

Graphical Representation Technology for Knowledge Acquisition of blood pressure analysis through Data Mining Technique

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Abstract-

The project is all about graphical representation of blood pressure for a particular hospital, in which research and analysis done through data mining technique and this graphical data is useful for any health organization like WHO OR IMA which is useful for remedies, Precautions and awareness in a society which is help to maintain a high blood pressure. High blood pressure is causes hypertension, people not aware about hypertension they not check blood pressure any intervals of time so that people can aware about high blood pressure and decrease the chance of high risk atherosclerotic cardiovascular disease (ASCVD), such as heart attack and stroke. Using this project graphical representation of blood pressure aims to data represent for research and analysis of blood pressure for particular hospital and organization in which symptoms of patient its causes, analysis and ratio which is useful for hospitals. Also the aim of this spread awareness in society of using statistical approach to research and analysis of particular disease like hypertension its reason behind high blood pressure. Graphical representation of blood pressure shows patient blood pressure ranges like low, normal, elevated, high blood pressure, and hypertension stages.

Keywords- *Stages of blood pressure, Hypertension, data mining technique, Data sets, Graphs of blood pressure,*

I. INTRODUCTION

High Blood pressure causes Hypertension there is need of check blood pressure at every intervals people aware about hypertension so there is need of research and analysis of blood pressure. Using data mining techniques graphical representation [4] of blood pressure which is useful for particular hospitals and research organization so that people should aware about high blood pressure or hypertension because hypertension is silent killer. Data mining is the practice of examining large amount of data in order to generate new useful information. The use of data mining [2] can analyzing and understand large set of data which is useful for research and analysis in medical field and also done patient management and provide essential information which is useful for health organization, hospitals so that aware about the high blood pressure and symptoms of hypertension [1]. The purpose of graphical representation of blood pressure which shows the variations in Blood pressure which is low, high, normal elevated and hypertension stages [2]. Hypertension is one of the most critical disease of cardiovascular disease (CVD), which is the leading cause of death worldwide [3].

It is essential to check Blood pressure regular intervals if it is not check there is chances of hypertension. Most people having hypertension but they are unaware of the problem because hypertension may not having any sign or symptoms. Blood pressure falls into 5 categories [3] this categories are low blood pressure, normal BP which is good for health, high blood pressure hypertension stage 1 and hypertension stage 2. Elevated blood pressure if BP range from 120-129 systolic and less than 80 mm Hg diastolic. Which elevated blood pressure is risk of developed high blood pressure. High blood pressure causes hypertension and it may consider high risk of atherosclerotic cardiovascular disease [3] (ASCVD), such as heart attack or stroke. It depends on the variations of blood pressure these 5 ranges such as 1st range is 120/80 mm Hg which is consider the normal range there is not any risk of (ASCVD) disease then the 2nd range is elevated blood pressure its range 120 to 129 mm Hg systolic and less than 80mm Hg diastolic this range of blood pressure developed chance of high blood pressure so doctor prescribe to control your blood pressure and tell the remedies so that it will go to the normal range.

Third range is high blood pressure Stage 1, when blood pressure consistently ranges from 130-139 systolic or 80-89 mm Hg diastolic. At this stage of high blood pressure, there is high risk of hypertension so that doctor prescribed some remedies and changes lifestyle which is necessary for reduce risk of hypertension. Next stage is high blood pressure stage 2 in this stage high risk of atherosclerotic cardiovascular disease (ASCVD), such as heart attack or stroke. So that 3rd and 4th ranges of hypertension stages is required the treatment it also goes to the hypertensive crisis which is 5th stage. So that there is need of research and analysis of blood pressure, graphical representation of data is useful for remedies, Precautions and awareness in a society which is help to maintain a high blood pressure.

I. DATA MINING TECHNIQUES

Data Mining Algorithms-Data mining technique[5][6] is most important technique which is used in Knowledge Discovery in Database(KDD).KDD[9] has different types of steps like Data cleaning, Data integration, Data selection, Data transformation, Data mining, Pattern evaluation, Knowledge presentation etc. There are different types of techniques used in Data mining project. These include Decision tree, KNN, Bayesian algorithm, neural networks, classification based on clustering.

Decision tree-It is the most frequently used techniques of data analysis [9][10]. It is used to classify records to a proper class is applicable in both regression and associations tasks. In healthcare industry decision tree specify the sequence of attributes which is used largely. Such a tree is made up of nodes which is determine particular conditional attributes – symptoms such as $X=\{x_1,x_2,.. x_k\}$,branches which show the values of S_i i.e. the h -th range for i -th symptom and leaves which present decisions $Y=\{y_1,y_2 y_k\}$ and their binary values $Z_{dk}=\{0,1\}$. Example of decision tree is showed in the figure 3.

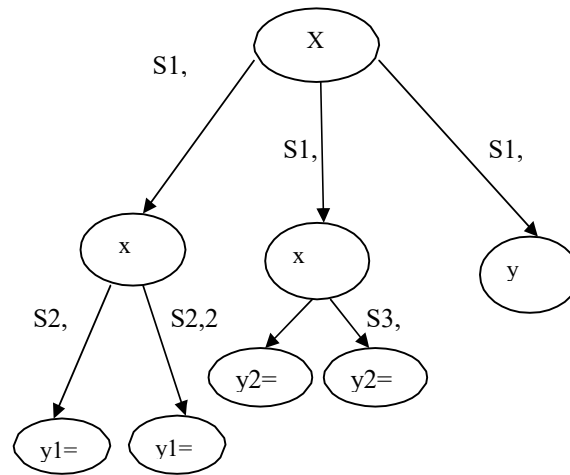


Figure 1. Decision Tree

Naive Bayes- It is a simple probabilistic classifier, which is based on an assumption about mutual independency of attributes. This algorithm is used in project because it is simple, error free and more accurate algorithm. It is depends on Naive Bayes [5] classification which is useful for classification of clustering. It is filtering algorithm so that useful for data filtering.

K-Nearest Neighbors (KNN) - is one of the most simple and straight forward data mining techniques. It is called Memory-Based Classification as the training examples need to be in the memory at run-time. K-NN [9] is a type of instance-based learning, or lazy learning where the mapping is only approximated locally and all computation is deferred until classification. When dealing with continuous attributes the difference between the attributes is calculated using the Euclidean distance. KNN usually deals with continuous attributes however it can also deal with discrete properties.

III. DATA SETS

There are different data sets are used in the system for storing large amount of data in tabular form, like patients datasets, Blood Pressure data sets, Blood pressure ranges datasets.

Patient Record database- System is fully depends on data. According to statistics it includes details about patient, Blood pressure is not constant variations are there So that there is need of checking blood pressure every intervals of time therefore, previous data is important to check difference between before blood pressure and after blood pressure and also it is increase or decrease or same. Know this all information there is need of storing large amount of data every time.

Blood Pressure Database-In this database data represented in useful information in the form of graphs. Which is shows how many patients in the year, how many patient having high blood pressure, hypertension crisis all 5 ranges shows in graphical form.

A. Application of Graphical representation of Blood pressure

High blood pressure or hypertension is very danger and killed number of people every year so that taking precaution and spread awareness in the society is very essential for controlling blood pressure. Applications are as follows:

- All the data in the form of graphs [4] health organization like WHO or IMA can get benefits for research and analysis of BP which will be helpful for remedies, precaution and awareness in a society which will help to maintain blood pressure. With the help of Graphical form access and process data easily.
- Research oriented terminology data analysis through data mining and processing, the factor which causes the high blood pressure or hypertension will get analyze and remedies also suggested by doctor. They also aware about (ASCVD) disease that is heart attack and stroke reason behind of this disease is hypertension or high blood pressure.
- In this technology representation for knowledge acquisition of research and analysis of blood pressure which will be useful for end user [8] as well as particular hospital.

B. Importance of Graphical data for blood pressure

These are the some important features of project

- Access all the patient records and rapidly detect anomalies, and also process data.
- Data using an automated system, which is useful in the case of future requirement.
- Blood pressure productivity and care quality through Analyze remote, shorter and data should be no loss.
- Interact quickly and easily in a structured way via tools shared between the primary care provider and Doctors can also use this data for remedies, precaution and awareness spread in the society.
- There is no loss of data because storage capacity is more.
- Online connected multiple hospital through networking and internet [8].

In future multiple hospitals connected to each other through centralized system [7] data can easily access.

IV. EXPERIMENT AND ANALYSIS OF BLOOD PRESSURE

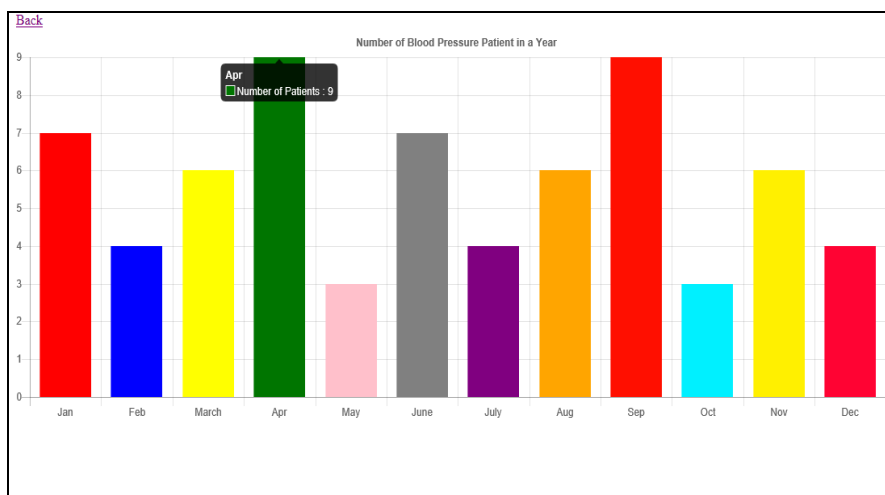


Figure 2. Number of Blood Pressure patient in year

A. Graph shows Number of Blood pressure Patient in a year wise

Above figure 2. shows number of blood pressure patient in a year for example in April month number of blood pressure patient is 9 which is visited hospital and checked blood pressure the graph shows every month visited patient total count. From January to December shows in the form of chart. Using this graph analysis should be done easily months are display in different colors, how many patient visited in every month knowing the number of patient increase or decrease this all information known by using this graph.

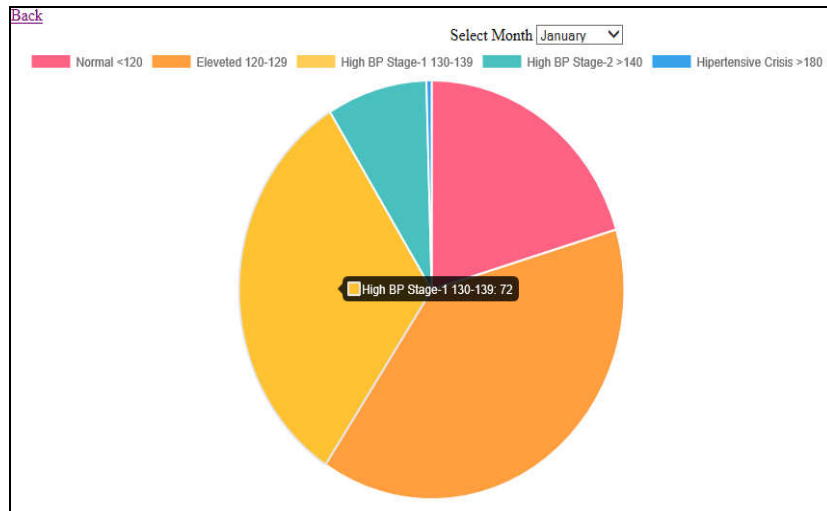


Figure 3. Blood Pressure Analysis for a Month

B. Graph shows Number of Blood pressure Patient in Month Wise

Above figure 3 shows blood pressure analysis for month, normal blood pressure that is ideal blood pressure and high blood pressure stage 1 and hypertension stage low blood pressure is called diastolic which is low Blood pressure and high blood pressure that is top called systolic blood pressure. Data shows in the graphical form so that people aware about blood pressure.

C. Graph shows analysis of Number of Blood pressure Patient in a Year

Below figure 4 shows year wise data, how many patient of blood pressure treated in a year? In the system large storage is available so that in future every year data should be analysis as year wise like year 2020, 2021, 2022 etc.

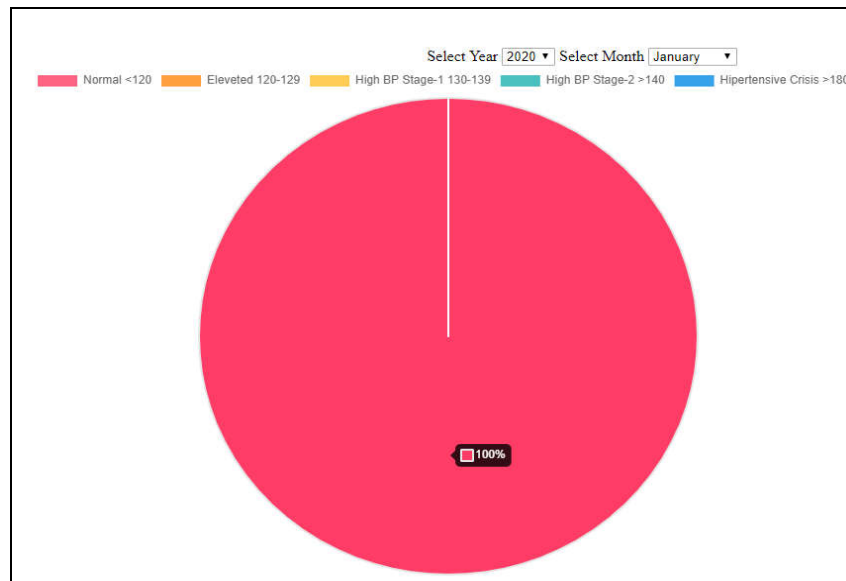


Figure 4. . Blood Pressure Analysis for years

V. RESULT OF ANALYSIS

The system is based on the Graphical Representation of Blood pressure used data mining algorithms because this are simple, more accurate, filtering algorithms this are naive Bayes, decision tree, neural network, classification with clustering algorithm, KNN algorithm this all algorithms and their techniques are used.

The system is fully depends on data. So that database is very essential for this system and in this database not only shows the patients records but also it shows the data in the graphical form. Which shows patient blood pressure with all 5 ranges of blood pressure which is useful for research and analysis. In this system analysis done and get the result about blood pressure which is easy to access and accurate because data mining algorithms are more simple and accurate. In this system all records of patients and blood pressure ranges shows in the form of graphs, which are easily analysis that how many patient check their blood pressure in a year?

How they are aware about their blood pressure and how they control their blood pressure? It also shows how many patient in a month visited to hospital and their blood pressure lie on which categories? Some patients are critical, some patients are normal, some patients having high blood pressure problem. This all information shows in the form of graph.

It shows total number of patients percentages which is checked their blood pressure and shows how many patients having high blood pressure

TABLE 1

Table shows the details of March month

Serial No.	BP Ranges	No. of Patient	Their Percentages
1	Normal 120-129	90	68%

2	Elevated 120-129	67	47%
3	High BP stage -1 130-139	35	43%
4	High BP stage -2 >140	28	36%
5	Hypertensive Crisis >180	12	10%

For example: Table shows the details of March month

Normal <120: 90 patients, Percentages: 68%

Elevated 120-129: 67 patients, Percentages: 47%

High BP stage -1 130-139: 35 patients, Percentages: 43%

High BP stage -2 >140: 28 patients, Percentages: 36%

Hypertensive Crisis >180: 12 patients, Percentages: 10%

In above example shows details about march month all 5 ranges shows in it and normal range total number of patients count is 90, 90 patients having normal BP and its percentages are 68% in march month. Graph and blood pressure ranges shows month wise. In this graph represent patient data in the form of pie chart which is shows all five ranges of blood pressure that are normal, elevated blood pressure, hypertension stage 1, hypertension stage 2, and systolic and diastolic blood pressure. This all information helps to research and analysis of blood pressure for hospitals and research organization.

VI. CONCLUSION

Data mining technique have been used in many fields one of them is healthcare. This paper objective is to shows the data in the form of graph. This graphical data representation of blood pressure for a particular hospital which is useful for research and analysis for health organization like WHO or IMA. In this experiment we find that data mining technique shows good accuracy which are KNN algorithm, decision tree algorithm, Naïve Bayes, neural network this techniques are simple, filtering algorithms, easy and show good accuracy. The benefits as the result from this study we can prove that graphical data are more useful for research and analysis of blood pressure. Easily determined the quantity of BP patient and their variations in blood pressure. How people are aware about their blood pressure ranges and if it goes to the high blood pressure stage how they tackle with it so that it is necessary to control it otherwise there is chance of ASCVD disease that is heart attack or stroke for controlling blood pressure doctor suggested the remedies. Using this system research organization analysis data easily the data shows in the form of graphs they can analysis monthly data as well as yearly, which is shows number of patients and their blood pressure ranges, how many BP patient check BP in a month shows total number of patient in the form of graph for each month. Number of patient increase or decrease and also can find how many patient BP goes in the hypertension crisis its shows their percentages and number of total patients include in it. Most of the people with hypertension they are not aware of the problem because it may not warning signs or symptoms. For this reason it is important to blood pressure is measure regularly. So we conclude that in this system storing and measuring blood pressure at regular interval and using that we can do further analysis and report for the operational structure. Which will useful for any health or research organization for remedies, precaution and awareness in a society which will help to maintain blood pressure.

In future using centralized system multiple hospitals connected to each other through centralized system data can easily access. In future centralized system [7] where the analytics group is its own entity independent of any particular group so that any countries hospital data easily access by any research organization and health institute for research

and analysis of blood pressure. In the system large storage is available so that in future every year data should be analysis as year wise like year 2020, 2021, 2022 etc.

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