KANTIPUR ENGINEERING COLLEGE

(Affiliated to Tribhuvan University)

Dhapakhel, Lalitpur

[Subject Code: CT755]

A MAJOR PROJECT MID-TERM REPORT ON

WECARE-YOUR PERSONAL HEALTH ASSISTANCE

Submitted by:

Abhishek Gurung [91/BCT/072]

Manjil Nepali [105/BCT/072]

Sagar Maharjan [118/BCT/072]

Sovin Shrestha [126/BCT/072]

A MAJOR PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR IN COMPUTER ENGINEERING

Submitted to:

Department of Computer and Electronics Engineering

July, 2019

WECARE-YOUR PERSONAL HEALTH ASSISTANCE

Submitted by:

Abhishek Gurung [91/BCT/072]

Manjil Nepali [105/BCT/072]

Sagar Maharjan [118/BCT/072]

Sovin Shrestha [126/BCT/072]

A MAJOR PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR IN COMPUTER ENGINEERING

Submitted to:

Department of Computer and Electronics Engineering

Kantipur Engineering College

Dhapakhel, Lalitpur

July, 2019

ABSTRACT

According to the World Health Organization, health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Better health is central to human happiness and well-being. Our project ”WeCare” is a prediction system that helps the user to get the information about the disease according to the symptoms they feed to the system. So that it is also called as Health Assistance application because it assists the user about the possible disease but does not give the exact information.

Traditionally, physicians or doctors use a risk calculator to assess the possibility of disease development. These calculators use fundamental information such as age, medical conditions, and more to calculate the probability of developing a certain disease. Main aim of our project is to develop the prediction system which predict the disease with help of data mining algorithm i.e. Feed Forward Back Propagation Neural Network

Keywords– Health Assistance,Data Mining, Back Propagation Neural Network

ACKNOWLEDGMENT

This project is the outcome of inspiration and moral support of many people and for this we are grateful to them all. It's hardly possible to list the names of all but we sincerely acknowledge their incredible contribution during the preparation. We take this opportunity to express our sincere gratitude to all those who have directly or indirectly inspired us for the completion of this project.

We express our gratitude towards the Computer and Electronic Department of Kantipur Engineering College for providing us the learning and working environment which was helpful to work for our team. We are very grateful to our project supervisor Shagar Upadhyay for his support in this project. Special thanks goes to Er. Bishal Thapa and Er. Shiva Gautam for providing us theoretical background, practical advice and valuable suggestions for the development of this design. We would also like to thank the library staff for providing us with the study materials needed for research purposes.

Abhishek Gurung	[91/BCT/072]
Manjil Nepali	[105/BCT/072]
Sagar Maharjan	[118/BCT/072]
Sovin Shrestha	[126/BCT/072]

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

1.1 Background

Human health is a relative state in which one is able to function well i.e physically, mentally and live socially well-being within the environment in which one is living. The human body is an incredible machine i.e has the ability to adapt, repair itself and manage challenges throughout life. With the on-going development of world over years, human learns the symptoms of affected human and provide remedy for hazardeous diseases.

The health sector is of critical importance for human development, improving living standards in rural areas and for mainstreaming marginalized groups and communities. Despite significant progress in recent years, service delivery in the health sector remains weak. Although an extensive network of primary health care centres has been constructed nationwide, it has not been functioning well in many rural areas due to lack of trained staff, drugs and medicines, etc. The sector's overall performance has suffered due to inadequate funding for essential recurrent expenditures, misallocation of resources and limited capacity for supervision and for co-ordination of the activities of other agencies providing health care services.

This android application entitled "WeCare-Your Personal Health Assistance" aims to be helpful application by predicting the possible diseases as Tele-medicine center. Our proposed system takes symptoms from the user as input and data mining technique is used to do provisional diagnosis as practiced in telemedicine centers. Similar to that in telemedicine center, output generated doesn't provide fully diagnosed results. The user has to consult doctor for further treatment.

In order to reduce the risk of disease, prediction should be done. Discovering of disease is usually based on symptoms, physical examinations and signs of patient body. Normally, doctors are predicting disease by knowledge and experience. Discovering and predicting diseases is a difficult task in medical environment. Discovering disease from

several factors is a multi-layered problem which may lead to negative presumptions and unpredictable effects. As a result, Health-care industry today creates large amounts of complex data about patients, hospitals resources, disease diagnosis, electronic patient records, medical devices etc. The huge amount of data is a key resource to be processed and analyzed for knowledge extraction that enables support for cost-savings and decision making.

1.2 Problem Statement

Taking appointment with the doctors is very difficult in both rural an urban areas of Nepal. Like most developing nations, doctors are geographically maldistributed in Nepal. The Kathmandu valley has one doctor for 850 people but in rural areas the number is one doctor for every 150000 people. The doctor-population density in Kathmandu is estimated to be about 40 times that in rural Nepal.

People often feel reluctant to go to hospital or physician on minor symptoms. However, in many cases, these minor symptoms may trigger major health hazards. If they get some information about the disease they might have been suffering from, it will be helpful when they discuss their problems with the doctor later.

People will not know the possible reasons for the disease and may be mistaken with other disease. It will be helpful to take the preventive measures if people have some idea about the disease they are suffering from. Now a day's people are busy on their daily life works so they forget to take their medicine on time, thus it could be helpful if someone notify them on time to take their medicine. So, Pill Reminder lets you create tasks with a deadline. The reminder simply reminds you when it's time to do it.

1.3 Objectives

The major objectives are listed:

- To give environment to the users to diagnose their symptoms.
- To list out provisional diagnosed diseases.
- To help users take an active role in meaning their health by providing objective healthcare information.

1.4 Applications

This developed application enables users to make sense of symptoms and recognition of disease by decision algorithm. This project has wide use in various fields.

As in rural areas, it might have happened so many times that people may need doctors help immediately, but they are not available due to some reason. This project allows user to get instant guidance on their health related problems. This app is a tool for user to check their symptoms, find trusted information and probable diseases with questionnaire based on the symptoms. This project is not limited to diseases prediction only, it suggests basic preventive measures and overview of the disease. Users can take immediate action. This project has wide area of application use in telemedicine centers. It can be easily access by nursing home staffs, sometimes parents and patient themselves. Users can get quick instant guidance of disease with preventive measures.

This project also provides the functionality of pill reminder, where users can get instant notifications of time and medicine to be taken according to their prescriptive noted schedule. As taking of medicine pill in time, during of sickness has great affect in health, pill reminder can be very useful to users.

1.5 Features

The features are listed:

- Provides suggestions and informs about the possible occurence of disease based on the symptoms ans users information.
- User friendly interface.
- Suggest basic preventive measures and overview of disease.
- Works as pill reminder.

1.6 Feasibility Analysis

1.6.1 Economic Feasibility

Economic Feasibility is the cost and logistical outlook for a business project and is carried out to check the economic impact to the organization by the use of this system. The amount of fund that the company can invest for system is limited.

1.6.2 Technical Feasibility

This study is carried out to check technical requirements of the system. Any system developed must not have a high demand on the available technical resources as this may lead to high demands being placed on the client. This project doesn't incorporate the use of complex hardware. The technology required for the project is practical and necessary technical resources and expertise are assured.

1.6.3 Operational Feasibility

Operational feasibility is the ability to utilize, support and perform the necessary tasks of a system or program. The aspect of study is to check the level of acceptance of the system by the user. This system has been developed with users in mind. With the use of android technology, the system is easy to use and operate. The effective operation

of the system can be achieved in required health purpose application. Greater level of user-friendliness and high performance of the proposed system can be achieved.

1.7 System Requirements

1.7.1 Software Requirements

- Android Studio
- Java
- Python
- Flask

1.7.2 Hardware Requirements

- Android Mobile

CHAPTER 2
LITERATURE REVIEW

There are different areas in medicine where an expert system has been designed and implemented. Numerous works has been done related to disease diagnosis using different data mining techniques.

2.1 Previous Work On Medical Expert System

2.1.1 MYCIN

MYCIN is the name of a decision support system developed by Stanford University in the early-to mid-seventies, built to assist physicians in the diagnosis of infectious diseases. The system (also known as an ”expert system”) would ask a series of questions designed to emulate the thinking of an expert in the field of infectious disease (hence the ”expert-”), and from the responses to these questions give a list of possible diagnoses, with probability, as well as recommend treatment (hence the ”decision support-”).

MYCIN is an AI program designed:

- to provide expert level solutions to complex problems
- to be understandable
- to be flexible enough to accommodate new knowledge easily

MYCIN was designed to provide advice through a consultative dialogue, which sometimes refer to it as a consultation system.

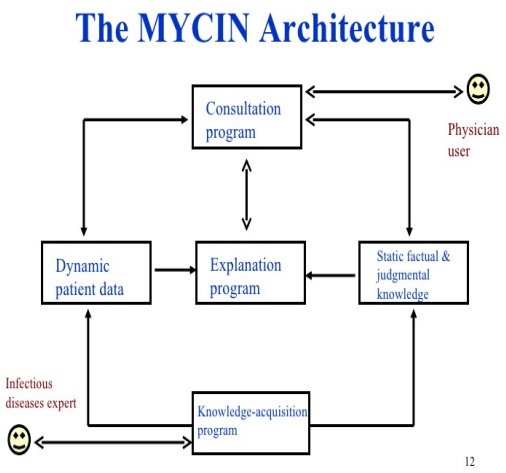

Figure 2.1: MYCIN Architecture(Source: slideshare.net)

2.1.2 Chronic Kidney Disease Prediction Using Back Propagation Neural Network Algorithm

This system of neural network accepts disease-symptoms as input and it is trained according to various training algorithms. Levenberg, Bayesian regularization, Scaled Conjugate and Resilient back propagation algorithm are discussed here. After neural network is trained using back propagation algorithms, this trained neural network system is used for detection of kidney disease in the human body. The back propagation algorithms presented here have capacity for distinguishing amongst infected patients or non-infected person.

2.2 Automated Disease Prediction System (ADPS): A User Input-based Reliable Architecture for Disease Prediction

Automated Disease Prediction System (ADPS) that relies on guided (to be described later) user input. The system takes input from the user and provides a list (topmost diseases have greater likelihood of occurrence) of probable diseases. The accuracy of ADPS has been evaluated extensively. It ensured an average of 14.35% higher accuracy in comparison with the existing solution.

In this paper, the contribution includes proposing a new disease prediction framework (ADPS) that takes into account symptom names as well as other vital parameters to improve disease prediction accuracy and proposing techniques to allow greater linguistic diversity so that users do not feel uncomfortable while giving input.

It is presumed that the user will give text input in one sentence describing a single symptom at a time (guideline for user input). Subsequent symptoms can be added in new lines. After getting user input, the system will scan through each line and tag each word according to their relevant parameter. Then after performing certain computations (to be described later) the system will return a list of possible diseases ordered according to the likelihood of their occurrences.

2.3 Neural Network Based Intelligent System for Predicting Heart Disease

This paper proposed an intelligent automated system incorporating the techniques of data mining with machine learning in order to make decisions. Medical practitioners are being assisted by the automated systems for providing effective treatment [18]. Data mining techniques involves a combination of statistical methods with machine learning algorithms .Data mining techniques help the system in analyzing the symptoms and machine learning methodshelp in predicting the disease based on the analysis performed [13,20]. The advantage of this automated system is that it predicts the disease in a less amount of time as well in less cost. Therefore, more research is carried out in the field of machine intelligence to improvise the system for an effective prediction. This paper proposed an intelligent system developed using the concept of Multilayer Perceptron Neural Network with Back propagation algorithm, as a practitioner needs to make a decision from multiple inputs such as current and previous medical history of a patient.

Neural networks are proved to be effective in making decisions by predicting the data. As the inputs used in predicting the disease are more in number and diagnosis has to be performed at different stages, Multilayer Perceptron based neural networks are used in this proposed system. Neural Network extends its predictive capability at different hi-

erarchical levels in a multi-layered structure of networks. This multi-layered structure helps in selecting features from the dataset at different scales in order to refine them into more specific features. To facilitate this, the concept of Multi-layer Perceptron Neural Network has been introduced through the implementation of Back-propagation algorithm for efficient diagnosis of heart disease. In this paper, 14 attributes are used as inputs for training the system of neural networks for diagnosing heart disease risk level using multi-layered network.Traditional diagnosing approaches have no proper automated tools use for the purpose of heart disease diagnostic system. The commonly used data mining algorithms for predicting diseases are:Genetic algorithmK-means algorithmMAFIA algorithmSeveral methods proposed the implementation of classification algorithms in diagnosis of heart disease and resulted with an accuracy of 88.33

CHAPTER 3
EQUATIONS

3.1 Basics of Equations

Mathematical expression within text can be written as $y = mx + c$. In separate line as

$$ax + by + c = 0$$

Some latex mathmatics examples:

Superscript:

x^3

$$x^3$$

$$x^{3x+4}$$

$$x^{3x+4^4+5}$$

Subscript:

$$x_{13}$$

x_{12}

$$x_{123}$$

Greek letters

$$\pi$$

$$\alpha$$

αA β βB δ γ ϑ Θ ϕ φ Φ trigonometric: $y = \sin(\pi)$ Log: $y = \log(\pi)$ $y = \ln(\pi)$ $y = \log_{10}$ Square root: $\sqrt{2}$ $\sqrt[3]{4}$ $\sqrt{x^2 + y^2}$ $\sqrt[3]{x^2 + y^2}$ $\sqrt{\sqrt[3]{x^2 + y^2}}$ Fraction: About 2/3 of the class is full. About $\frac{2}{3}$ of the class is full. About $\dfrac{2}{3}$ of the class is full. About $\dfrac{\sqrt{\sqrt[3]{x^2 + y^2}}}{\sqrt{x^2 + x + 1}}$ of About $\dfrac{2}{1 + \sqrt{\sqrt[3]{x^2 + y^2}}}$ of the class is full.

Reserved characters: $\{a, b, c\}$ \$20 $10\%of100is100$ 10 $\%$ of 100 is 100

Braket Style: $3(\frac{2}{3})\ 3\left(Hello(\frac{2}{3})\right)\ 3\left\{Hello(\frac{2}{3})\right\}\ 3\left\{Hello(\frac{2}{3})\ 3\ Hello(\frac{2}{3})\ \frac{dy}{dx}\right|_{x=1}$ (($\Big($ $\Big($ $3(\frac{2}{3})\ 3\Big(\frac{2}{3}\Big)$

Equation:

$$E = mc^2 \tag{3.1}$$

$$E = mc^2$$

$$E = mc^2$$

$$E = mc^2 \tag{3.2}$$

$$E = mc^4 \tag{3.3}$$

$$E = mc^7 \tag{3.4}$$

$$E = mc^2$$

$$E = mc^4$$

$$E \approx \pm(mc^7 + 3)$$

$$E \approx \pm(mc^7 + 3)$$

$$E = mc^2 \tag{3.5}$$

$$E = mc^4$$

$$E \approx \pm(mc^7 + 3) \tag{3.6}$$

Limit: $\lim_{x \to a} f(x)$
$\lim_{x \to a} \frac{f(x)-f(a)}{x-a} = f'(a)$ Integration: $\int$
$\int(\quad sin \quad x \quad dx =)$
$\int(\quad sin \quad x \quad dx =) \int_a^b (\quad sin \quad x \quad dx =) \int_a^b x^2 \, dx \; = \left[\frac{x^3}{3} \right]_a^b$

Summation: $\sum_{n=1}^{10} \int_a^b f(x) \, dx \; = \lim_{x \to \infty} \sum_{K=1}^{10} f(x_k).\delta x$

3.2 Referencing the Equation

The Equation can be referenced using labels. example Equation 2.2 of page 7 is referenced here. LaTeX is the de facto standard for the communication and publication of scientific documents. LaTeX is available as free software.

CHAPTER 4
LISTING EXAMPLES

Here are some examples of listing

Ordered List Technique:

Listing Technique 1:

1. Pencil
2. Paper
3. Calculator
4. Notebook
    (a) Assignment
        i. Test
            A. Test 1
            B. Test 2
        ii. Quiz
    (b) Classwork

Listing Technique 2:

- Pencil
- Paper
- Calculator
- Notebook
    - Assignment
        1. Test
            * Test 1
            * Test 2
        2. Quiz
    - Classwork

Listing Technique 3:

1. Pencil
2. Paper

3. Calculator
4. Notebook
    A Assignment
        I Test
            i Test 1
            ii Test 2
        II Quiz
    B Classwork

4.1 The Subsections

LaTeX is a document preparation system for the communication and publication of scientific documents.

It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing. as said in 1.1 of page no. 1 LaTeX is the de facto standard for the communication and publication of scientific documents. LaTeX is available as free software.

The subsubsection

LaTeX is a document preparation system for the communication and publication of scientific documents.

It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing.

LaTeX is the de facto standard for the communication and publication of scientific documents. LaTeX is available as free software.

The paragraph LaTeX is a document preparation system for the communication and publication of scientific documents.

It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing.

The subparagraph LaTeX is a document preparation system for the communication and publication of scientific documents.

It is most often used for medium-to-large technical or scientific documents but it can be used for almost any form of publishing.

CHAPTER 5
EXAMPLE ABBR AND SYMBOLS

5.1 Abbr

Here is an example of writing abbreviations ABC is abbr of Annapurna Base Camp UN is abbr of United Nations

5.2 Symbols

Now the symbol α is the Transparency Factor a is abbr of Area of Triangle Note that only those abbrs and bymbols that are included in the text will be listed in List of Abbr/Symbols.

CHAPTER 6
CITATION EXAMPLE

6.1 Citation and compiling bib file

This is an example of citing texts [**?**]. This is second citation [**?**] The first cited reference will be numbered ”1”, second ”2” and so on. Only those cited in the document will be listed in the reference section.

Note that to compile documents with reference correctly, you need to follow following steps:

1. Run pdfLatex (or Quick build)
2. Run Bibtex
3. Run pdflatex 2 times

Tation eirmod iracundia sea no, duo no aliquando elaboraret. Qui ut legere mucius, dolore efficiendi definitionem quo ex. Usu te falli similique posidonium, eum eu dicat aeterno phaedrum, te paulo deleniti ius. Pro te aliquam platonem, eos ea dolore phaedrum. Graece honestatis sit at, nec id ubique legendos. Detracto suavitate id per, no est putent accusata quaestio, purto quaeque oporteat ei sea. Id eam erat affert, ex has summo inimicus partiendo. Option aliquam imperdiet ius ex. Efficiendi omittantur in mea, id usu tacimates rationibus. Ei accusamus dissentias vix, eos aperiam percipit id.

Mea cu vitae noluisse. Tation eirmod iracundia sea no, duo no aliquando elaboraret. Qui ut legere mucius, dolore efficiendi definitionem quo ex. Usu te falli similique posidonium, eum eu dicat aeterno phaedrum, te paulo deleniti ius. Pro te aliquam platonem, eos ea dolore phaedrum. Graece honestatis sit at, nec id ubique legendos. Detracto suavitate id per, no est putent accusata quaestio, purto quaeque oporteat ei sea. Id eam erat affert, ex has summo inimicus partiendo. Option aliquam imperdiet ius ex. Efficiendi omittantur in mea, id usu tacimates rationibus. Ei accusamus dissentias vix, eos aperiam percipit id.

APPENDIX

Appendix Text Comes Here