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Assignment- B2

* **Title:-** Expert system.

* **Problem statement:-** Implement an expert system for medical diagnosis of diseases based on adequate symptoms.

* **Objectives:-**
  - To learn and implement an expert system.

* **Outcomes:-** Students will be able to:-
  - learn and implement Expert system for Medical Diagnosis.

* **S/W and H/W Requirements:-**
  - OS: 64-bit Ubuntu 18.04.
  - Programming languages : Python3.
  - Jupyter Notebook Environment, Google Colaboratory.
  - Python3 Library : Experta.

* **Theory:-**
  - **Expert Systems:-**

Diagnostic expert-based systems are computer systems that seek to emulate the diagnostic decision-making ability of human experts. Medical expert systems generally including 2 components.

a) **Knowledge Base:-** It encapsulates the evidence-based medical knowledge that is curated by experts.

b) **Rule based inference engine:-** It is devised by the expert, which operates on the knowledge base to generate a differential diagnosis.

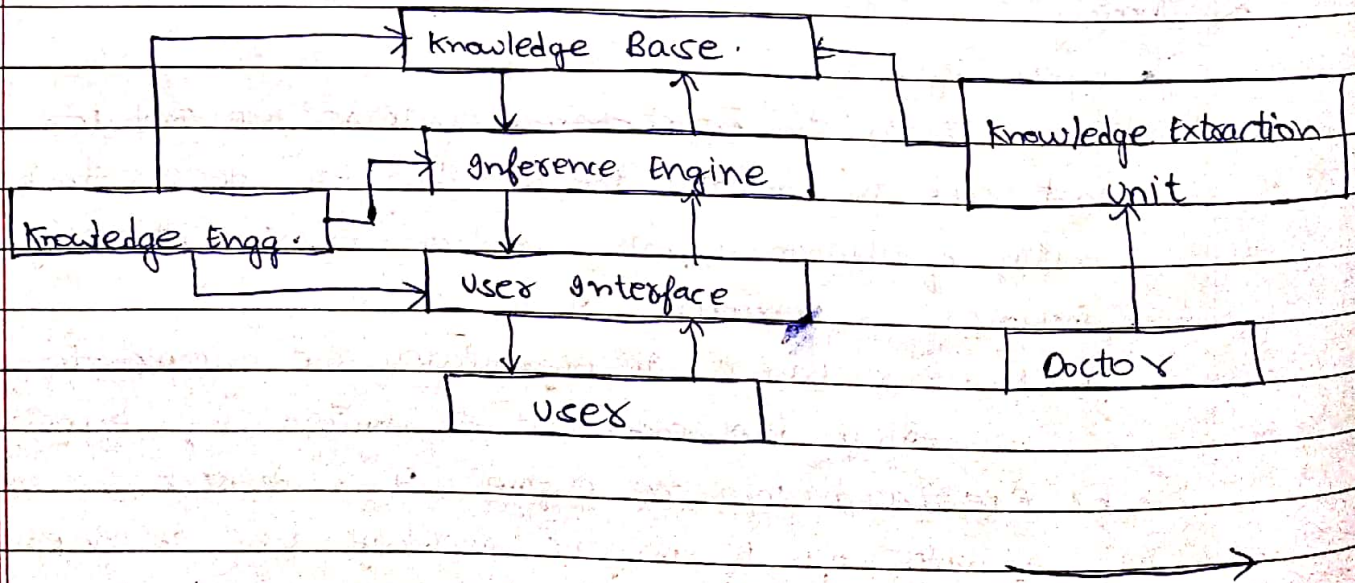
⇒ Diagonistic knowledge bases generally consist of diseases, findings (i.e. symptoms, signs, history or lab results) and their relationships. In many cases, they explicitly layout the relationships between a set of findings and the things that cause them (diseases).

For e.g:- a KB might include: influenza & show it's relationships with fever, coughing and congestion.

⇒ Knowledge Base Design:-

The knowledge domain was got from facts of a collection of data about the types of symptoms & diseases to be isolated and identified, the identification methods, the expected results.

Data elicited for the isolation, identification of symptoms and possible recommendations on susceptibility patterns makes the knowledge base which was modeled into frames at different levels of decision trees using the 'IF-THEN' production rules. quick deductions are made.



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Saathi Notebooks (3)

Representing diseases and symptoms

Label	Disease	Label	Symptom
X_1	Jaundice	$S1$	Headache
X_2	Alzheimers	$S2$	Back Pain
X_3	Arthritis	$S3$	Chest Pain
X_4	Tuberculosis.	$S4$	Cough.
X_5	Asthma	$S5$	Fainting.
X_6	Sinusitis.	$S6$	Sore throat.
X_7	Epilepsy.	$S7$	Fatigue.
X_8	Heart Disease.	$S8$	Restlessness
X_9	Diabetes.	$S9$	Low body temp.
X_{10}	Glaucoma	$S10$	Fever.
X_{11}	Hyperthyroidism	$S11$	Sunken Eyes.
X_{12}	Heart stroke.	$S12$	Nausea.
X_{13}	Hypothermia	$S13$	Blurred Vission.

* Test Cases:-

	Input		Output	Result
1)	Symptoms			
	Cough : n	Back Pain : n		
	Fever : n	Low Body temp : n	Glaucoma	Success.
	restlessness : n	Blurred vision : y		
	sore throat : n	Chest pain : n		
	Fatigue : n	Nausea : y		
	Headache : y	Fainting : n		
	Sunken Eyes : n			

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2) symptoms:-

Headache : y	backpain : n	
blurred vision = y	~~blood body temp. n~~	
restlessness : y	cough : y	most probably success.
Nausea : y	fever : n	diabetes
Fainting : y	sore throat : n	
Sunken Eyes : y	chest pain : n	
Fatigue : y	low body temp : n	

* conclusion:-

we have successfully implemented an Expert system for medical diagnosis.