Medical Expert System Development

Expert system is a program that is designed to think like humans and make decision like a human that is expert in the field it will be used in. Expert systems are made from 3 important components firstly is Knowledge base which is rules that are structed as IF-Then statements. Then comes the inference engine which processes the rules found in the knowledge base then it compares the inputs to the rules and draws a conclusion based on the matches. finally comes the user interface which allows the user to input symptoms which are then send to the inference engine, the user interface also displays the final diagnosis. In this case, we are designing a system that diagnoses medical conditions based on syptomps.it uses Rule-Based approach to match symptoms to possible diseases.

Advantages of Medical expert system:

* Consistency: provides the same diagnosis every time the same symptoms are inputted.
* Accessibility: people with no medical knowledge can figure out their diagnosis.
* Efficiency: Much faster at finding a person diagnose than humans.

Limitations:

* Scope: its limited to the conditions and symptoms in the system.
* No personalization: cannot adapt or patient histories or previous diagnosis.
* Accuracy: it depends solely on the rules and may not account for complex conditions

Steps to implement medical expert system:

1. we need to define the scope of the programs by deciding on what medical conditions the system will cover in this case we will focus on FLU, Common cold, Migraine and measles.
2. we need to collect knowledge in this case we will use reliable source to understand symptoms for each condition. In this case we used 3 reliable sources from Mayo clinic, World Health Organization and centers for disease control and prevention (CDC).
3. Then we create rules in the form of If Then format.
   1. Example:
      1. Rule 1: If fever and Cough Then possible diagnosis is Flu.
      2. Rule 2: If Headache, nausea and light sensitivity then Migraine.
4. Build the inference engine, we will use forward-chaining .forward-chaining work by starting at the symptoms and moving toward the possible outcome in this case diagnoses.
5. Finaly, we need to test to make sure the input of different combinations of symptoms lead to the accurate diagnoses.

Rules:

1. Flu
   1. Symptoms:
      1. Fever,Cough,Fatigue,Sore Throat.
   2. Rule:
      1. IF Fever and Cough,THEN diagnosis is Flu.
2. Migraine
   1. Symptoms:
      1. Headache,Light sensitvity,Nausea.
   2. Rule:
      1. IF Headache,Light sensitvity,Nausea ,THEN diagnosis is Migraine.
3. Common Cold
   1. Symptoms:
      1. Runny nose,Sore Throat,Sneezing,Mild Cough.
   2. Rule:
      1. IF Sore Throat and Sneezing ,THEN diagnosis is Common Cold.
4. Measles
   1. Symptoms:
      1. Fever,Rash,Red Eyes.
   2. Rule:
      1. IF Fever and Rash ,THEN diagnosis is Measles.

# Reference List:

1. Centers for Disease Control and Prevention. (n.d.). Common cold: About. Retrieved December 6, 2024, from https://www.cdc.gov/common-cold/about/index.html

2. Mayo Clinic. (n.d.). Migraine: Symptoms and causes. Retrieved December 6, 2024, from https://www.mayoclinic.org/diseases-conditions/migraine-headache/symptoms-causes/syc-20360201

3. World Health Organization. (n.d.). Influenza (seasonal). Retrieved December 6, 2024, from https://www.who.int/news-room/fact-sheets/detail/influenza-(seasonal)

4. World Health Organization. (2024, November 14). Measles. Retrieved December 6, 2024, from https://www.who.int/news-room/fact-sheets/detail/measles

5. Javatpoint. (n.d.). Expert systems in artificial intelligence. Retrieved December 6, 2024, from https://www.javatpoint.com/expert-systems-in-artificial-intelligence