

AI CS 6364.003 SP14 Project Report

Medical Diagnosis System

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Description:

The problems that are faced by patients are generally common and each and every time common solutions are given to them. If a patient is facing some new problem or some new symptom regarding a disease then the doctors need to think on every time and suggest some new medicines. So there should be a system which keeps track of the current and new symptoms and the medicines suggested against it so it can help saving time for future.

Why It Is Important

It is important to store the data of all the cases in the past and also current ones so it easy to recollect data in case where there are similar symptoms. As the diseases is detected based on the symptoms , it plays a vital role to store the symptoms and help to solve the cases in future.

Proposed Solution:

The System will be asking few questions to the patients regarding the symptoms, which are common, and being faced. Based on the symptoms which faced the knowledge store will check for past cases and one which has the maximum probability will we thrown as the maximum chances disease.

Once the disease is detected by the system, the database is updated and

Examples:

1) UTD HEALTH CENTRE

In UTD Health center I had been treated for a wound so was able to have a good look at the system. It consisted of dynamic entries based on the options selected at time. E.g. The nurse selected the wound option then the system asked for the size of the cut. After the size was mentioned the system recommended that stitches were not necessary. She asked me for any allergies so the medicine to go for the wound treatment was suggested by the system.

Data Set:

1. # Diseases (apprx 4-6)
2. # Symptoms/Disease (apprx 7-10)
3. # Cases/disease (apprx 3-6)

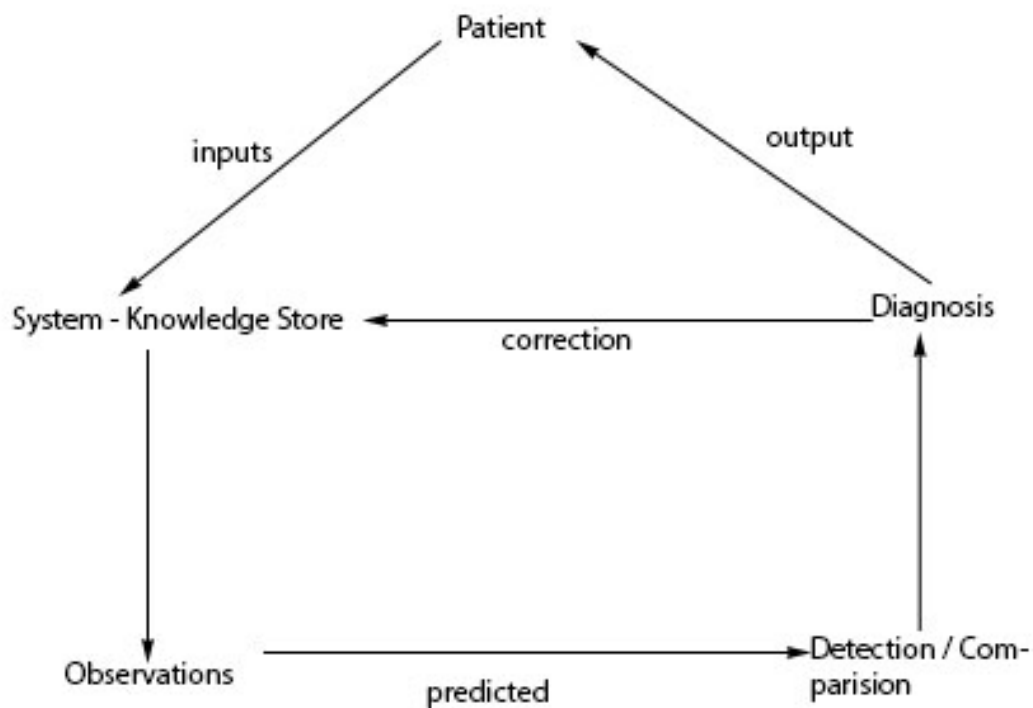
Techniques for Detection:

Naive Bayes Classification

Programming Tools:

- Eclipse SDK (JAVA SWIING)
- Eclipse to DB connectivity JAR file
- SQL SERVER

Architectural Diagram:



reference:

1. [wiki/Diagnosis_\(artificial_intelligence\)](#)
2. http://en.wikipedia.org/wiki/Bayesian_network
3. http://en.wikipedia.org/wiki/Machine_learning

Implementation Details

The Front-End (GUI) part is developed in JAVA Swing and the backend is developed and maintained in MS SQL Server 2012.

The Connection between Java and SQL server is made by a third party .jar file extension. There is a third party windows builder .jar file is needed for form creation in java swing.

The database consists of all the tables which consists of all the diseases and symptoms which helps to maintain the track record of cases.

Views are used to fire queries on database for counting probability for calculations.

```
select * from probability_appendix
select * from probability_dengue
select * from probability_influenza
select * from probability_measles
select * from probability_pollen
```

appendix_fever	appendix_nausea	appendix_vomiting	appendix_sleeping	appendix_urination	appendix_headache	appendix_muscle	appendix_rashes	appendix_cough	appendix_nose
1	1	0.6	0.4	0	0.8	0	0	0	0

dengue_fever	dengue_nausea	dengue_vomiting	dengue_sleeping	dengue_urination	dengue_headache	dengue_muscle	dengue_rashes	dengue_cough	dengue_nose
1	1	0.6	0	0	1	0.4	0.6	0	0

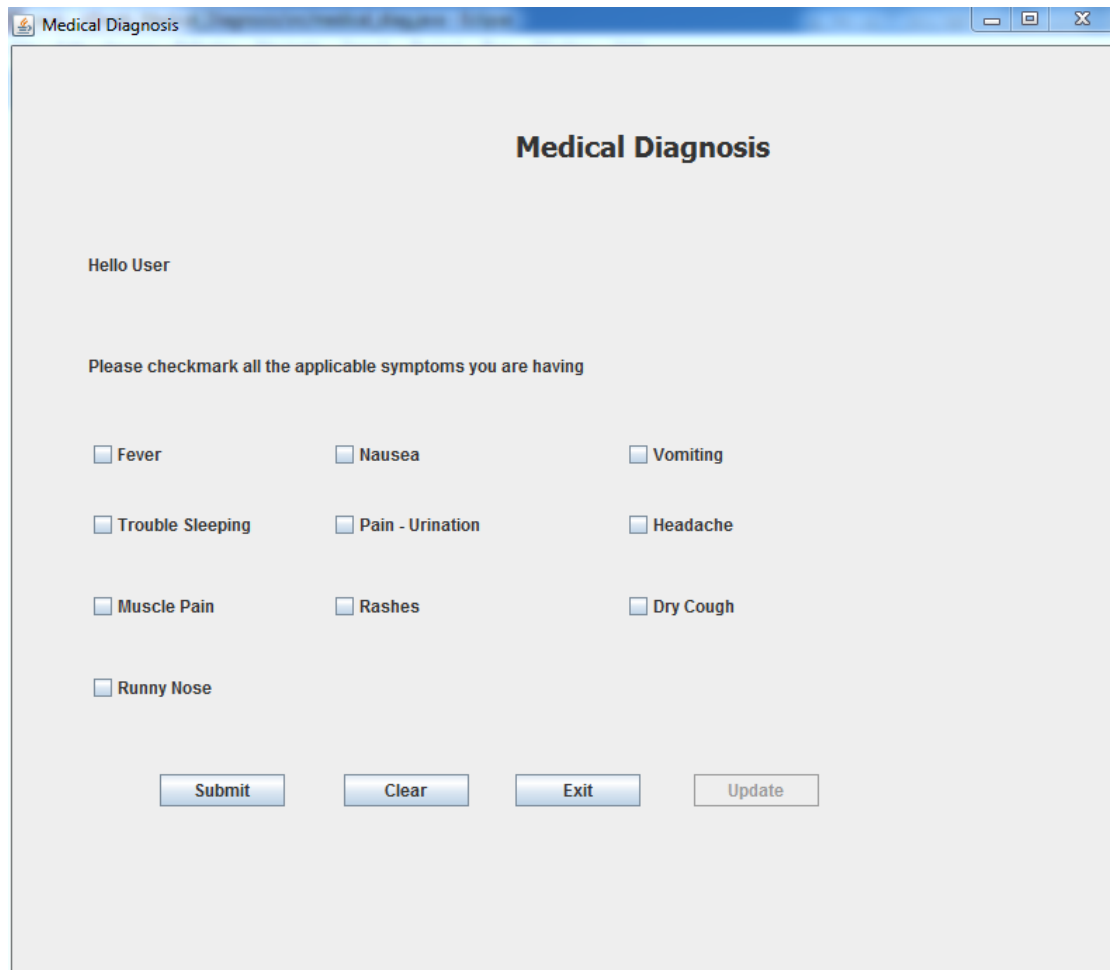
influenza_fever	influenza_nausea	influenza_vomiting	influenza_sleeping	influenza_urination	influenza_headache	influenza_muscle	influenza_rashes	influenza_cough	influenza_nose
1	0	0	0.2	0	1	1	0	1	0.6

measles_fever	measles_nausea	measles_vomiting	measles_sleeping	measles_urination	measles_headache	measles_muscle	measles_rashes	measles_cough	measles_nose
1	0	0	0.4	0	0.4	0	1	1	1

pollen_fever	pollen_nausea	pollen_vomiting	pollen_sleeping	pollen_urination	pollen_headache	pollen_muscle	pollen_rashes	pollen_cough	pollen_nose
0	0	0.4	0	0	0	0	1	1	0.2

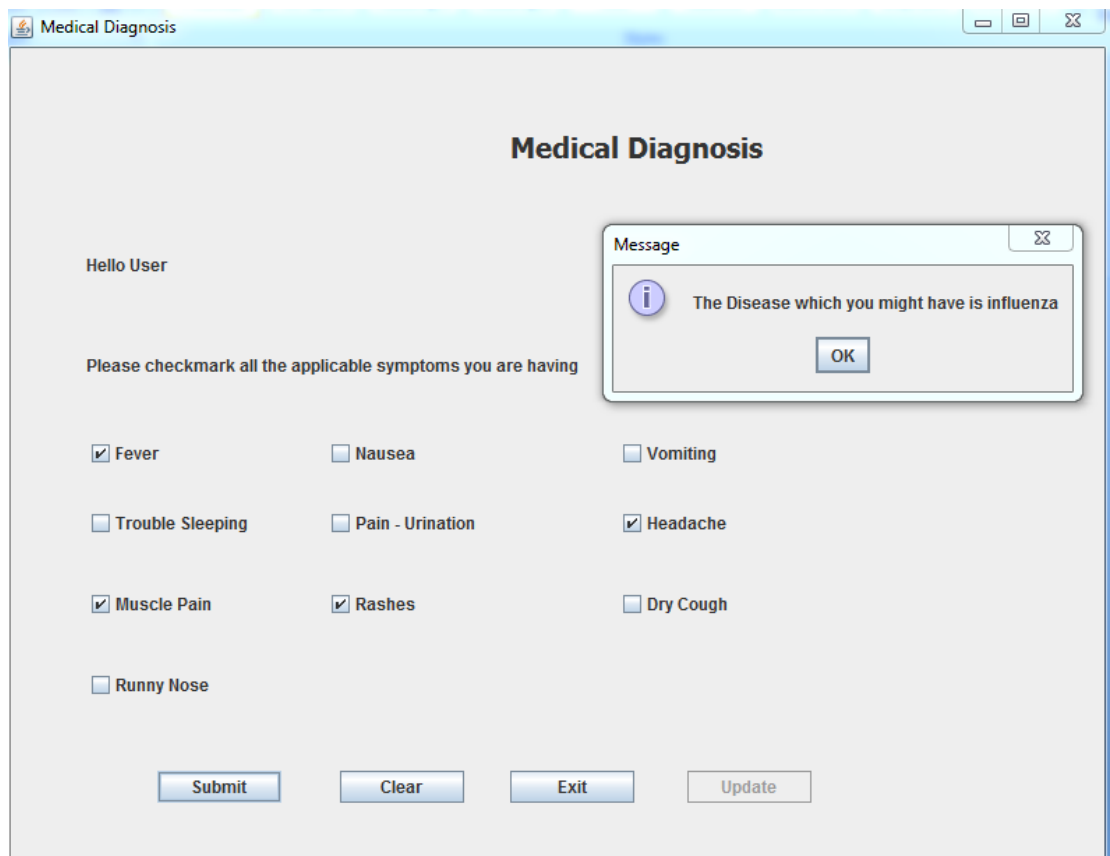
This is a probability table(VIEW) which is maintained in SQL Server.

Results:



The screenshot shows a Java Swing window titled "Medical Diagnosis". Inside the window, the title "Medical Diagnosis" is centered at the top. Below the title, the text "Hello User" is displayed. Further down, a prompt says "Please checkmark all the applicable symptoms you are having". There are ten checkboxes arranged in three columns: "Fever", "Nausea", "Vomiting" in the first row; "Trouble Sleeping", "Pain - Urination", "Headache" in the second row; "Muscle Pain", "Rashes", "Dry Cough" in the third row; and "Runny Nose" alone in the fourth row. At the bottom of the window, there are four buttons: "Submit", "Clear", "Exit", and "Update".

This is the form used to get the input from user



This screenshot shows the same "Medical Diagnosis" window, but with a message dialog box open on top of it. The dialog box is titled "Message" and contains an information icon (a lowercase 'i' in a circle) followed by the text "The Disease which you might have is influenza". There is an "OK" button at the bottom right of the dialog box. In the background window, the checkboxes for "Fever", "Muscle Pain", and "Headache" are now checked, while the others remain unchecked. The "Submit", "Clear", "Exit", and "Update" buttons are still visible at the bottom.

This is the output we get in the Swing application

Medical Diagnosis

Hello User

Please checkmark all the applicable symptoms you are having

☒ Fever
 ☐ Nausea
 ☐ Vomiting

☐ Trouble Sleeping
 ☐ Pain - Urination
 ☒ Headache

☒ Muscle Pain
 ☒ Rashes
 ☐ Dry Cough

☐ Runny Nose

Message

Data Successfully inserted into database for record

Once result is obtained it is stored in database for future reference

```

medical_diag [Java Application] C:\Program Files\Java\jre8\bin\javaw.exe (May 6, 2014, 10:20:44 PM)
Appendix probability calculated =0.32479998
Dengue probability calculated =0.41439998
Influenza probability calculated =0.3422222
Measles probability calculated =0.27222222
Pollen probability calculated =0.27222222
The Disease which you might have is dengue
insert into dengue values(1,0,0,0,0,1,1,1,0,0)
  
```

This is the output in java and probability calculated for diseases given symptoms.

```
select * from dengue
```

	fever	nausea	vomiting	sleeping	urination	headache	muscle	rashes	cough	nose
1	1	1	1	0	0	1	1	1	0	0
2	1	1	1	0	0	1	1	0	0	0
3	1	1	1	0	0	1	0	1	0	0
4	1	1	0	0	0	1	0	0	0	0
5	1	1	0	0	0	1	0	1	0	0

The data stored in database

Problems Encountered:

- With decision making on how to track probability of each diseases and how to use it wisely. This problem was solved by creating views in database which fires query runtime when we need it tracking every thing.

Pending Issues:

- To track and detect the disease with one more technique and compare it to the other technique.

Future Improvement:

- To keep track of a personal patient record. So it can help to track record based on a particular patient and also all cases based on some factors like age, gender, weight which can be taken into consideration.
- To increase the number of symptoms and also diseases and classify them based on the organs or upper / lower body.