

Prolog Expert System

Cairong Yang 317203

1. Introduction

In this lab an expert system using prolog to emulate the decision-making ability of a human expert will be implemented.

2. Code

```
go:- hypothesis(Disease),  
    write('I believe you have: '),  
    write(Disease),  
    nl,  
    undo.  
/*Hypothesis that should be tested*/  
hypothesis(cold) :-cold,!.  
hypothesis(flu) :-flu,!.  
hypothesis(ebola) :-ebola,!.  
hypothesis(measles) :-measles,!.  
hypothesis(arthritis) :-arthritis,!.  
hypothesis(unknown). /*no diagnosis*/
```

```

/*Hypothesis Identification Rules*/
cold :-
verify(headache),
verify(runny_nose),
verify(sneezing),
verify(sore_throat).

flu :-
verify(fever),
verify(headache),
verify(chills),
verify(body_ache).

ebola :-
verify(headache),
verify(rash),
verify(nausea),
verify(bleeding).

measles :-
verify(fever),
verify(runny_nose),
verify(rash),
verify(conjunctivities).

arthritis :-
verify(pain_in_joints),
verify(stiffness_in_joints),
verify(fatigue).

/*how to ask questions */
ask(Question) :-
    write('Dose 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.

```

```

^/*How to verify something */
verify(S) :-
    (   yes(S)
    ->
:   true ;
    (   no(S)
    ->
        fail ;
    ask(S))).
/*undo all yes/no assertions*/
undo :- retract(yes(_)),fail.
undo :- retract(no(_)),fail.
undo.

```

3.Test Case & Result

```

?- go .
Dose the patient have following symptom: headache? n.
Dose the patient have following symptom: fever? |: n.
Dose the patient have following symptom: pain_in_joints? |: y.
Dose the patient have following symptom: stiffness_in_joints? |: y.
Dose the patient have following symptom: fatigue? |: y.
I belive you have: arthritis
true.

?- go .
Dose the patient have following symptom: headache? y.
Dose the patient have following symptom: runny_nose? |: y.
Dose the patient have following symptom: sneezing? |: y.
Dose the patient have following symptom: sore_throat? |: y.
I belive you have: cold
true.

?- ■

```

```
?- go .  
Dose the patient have following symptom: headache? y.  
Dose the patient have following symptom: runny_nose? |: n.  
Dose the patient have following symptom: fever? |: n.  
Dose the patient have following symptom: rash? |: y.  
Dose the patient have following symptom: nausea? |: y.  
Dose the patient have following symptom: bleeding? |: y.  
I belive you have: ebola  
true.
```

```
?- go .  
Dose the patient have following symptom: headache? y.  
Dose the patient have following symptom: runny_nose? |: n.  
Dose the patient have following symptom: fever? |: y.  
Dose the patient have following symptom: chills? |: y.  
Dose the patient have following symptom: body_ache? |: y.  
I belive you have: flu  
true.
```

```
?- go .  
Dose the patient have following symptom: headache? n.  
Dose the patient have following symptom: fever? |: y.  
Dose the patient have following symptom: runny_nose? |: y.  
Dose the patient have following symptom: rash? |: y.  
Dose the patient have following symptom: conjunctivities? |: y.  
I belive you have: measles  
true.
```

```
?- go .  
Dose the patient have following symptom: headache? n.  
Dose the patient have following symptom: fever? |: n.  
Dose the patient have following symptom: pain_in_joints? |: n.  
I belive you have: unknown  
true.
```