PROJECT REPORT- COMPUTATIONAL LOGIC

Anand Krishnakumar Rajagopalan
akr170430@utdallas.edu

MEDICAL DIAGONISTIC SYSTEM FOR CHILDREN WITH SYMPTOMS

PROJECT OVERVIEW:

The project is a medical diagnostic system for children suffering from particular symptoms.

The symptoms of the child is taken as input and the program returns the probable cause of the disease with a full diagnostic report. The diagnostic report contains the disease that most probably caused the given symptoms for the child. Also, a description about the disease is also provided so that it is easy for the person reading the report, especially the child's parents, to know about the disease.

It also contains instructions about who should be notified and suggests remedy for the disease caused.

The system was made using s(ASP).

CHALLENGES FACED:

- Creating a more interactive interface where the user can ask queries in an easier manner.
- Modelling the problem in such a way to use ASP's capabilities.

OUTLINE OF SOLUTION:

I used two predicates disease and symptom to represent the knowledge base of probable diseases caused from a list of symptoms.

disease(cold):-

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                    _symptom(runny_or_stuffy_nose),
                    _symptom(scratchy_throat),
                    _symptom(coughing),
                    _symptom(sneezing),
                    _symptom(watery_eyes),
                    _symptom(fever),
                    not -disease(cold).
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Also, I had to make to make sure that the Answer set of -disease(cold) is not generated even though disease(cold) is true(hence the final condition).

Also , I added the following closed world assumptions:
-disease(X) :- not disease(X).
-has_symptom(X) :- not has_symptom(X).

Here has_symptom(X) represents if the current patient has the symptom X.

_symptom(Y) :- has_symptom(Y).
has_symptom(X) :- _symptom(X).

I added predicates for notifying the patient as below:

_notify(X) :- _notify_consultant(X), _notify_parent(X).

_notify_parent(X) :- nl,write('NOTIFY PARENT?'),nl, write('The parent should be notified that the child has '), write(X), nl.

_notify_consultant(cold) :- nl,write('NOTIFY HEALTH CONSULTANT?'),nl, write('Not Necessary').

Predicates for suggestion, about, common causes for the disease were also added:

_suggestion(cold):-
                                    nl, write('SUGGESTIONS'),nl, write('Home treatment for the common cold includes getting rest and drinking plenty of fluids.Gargling with warm saltwater may help people with sore throats.'), nl.

_about(cold):-nl, write('ABOUT DISEASE '),nl, write('The common cold, also known simply as a cold, is a viral infectious disease of the upper respiratory tract that primarily affects the nose.The throat, sinuses, and larynx may also be affected. Signs and symptoms may appear less than two days after exposure to the virus.These may include coughing, sore throat, runny nose, sneezing, headache, and fever.People usually recover in seven to ten days, but some symptoms may last up to three weeks.'), nl.

_common_causes(cold):- nl,write('COMMON CAUSES '), nl, write('Viruses(early stage of many viruses) like'), nl, write('Adenovirus, Coxsackievirus, Influenza'), nl, write('bacteria like Mycoplasma'), nl.

Finally the diagnostic report is generated:

diagnosis:- write('----------------------DIAGNOSIS REPORT----------------------------'), nl, disease(X), write(' The child is likely to have '),write(X), _about(X), _notify(X), _common_causes(X), _suggestion(X), nl, write('ANSWER SET GENERATED'), nl.
diagnosis :- nl, write('sorry the system does not have adequate knowledge regarding the following symptoms'),nl.

CONCLUSION:
Through this project I learnt a lot about the capabilities of logic programming and the power of s(ASP).