Disease Observation and Forecasting System

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Abstract

Our program's aim is to predict the future diseases that can harm our people and be ready for production of necessary medicines that can help us. Using this program, pharmaceutical companies can take decisions for future productions. This program uses the collected data from different medicine stores and calculates the data. Using the calculation, our program gives a decision for which diseases the pharmaceutical company should produce medicines for future in order to keep pace with the future demand. Since, there are a lot of medical representatives for a pharmaceutical company; the number of various sold medicines throughout an entire area/locality/city/country can be collected easily. Thus, this program can easily work using those collected data.

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Chapter 1

Introduction

1.1 Welcome

Welcome to our project report. We have faced some challenges to complete this project. We have done some research on medicines as well as on some pharmaceutical companies. Disease forecasting is totally based on the number of medicines sold for a particular time.

1.2 What is Disease Observation?

Disease observation is the process gaining more information on any particular disease. This process includes analysis of disease, disease transmission information and many other information. Disease observation process varies from disease to disease. By observation of a disease we can know about a disease properly. Thus we can take necessary steps in advance to prevent any particular disease and its harmful effect.

1.2.1 Importance of Disease Observation

In the field of medical, the importance of disease observation is great. Through observation we can learn about disease's behavior and it's analogy. We can also learn about a disease's root cause and learn how to prevent it from causing death.

1.3 What is Disease Forecasting?

Disease forecasting is a management system used to predict the occurrence or change in severity of various diseases. Accurate disease forecasting models would markedly improve epidemic prevention and control capabilities. There are unlimited ways to develop a forecast system. In principle, forecasting should not be regarded as the answer provider rather as a tool increase understanding and highlight important processes.

1.3.1 Importance of Disease Forecasting

Not only in the field of pharmaceuticals but also in medical science, disease forecasting is a new concept to fight against disease. Disease forecasting can tell us about future risk of any disease. We can consider it a very important tool to use for taking nearly perfect decision. Pharmaceutical companies can do a better research based on various data from current markets. Even, this vast data collection can be used for developing a well health system of a country.

1.4 Our Contributions

We have used general formula of probability to predict the data of future disease risk. Based on the given market sales data at root level the system will be able to analysis that which disease is now currently most occurring in the particular region or locality.

1.5 Organization of the Project Works

We have designed our rest of the project works as following: In Chapter 2, we have discussed about some related works/articles in disease observation and forecasting; our proposed solution or model are discussed briefly in Chapter 3; Chapter 4 presents the result of demo input and output; Chapter 5 includes some code part; Chapter 6 how

exception is handled; Lastly proper references of our project works.

Chapter 2

Related Works

2.1 Introduction

Disease observation and forecasting is a new topic for medical system as well as for pharmaceutical companies. So, we have gone through some research papers as well as many websites to understand about medicines and diseases. We had to go through a lot of information and analysis at the time of giving input in the database.

2.2 Related Works

Many institutions as well as many individual experts are now researching on this topic and also publishing papers which are as follows:

2.2.1 Forecasting in Communicable Diseases

Forecasting in communicable diseases necessitates good epidemiological practice, a functional surveillance system and statistical and mathematical expertise. It sets the communicable diseases as first priority for forecasting. Forecasting horizon is divided into short-term, mid-term or long-term.They decided that the shorter horizon is more easier and more accurate forecast.

2.2.2 National Surveillance and Systems

WHO have published a paper on evaluating the cost and benefits of disease surveillance and systems on national level. Surveillance and response activities are diverse and spread over many layers of health system.In this paper they have discussed about the benefits of surveillance system and also discussed about different approaches of surveillance system.

2.2.3 Prediction Rule for Undifferentiated Arthritis

In this paper, author tried to form a rule based on 9 clinical variables: sex, age, localization of symptoms, morning stiffness, the tender joint count, the swollen joint count, the c-reactive protein level, rheumatoid factor positivity and the presence of anti-cyclic citrullinated peptide antibodies. This model used to predict disease for individuals.

Chapter 3

Our Proposed Model

3.1 Introduction

In case of medical science and pharmaceutical business, disease observation and forecasting is now one of the top ranking topics. We have studied our countries pharmaceuticals business situation and other related topics and we tried to establish a very simple model of disease forecasting.

3.2 Some Factor Learning

We have used a very general theory of probability. Many events can't be predicted with total certainty. The best way we can say is how likely they are to happen, using the idea of probability. Probability of an event happening = Number of ways it can happen/Total number of outcomes

For example the probability of a coin landing heads is and the probability of a coin landing tail is .

3.3 Our Project Idea

Everyday a lot of different medicines are sold all over the country through thousands of medicine stores. Every pharmaceutical company recruits a lot of medical representatives for their product promotion. Our idea is to collect the number of sold medicines from

different pharmacies through these medical representatives. We can also use volunteers for this type data collection from root level. Then we will use the data for prediction. We will have different database different medicines and their treatment information. The system also has the database of long term effect of all medicines. The system will compute the probability from the collected data of medicines and find the maximum probability. The medicine which probability will be match with the database. The system will show the future disease that can occur. Based on this prediction, pharmaceutical companies can decide about their future production. Our system will be able to tell the maximum sold product and also can predict the future diseases that can occur in general.

3.4 Conclusion

It is very important that in which method the data are collected. Currently we are considering that volunteers in the field will be collecting data. Long term effect or consequence of a medicine should be carefully used. We have collected those data by studying various articles, papers and websites.

Chapter 4

Program Simulation

4.1 Introduction

In this chapter, we will use some demo input for our program and we will see how it works in the program. We will see how it predicts and show results.

4.2 Menu

In this part of the report, we will see the user interface of the menu of the program.In the menu there are two options. One is directly go to the main program and the second option represents exit from the program.

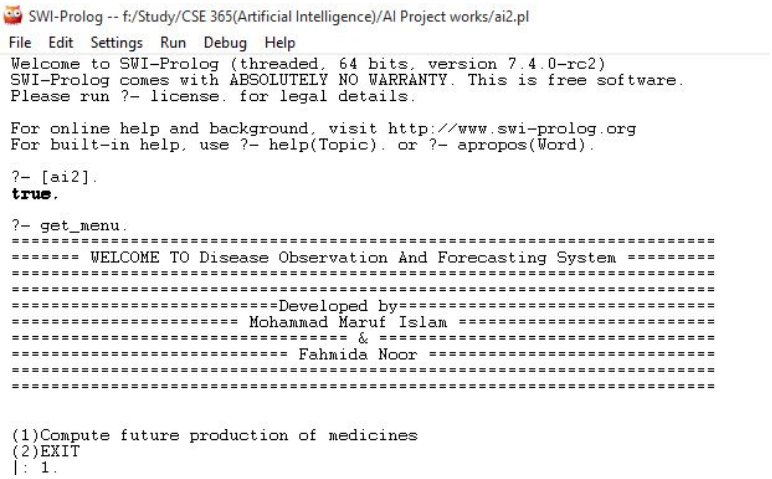

Figure 4.1:

4.3 Sample Input

We have used some random numbers as input. We have used 18 types of medicines as input in this program. The demo input of the program is given below.

```
(1)Compute future production of medicines
(2)EXIT
|: 1.
Enter the number of SECLO(Sqare Pharmaceuticals) is sold in this quarter
|: 456886.
Enter the number of LOSECTIL (Eskayef Bangladesh) is sold in this quarter
|: 458999.
Enter the number of NEOTACK (Squar Pharmaceuticals) is sold in this quarter
|: 6555544.
Enter the number of NAPA (Beximco Pharmaceuticals) is sold in this quarter
|: 55643.
Enter the number of ACE (Square Pharmaceuticals) is sold in this quarter
|: 569988.
Enter the number of FLUCLOX (ACI Limited) is sold in this quarter
|: 998876.
Enter the number of FLUBEX (Beximco Pharmaceuticals) is sold in this quarter
|: 334789.
Enter the number of AVALON (Techno Drugs) is sold in this quarter
|: 233568.
Enter the number of FIMOXYL (Sanofi-Aventis Bangladesh Ltd.) is sold in this quarter
|: 44678.
Enter the number of MOXACIL (Square Pharmaceutical Ltd.) is sold in this quarter
|: 34789.
Enter the number of PROPRANOL (Opsonin Pharma Limited) is sold in this quarter
|: 146678.
Enter the number of ACE INDEVER (ACI Ltd.) is sold in this quarter
|: 345687.
Enter the number of IMOTIL (Square pharmaceuticals) is sold in this quarter
|: 566784.
Enter the number of NOMOTIL (Ziska pharmaceuticals) is sold in this quarter
|: 3336678.
Enter the number of OSARTIL (Incepta Pharmaceuticals Ltd.) is sold in this quarter
|: 6777543.
Enter the number of LOSARDIL (Drug International Ltd.) is sold in this quarter
|: 988765.
Enter the number of GLUCONIL (ACME Laboratories Ltd.) is sold in this quarter
|: 34567.
Enter the number of DIALON (Eskayef Bangladesh Ltd.) is sold in this quarter
|: 887765.
22828227 is the Summation
```

Figure 4.2:

4.4 Sample Output

```
2.0014081689305088 is the Probability of SECLO
2.0106642535138626 is the Probability of LOSECTIL
28.716833769000104 is the Probability of NEOTACK
0.24374648105610655 is the Probability of NAPA
2.496856194745216 is the Probability of ACE
4.3756179575400225 is the Probability of FLUCLOX
1.4665571706466736 is the Probability of FLUBEX
1.0231543606080316 is the Probability of AVALON
0.19571384146477955 is the Probability of FIMOXYL
0.15239466472801413 is the Probability of MOXACIL
0.6425290934771237 is the Probability of PROPRANOL
1.514296313945012 is the Probability of INDEVER
2.482820939182005 is the Probability of IMOTIL
14.616457073078868 is the Probability of NOMOTIL
29.68930964283823 is the Probability of OSARTIL
4.331326300548877 is the Probability of LOSARDIL
0.1514221844736343 is the Probability of GLUCONIL
3.888891590222929 is the Probability of DIALON
```

Figure 4.3:

We can see here the output of the program. Here, we have showed the output probability multiplying by 100, so, that we can easily distinguish the difference among them.The demo output is given below.

4.5 Final Result

```
The generic name of OSARTIL is Loperamide
Loperamide is used for: Treating symptoms or diarrhea (including travelers diarrhea).
contents.
Number of People with diarrhea are increasing day by day
*********************************************************************************
Recommended medicines production for future for these people:-
# Medicine for Fatigue(like OR Saline.
# Medicine for Constipation.
# Medicine for Skin Rash.
# Medicine for itching.
---------------------------------------------------------------------------------
```

Figure 4.4:

In this part of this section we will see the final outcome of the program. The final result is given below.

4.6 Conclusion

The final outcome will show the prediction. We have database of long term effect of various medicines as well as of various diseases by which this program can successfully show the prediction. This outcome can be used by pharmaceutical companies to determine the future demand of product.

Chapter 5

Coding Part

5.1 Introduction

In this part, we will discuss about the key logics and code we have used in the program. We have used some general coding logic to create this program.

5.2 Menu Part

We have simply used if/else in the menu part. A glimpse of coding part is given below.

```
write('(1)Compute future production of medicines'),nl,
write('(2)EXIT'),nl,

read(MENU),

(
    (MENU==1)->
    (
        get_prob
    );
    (MENU==2)->
    (
        write('Thank you for using the system'),nl
    );
    (
        write('!!!!!!!!! Attention !!!!!!!!!'),nl,
        write('You Have entered wrong option'),nl,
        write('!!!!!!!!! Attention !!!!!!!!!'),nl,
        get_menu
    )
).
```

Figure 5.1:

5.3 Input Part

We used write and read function for taking input. Coding of input part is given below.

```
get_prob:-

    /*-------------------TAKING INPUT------------------- */
    write('Enter the number of SECLO(Sqare Pharmaceuticals) is sold in this quarter'),nl,
    read(SECLO),
    write('Enter the number of LOSECTIL (Eskayef Bangladesh) is sold in this quarter'),nl,
    read(LOSECTIL),
    write('Enter the number of NEOTACK (Squar Pharmaceuticals) is sold in this quarter'),nl,
    read(NEOTACK),

    write('Enter the number of NAPA (Beximco Pharmaceuticals) is sold in this quarter'),nl,
    read(NAPA),
    write('Enter the number of ACE (Square Pharmaceuticals) is sold in this quarter'),nl,
    read(ACE),
```

Figure 5.2:

5.4 Output Part

The output part of our program is divided into two parts. First one is the probability calculation and the other one is finding the maximum probability.

5.4.1 Calculating Probability

Calculation of probability is done in the program using general arithmetic operation. Coding part of the probability calculation is given below.

```
get_calculation(SECLO,LOSECTIL,NEOTACK,NAPA,ACE,FLUCLOX,FLUBEX,AVALON,FIMOXYL,MOXA

    X is (SECLO + LOSECTIL + NEOTACK + NAPA + ACE + FLUCLOX + FLUBEX + AVALON + FI
        PROPRANOL + INDEVER + IMOTIL + NOMOTIL + OSARTIL + LOSARDIL + GLUCONIL + D
    format('~w ~s Summation ~n',[X,"is the"]),nl,

    (
        (SECLO>=0 , SECLO=<100000000)->
            (
                X1 is ((round(SECLO)/X)*100),
                format('~w ~s Probability of SECLO ~n',[X1,"is the"]),nl
            ),
        (LOSECTIL>=0 , LOSECTIL=<100000000)->
            (
                X2 is ((round(LOSECTIL)/X)*100),
                format('~w ~s Probability of LOSECTIL ~n',[X2,"is the"]),nl
            ),
        (NEOTACK>=0 , NEOTACK=<100000000)->
            (
                X3 is ((round(NEOTACK)/X)*100),
                format('~w ~s Probability of NEOTACK ~n',[X3,"is the"]),nl
            ),
        (NAPA>=0 , NAPA=<100000000)->
            (
                X4 is ((round(NAPA)/X)*100),
                format('~w ~s Probability of NAPA ~n',[X4,"is the"]),nl
            ),
```

Figure 5.3:

5.4.2 Calculating Maximum

After calculating probability, based on the result, a function called getmax will calculate the final maximum probability which is the final result.

```
get_max(X1,X2,X3,X4,X5,X6,X7,X8,X9,X10,X11,X12,X13,X14,X15,X16,X17,X18):-
    M1 is max(X1,X2),
    M2 is max(M1,X3),
    M3 is max(M2,X4),
    M4 is max(M3,X5),
    M5 is max(M4,X6),
    M6 is max(M5,X7),
    M7 is max(M6,X8),
    M8 is max(M7,X9),
    M9 is max(M8,X10),
    M10 is max(M9,X11),
    M11 is max(M10,X12),
    M12 is max(M11,X13),
    M13 is max(M12,X14),
    M14 is max(M13,X15),
    M15 is max(M14,X16),
    M16 is max(M15,X17),
    M17 is max(M16,X18),
    format('~w ~s Max Number',[M17,"is the"]),nl,
    get_result(X1,X2,X3,X4,X5,X6,X7,X8,X9,X10,X11,X12,X13,X14,X15,X16,X17,X18,M17).
```

Figure 5.4:

Chapter 6

Exception Handling

6.1 Introduction

We are going to discuss about some exceptions that we have handled in this program. Exception handing is a part of a good program. We have taken an extra care to provide a bug free and complete intelligent program that can handle most of the exceptions.

6.2 Exception Handling in Menu

We have used condition for handling exception in the menu. If any input rather than 1 or 2 is given then the system will give an error message in the console.

6.3 Exception Handling in Main Input

We have used if condition for handling exception in the main input. If any input bigger than 10000000 or any input less than 0 is given then the system will give an error message in the console.

Chapter 7

Bibliography

7.1

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