

Raw decisions are made probable to the classification or identification answers given by the user. Prolog-based expert systems can also be used as educational tools in the field of Biology, which can be used by the general public or parties concerned with environmental sustainability.

## **(b) Medical Diagnosis System**

### **Abstract**

In recent decades AI has found numerous applications in the field of medical field. This medical expert system is used to diagnose the diseases among the patients. The diagnosis is made taking into account the symptoms that can be seen or felt. This medical expert system helps the doctor or expert in making the appropriate diagnosis of the patient. The diseases have many common symptoms and some of them are very much alike. This creates many difficulties for the doctor to reach at a right decision or diagnosis. The key idea behind this expert system is that doctors are not available at emergency or doctors may do some mistakes by coincidence. To overcome or eliminate these problems here we consider some diseases and design a prototype. In this work, this expert system is made to detect the diseases according to various infections and symptoms and give the effective solution to overcome them. This system provides various kinds of solutions like suggesting different tablets or medicines to be taken and advises the patient for the treatment of the particular disease. Afterward, we make proper formulation so that it deals with the indications of disease and prescribing the proper medications according to disease detected. This creates many difficulties for the doctor to reach at a right decision or diagnosis. This expert system is implemented in SWI-Prolog.

### **Identification of diseases**

#### Symptoms of diseases (Identification):

- Cold: headache, runny nose, sneezing, sore throat.
- Flu: fever, headache, chills, body ache.
- Typhoid: headache, abdominal pain, poor appetite, fever.
- Measles: fever, runny nose, rash, conjunctivitis.
- Malaria: fever, sweating, headache, nausea, vomiting, diarrhoea.
- Chickenpox: fever, tiredness, headache, inflammation of brain, skin infection, rash.
- Cholera: headache, muscle cramps, vomiting, diarrhoea.

#### Advices and Suggestions:

- Cold: Tylenol/tab, panadol/tab, Nasal spray  
Please wear warm cloths
- Flu: Tamiflu/tab, panadol/tab, Zanamivir/tab  
Please take a warm bath and do salt gargling
- Typhoid: Chloramphenicol/tab, Amoxicillin/tab, Ciprofloxacin/tab,  
Azithromycin/tab

Please do complete bed rest and take soft Diet

- Measles: Tylenol/tab, Aleve/tab, Advil/tab, Vitamin A  
Please get rest and use more liquid
- Malaria: Aralen/tab, Quaalatin/tab, Plaquenil/tab, Mefloquine  
Please do not sleep in open air and cover your full skin
- Chickenpox Zovirax/tab, Valtrex/tab, Tylenol/tab, Benadryl/tab  
Use cool wet compresses or cool water every three to four hours for the first few days to help relieve itching
- Cholera Oral Rehydration Salts(ORS), Antibiotics, Zinc supplements  
Consult the doctor immediately and replace lost fluids and electrolytes using a simple rehydration solution

#### Code:

```
go:- hypothesis(Disease),  
write('I guess the patient have '),  
write(Disease),  
nl,  
write('TAKE CARE '),  
undo.
```

```
/*Hypothesis to be tested*/  
hypothesis(cold) :- cold, !.  
hypothesis(flu) :- flu, !.  
hypothesis(typhoid) :- typhoid, !.  
hypothesis(measles) :- measles, !.  
hypothesis(malaria) :- malaria, !.  
hypothesis(chickenpox) :- chickenpox, !.  
hypothesis(cholera) :- cholera, !.  
hypothesis(unknown). /* no diagnosis*/
```

```
/*Hypothesis Identification Rules*/  
cold :-  
verify(headache),  
verify(runny_nose),  
verify(sneezing),  
verify(sore_throat),  
write('Advices and Sugestions:'),  
nl,  
write('1: Tylenol/tab'),  
nl,  
write('2: panadol/tab'),
```

```
nl,  
write('3: Nasal spray'),  
nl,  
write('Please weare warm cloths Because'),  
nl.
```

```
flu :-  
verify(fever),  
verify(headache),  
verify(chills),  
verify(body_ache),  
write('Advices and Sugestions:'),  
nl,  
write('1: Tamiflu/tab'),  
nl,  
write('2: panadol/tab'),  
nl,  
write('3: Zanamivir/tab'),  
nl,  
write('Please take a warm bath and do salt gargling Because'),  
nl.
```

```
typhoid :-  
verify(headache),  
verify(abdominal_pain),  
verify(poor_appetite),  
verify(fever),  
write('Advices and Sugestions:'),  
nl,  
write('1: Chloramphenicol/tab'),  
nl,  
write('2: Amoxicillin/tab'),  
nl,  
write('3: Ciprofloxacin/tab'),  
nl,  
write('4: Azithromycin/tab'),  
nl,  
write('Please do complete bed rest and take soft Diet Because'),  
nl.
```

```
measles :-  
verify(fever),  
verify(runny_nose),  
verify(rash),  
verify(conjunctivitis),  
write('Advices and Sugestions:'),  
nl,  
write('1: Tylenol/tab'),  
nl,  
write('2: Aleve/tab'),
```

```
nl,  
write('3: Advil/tab'),  
nl,  
write('4: Vitamin A'),  
nl,  
write('Please Get rest and use more liquid Because'),  
nl.
```

```
malaria :-  
verify(fever),  
verify(sweating),  
verify(headache),  
verify(nausea),  
verify(vomiting),  
verify(diarrhea),  
write('Advices and Sugestions:'),  
nl,  
write('1: Aralen/tab'),  
nl,  
write('2: Qualaquin/tab'),  
nl,  
write('3: Plaquenil/tab'),  
nl,  
write('4: Mefloquine'),  
nl,  
write('Please do not sleep in open air and cover your full skin Because'),  
nl.
```

```
chickenpox:-  
verify(fever),  
verify(tiredness),  
verify(headache),  
verify(inflammation_of_brain),  
verify(skin_infection),  
verify(rash),  
write('Advices and Sugestions:'),  
nl,  
write('1: Zovirax/tab'),  
nl,  
write('2: Valtrex/tab'),  
nl,  
write('3: Tylenol/tab'),  
nl,  
write('4: Benadryl/tab'),  
nl,  
write('Use cool wet compresses or cool water every three to four hours for the first few days  
to help relieve itching Because'),  
nl.
```

```
cholera:-
```

```

verify(headache),
verify(muscle_cramps),
verify(vomiting),
verify(diarrhea),
write('Advices and Sugestions:'),
nl,
write('1: Oral Rehydration Salts(ORS)'),
nl,
write('2: Antibiotics'),
nl,
write('3: Zinc supplements'),
nl,
write('Consult the doctor immediately and replace lost fluids and electrolytes using a simple
rehydration solution Because'),
nl.

```

```

/* Asking Question */
ask(Question) :-
write('Does the patient have following symptom:'),
write(Question),
write('? '),
read(Response),
nl,
( (Response == yes ; Response == y)
->
assert(yes(Question)) ;
assert(no(Question)), fail).

```

:- dynamic yes/1,no/1.

```
/*Verifying */
```

```
verify(S) :-
```

```
(yes(S)
```

```
->
```

```
true ;
```

```
(no(S)
```

```
->
```

```
fail ;
```

```
ask(S))).
```

```
/* undo all yes/no assertions */
```

```
undo :- retract(yes(_)),fail.
```

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

```
undo.
```

## Output:

```
1 ?- go.
Does the patient have following symptom:headache? y.

Does the patient have following symptom:runny_nose? |: n.

Does the patient have following symptom:fever? |: y.

Does the patient have following symptom:chills? |: n.

Does the patient have following symptom:abdominal_pain? |: y.

Does the patient have following symptom:poor_appetite? |: y.

Advices and Sugestions:
1: Chloramphenicol/tab
2: Amoxicillin/tab
3: Ciprofloxacin/tab
4: Azithromycin/tab
Please do complete bed rest and take soft Diet Because
I guess the patient have typhoid
TAKE CARE
true.

2 ?- go.
Does the patient have following symptom:headache? y.

Does the patient have following symptom:runny_nose? |: n.

Does the patient have following symptom:fever? |: y.

Does the patient have following symptom:chills? |: n.

Does the patient have following symptom:abdominal_pain? |: n.

Does the patient have following symptom:sweating? |: y.

Does the patient have following symptom:nausea? |: y.

Does the patient have following symptom:vomiting? |: y.

Does the patient have following symptom:diarrhea? |: y.

Advices and Sugestions:
1: Aralen/tab
2: Qualaquin/tab
3: Plaquenil/tab
4: Mefloquine
Please do not sleep in open air and cover your full skin Because
I guess the patient have malaria
TAKE CARE
true.
```