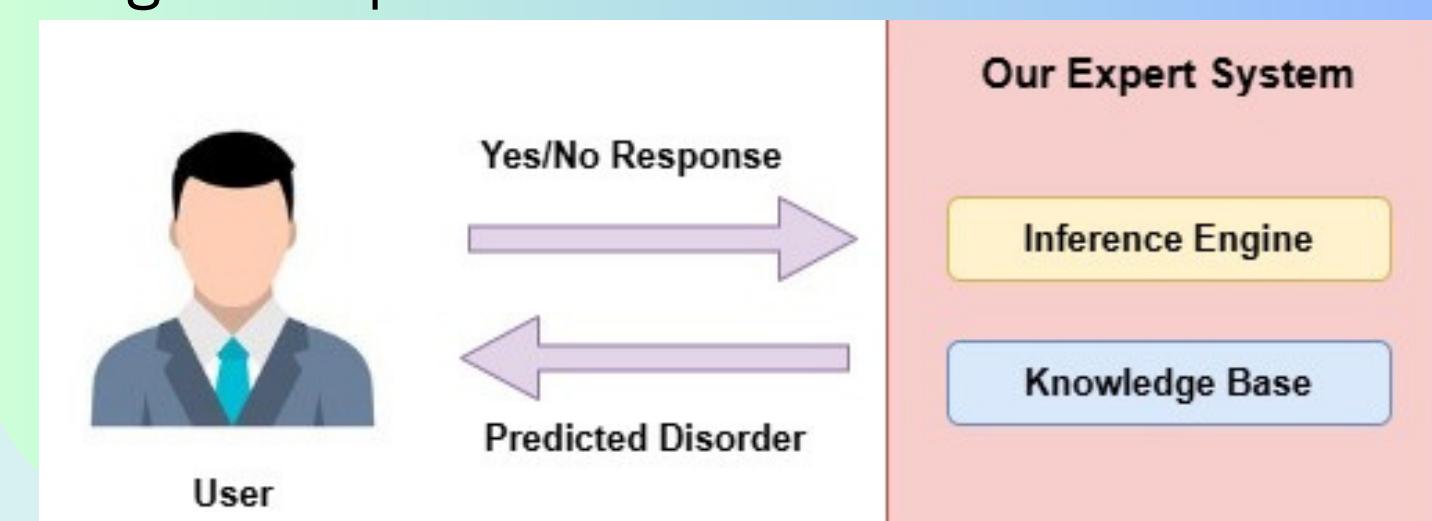
## System Architecture

We followed rule-based architecture which consists of 4 components: Knowledge Base, Inference Engine, Man-Machine Interface and Users.



## How Our System Works

This is how our system interacts with users. The expert system operates by taking yes/no responses from the user regarding symptoms, which are processed through an inference engine and a knowledge base to predict the most probable mental disorder. This interaction ensures a logical and transparent diagnostic process.



## Test Case & Output

```
File Edit Options Setup
Line 16 Col 47 C:\CODE\PROJECT.PRO Indent
response(char)
go
uses
go :-
    write("What is the name of patient?"),
    readIn(Patient),
    hypothesis(Patient,Disease),
    write(Patient," probably has ",Disease,"."),

go :-
    write("The disorder could not be determined")

symptom(Patient,persistent_sadness) :-
```

```
Does mahfuja have excessive_worry (y/n) ?n
Does mahfuja have mood swings (y/n) ?n
Does mahfuja have hallucination (y/n) ?y
Does mahfuja have delusions (y/n) ?y
Does mahfuja have disorganized thinking (y/n) ?y
mahfuja probably has schizophrenia.
Yes
Goal:
```

Message Trace

C:\CODE\PROJECT.PRO

## Future Work

- Include therapy and lifestyle recommendations based on diagnosis.
- Expand the knowledge base for greater accuracy with more disorders and symptoms.
- Improve user experience with more intuitive graphical interfaces.
- Personalize diagnoses by integrating user data and medical history.