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A

Project Report

On

Medical Expert System

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CLASS: BE4

GUIDED BY
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CERTIFICATE

This is to certify that **Mr. Vaibhav Navnath Kumbhar(4435) ,Mr.Kunal Kunkulol(4436),Mr.Chaitnya Joshi(4430)** students of B.E. (Computer Engineering Department) Batch 2017-2018, have satisfactorily completed a project report on "**Medical Expert System**" under the guidance of **Prof. Pravin Patil** towards the partial fulfillment of the fourth year Computer Engineering Semester I of Savitribai Phule Pune University.

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ABSTRACT

Diseases should be treated well and on time. If they are not treated on time, they can lead to many health problems and these problems may become the cause of death. These problems are becoming worse due to the scarcity of specialists, practitioners and health facilities. In an effort to address such problems, studies made attempts to design and develop expert systems which can provide advice for physicians and patients to facilitate the diagnosis and recommend treatment of patients. This project presents a comprehensive study of medical expert systems for diagnosis of various diseases. It allows human users to make complicated decisions. Simulates reasoning by applying knowledge and interfaces. Uses expert's knowledge as rules and data within the system.Model the problem solving ability of a human expert.

CONTENTS

1. PROBLEM STATEMENT

Expert System is one of the most common applications of artificial intelligence. It is a computer program that simulates the decision and actions of a person or an association that has specialist facts and experience in a particular field. Normally, such a system contains a knowledge base containing accumulated experience and a set of rules for applying the knowledge base to each particular situation. The major features of expert system are user interface, data representation, inference, explanations etc. Implement expert system for medical diagnosis of diseases based on adequate symptoms.

2. Requirement Specification

1. **SWI Prolog**

   SWI-Prolog is a free implementation of the programming language Prolog, commonly used for teaching and semantic web applications. It has a rich set of features, libraries for constraint logic programming, multithreading, unit testing, GUI, interfacing to Java, ODBC and others, literate programming, a web server, SGML, RDF, RDFS, developer tools (including an IDE with a GUI debugger and GUI profiler), and extensive documentation.

2. **Online Prolog Editor**

   SWISH was originally written by Torbjörn Lager as a homage to SWI-Prolog.The current SWISH application targets primarily at collaborative exploration of data. SWISH can be combined with e.g., CQL to explore relational (SQL) databases or sparkle to explore linked data. A ClioPatria plugin adds Prolog based exploration of RDF data to ClioPatria.

3)Medical Expert System:

The major components of Expert Systems are :

1. Knowledge Base:

The knowledge base holds facts and rules in a specific knowledge domain.

2. Inference Engine:

The inference engine receives input queries and replies to the questions through the user interface and use this active information with fixed knowledge kept in the knowledge base. The knowledge base is used to develop a conclusion about the present condition that is given to the user. The understanding of the process is done recursively in three stages: Match, Select, Execute.

During the match state, the stuff of working memory (facts and results) is compared with and rules that are placed in the knowledge base. All rules that can be executed are stored in a set called conflict set. One rule only is selected from the conflict set according to some criteria to be executed. The selected rule is then executed and the results of the rule are stored in the working memory with the initial facts.

3. Interface:-

The interface authorities the user to interconnect with the expert system.

4. Explanation Facility:-

The explanation module offers the user with an explanation of the reasoning process. To be able to answer a query, the explanatory module follows the chain of rules. The set of the rule that leads to the conclusion is then presented to the user in a simplified way. This allows the user to essentially see the reasoning process followed by the system in reaching to the conclusion. If the user is not happy with the reasoning steps showed then they can be modified using the editor.

5. Knowledge Engineer:

A knowledge engineer is a person who can design, build, and test the expert system. The knowledge engineer solicits the experience and knowledge from the human expert and discovers

how a problem can be solved. Thus the knowledge engineer identifies the reasoning method to be used to manage the facts and rules in the expert system. Furthermore, he is accountable for testing, modifying, and deploying the expert system.

4)SOURCE CODE

```
go:-
hypothesis(Disease),
write('It is suggested that the patient has '),
write(Disease),
nl,
undo;
write('Sorry, the system is unable to identify the disease'),nl,undo.

hypothesis(dengue) :-
symptom(fever),
symptom(vomiting),
symptom(headache),
symptom(rash),
symptom(joint_pain),
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```
symptom(eye_pain),
symptom(nose_bleed),
symptom(fatigue),

nl,
write('Advices and Sugestions:'),
nl,
write('1 : Drink plenty of fluids and get plenty of rest.'),
nl,
write('2: Maintain a clean and hygienic environment at home'),
nl,
write('3: Use mosquito repellents and nets'),
nl,
write('4: follow proper diet'),
nl,
write('Dengue is spread by the Aedes mosquito, which prefers biting during the day time
(sunlight hours). Even a single mosquito bite can lead to dengue. Thus it is important to protect
loved ones, both indoors and outdoors, especially during the day. Before stepping out, the use
of personal repellents like Goodknight Fabric Roll-On (or the Goodknight cool gel/patches etc.)
can prevent mosquito bites.Please do not sleep in open air and cover your full skin because'),
nl,!.
hypothesis(cold) :-
symptom(headache),
symptom(runny_nose),
symptom(sneezing),
symptom(sore_throat),
nl,
write('Advices and Sugestions:'),
nl,
write('1: Tylenol'),
nl,
write('2: Panadol'),
nl,
write('3: Nasal spray'),
nl,
write('Please weare warm cloths because'),
nl,!.



hypothesis(influenza) :-
symptom(sore_throat),
symptom(fever),
```

```
symptom(headache),
symptom(chills),
symptom(body_ache),
nl,
write('Advices and Sugestions:'),
nl,
write('1: Tamiflu'),
nl,
write('2: Panadol'),
nl,
write('3: Zanamivir'),
nl,
write('Please take a warm bath and do salt gargling because'),
nl,!.


hypothesis(typhoid) :-
symptom(headache),
symptom(abdominal_pain),
symptom(poor_appetite),
symptom(fever),
nl,
write('Advices and Sugestions:'),
nl,
write('1: Chloramphenicol'),
nl,
write('2: Amoxicillin'),
nl,
write('3: Ciprofloxacin'),
nl,
write('4: Azithromycin'),
nl,
write('Please do complete bed rest and take soft diet because'),
nl,!.


hypothesis(chicken_pox) :-
symptom(rash),
symptom(body_ache),
symptom(fever),
nl,
write('Advices and Sugestions:'),
nl,
```

```
write('1: Varicella vaccine'),
nl,
write('2: Immunoglobulin'),
nl,
write('3: Acetomenaphin'),
nl,
write('4: Acyclovir'),
nl,
write('Please do have oatmeal bath and stay at home because'),
nl.


hypothesis(measles) :-
symptom(fever),
symptom(runny_nose),
symptom(rash),
symptom(conjunctivitis),
nl,
write('Advices and Sugestions:'),
nl,
write('1: Tylenol'),
nl,
write('2: Aleve'),
nl,
write('3: Advil'),
nl,
write('4: Vitamin A'),
nl,
write('Please get rest and use more liquid because'),
nl,!.

hypothesis(diabetes) :-
symptom(headache),
symptom(increased_hunger),
symptom(dry_mouth),
symptom(fatigue),
symptom(blurred_vision),
symptom(frequent_urination),
symptom(weightloss),
nl,
write('Advices and Sugestions:'),
nl,
write('1: Metformin '),
```

```
nl,
write('2: Sulfonylureas'),
nl,
write('3: Thiazolidinediones'),
nl,
write('4: DPP-4 inhibitors'),
nl,
write('4: GLP-1 receptor agonists'),
nl,
write('4: SGLT2 inhibitors'),
nl,
write('4: Insulin Therapy'),
nl,
write('Please check your blood sugar level at least twice a day.Control your blood pressure,
cholesterol, and triglyceride levels. Get A1c blood tests to find out your average blood sugar for
the past 2 to 3 months to track your carbohydrates because '),
nl,!.

ask(Question) :-
write('Does the patient has the symptom '),
write(Question),
write('? : '),
read(Response),
nl,
( (Response == yes ; Response == y)
->
assert(yes(Question)) ;
assert(no(Question)), fail).
:- dynamic yes/1,no/1.

symptom(S) :-
(yes(S) -> true ;
(no(S) -> fail ;
ask(S))).

undo :- retract(yes(_)),fail.
undo :- retract(no(_)),fail.
undo.
```

5.Results

go.

Does the patient has the symptom fever? :
y.

Does the patient has the symptom vomiting? :
y

Does the patient has the symptom headache? :
y.

Does the patient has the symptom rash? :
y.

Does the patient has the symptom joint_pain? :
y.

Does the patient has the symptom eye_pain? :
y.

Does the patient has the symptom nose_bleed? :
y.

Does the patient has the symptom fatigue? :
y.

Advices and Sugestions:
1 : Drink plenty of fluids and get plenty of rest.
2: Maintain a clean and hygienic environment at home
3: Use mosquito repellents and nets
4: follow proper diet
Dengue is spread by the Aedes mosquito, which prefers biting during the day **time** (sunlight hours). Even a single mosquito bite can lead to dengue. Thus it is important to protect loved ones, both indoors and outdoors, especially during the day. Before stepping out, the use of personal repellents like Goodknight Fabric Roll-On (or the Goodknight cool gel/patches etc.) can prevent mosquito bites.Please **do** not sleep in open air and cover your full skin because
It is suggested that the patient has dengue

6.CONCLUSION

With this project we have used prolog to develop a medical expert system which can help physicians and patients to understand about diseases.