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“Diagnostic Expert System”

Project Description

An expert system to determine the disease by its symptoms, then assign the patient to the doctor.

The expert system will determine the disease by asking the user some questions, then the system will display the disease name and the assigned doctor name, doctor specialty, room, and cost.

To-Do

1. Using Python Programming Language
2. Creating 10-15 doctors with the specialties as the diseases specialties in the (neurologist, etc..) and random names and random room numbers.
3. Assigning each doctor a cost for each disease. (if the disease is within his specialty the cost will be low, and if not, the cost will be high).
4. Developing an algorithm to assign the doctor with minimum cost to the patient, not hard code the system with multiple if statements.

Diseases

1. Coronary artery disease(CAD): (cardiologist)

Symptoms:

Pain , numbness in the chest , dizziness, weakness, fatigue, nausea and vomiting.

2. Stroke: (Neurologist)

Symptoms:

Numbness, weakness ,fatigue in one side of the body, difficulty speaking.

3. Lower respiratory infections (LRI): (pulmonologist)

Symptoms:

Shortness of breath ,weakness, fatigue ,fever, cough.

4. Chronic obstructive pulmonary disease (COPD): (pulmonologist)

Symptoms:

Cough, Shortness of breath , wheezing , chest tightness

5. Lung cancer: (pulmonologist)

Symptoms:

Cough, Shortness of breath, chest pain, weakness, fatigue, weight loss

6. Diabetes mellitus (DM): (Endocrinologist)

Symptoms:

Weakness, Fatigue , nausea , weight loss, blurred vision.

7. hyperthyroidism: (Endocrinologist)

Symptoms:

Weight loss , fatigue, weakness, rapid heart rate, nervousness.

8. Allergy: (allergist)

Symptoms:

Nausea, vomiting, wheezing, dizziness, itching, swelling.

9. Arthritis: (Rheumatologists)

Symptoms:

Fatigue, pain, swelling, joint redness, joint warmth.

10. Asthma: (allergist)

Symptoms:

Shortness of breath, chest pain, chest tightness, wheezing.

11. HIV: (gynecologist in women)

Symptoms:

Nausea, vomiting, fatigue, cough, shortness of breath, fever.

12. diarrhoeal diseases: (gastroenterologist)

Symptoms:

Fever, nausea, abdominal pain and cramps, bloating.

13. Cirrhosis: (gastroenterologist)

Symptoms:

Weakness, weight loss, itching, nausea, pain, vomiting.

14. acute bronchitis: (pulmonologist)

Symptoms:

Cough, fatigue, shortness of breath, fever, chest discomfort.

15. Heart failure: (cardiologist)

Symptoms:

Weakness, fatigue, cough, shortness of breath, wheezing, swelling.

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Methodology/Algorithm (Filtration Algorithm)

When the system starts to diagnose the user by asking the questions about the symptoms the user might have.

That symptom asked about is generated by an algorithm that checks for the most frequent symptom across all diseases.

Then the user answers with yes/no to the question.

If the user answers with yes, then the algorithm eliminates all the diseases that do NOT contain the asked about symptom.

And if the answer was no, the algorithm eliminates all the diseases that contain the asked about symptom.

Once the user answers whether with yes or no and the dictionary of diseases is updated after the elimination/excluding, then the algorithm of choosing the next symptom to ask about is applied. It sees the most frequent symptom across all the remaining diseases after the elimination then it asks about it, and so on. It's like a filtration algorithm. It keeps excluding the diseases until one disease remains then that user have that disease. Then the expert system displays the disease name to the user. Besides the disease name that is displayed, there's also some other information displayed to the user as well, such as the doctor name, and his specialty. This is randomly generated from a predefined dictionary that contains doctor names with their specialties.

There's also a room number that is generated and this is randomly created within the range of 150 to 250 as integer values.

There is also the cost that is displayed which is low or high (50 or 100) depending on whether the disease is within the specialty of the doctor. If it's within the specialty then the cost is low (50) and if not then it is high cost (100).

By this algorithm, our expert system can diagnose the user with the minimum questions possible.

The algorithm was made using Python, and the GUI was created with PyQt Designer.