

PREDICTION OF CARDIOVASCULAR DISEASE USING SENSORS AND TECHNIQUE OF DATA MINING

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Abstract - Now-a-days people are easily affected by the diseases like Heart disease, Diabetes, Cancer, Stroke, Tumor Due to their life style and stress. Especially heart disease, heart diseases is life threatening, is one of the most frequent causes of death in adults in the modern life style. Arrhythmia is one of the types of heart diseases which causes by irregular heartbeats too fast and very slow heart rate. The analysis and prediction of future health condition still in informatics stage. We propose a cloud enable big data analysis platform to analyses the data generated from the sensors. Health sensors are used to monitor the patient continuously and sensors are used to collect the data from patient body. The sensor data transmitted to the microcontroller using cable the real and dynamic data are transmitted to the system. The data from the com port are obtained using net beans and saved in the sql database, from the database the patient health data are encrypted using blow fish encryption algorithm and stored in the cloud storage namely drop box. The real time data can be monitored by both patient and doctor. The real time data are processed from net beans to excel file to r programming studio from data analysis. Data mining technique are processed and predict the normal and abnormal condition of patient.

Key Words: Data mining; classification; clustering; cloud; security; healthcare.

1. INTRODUCTION

Data mining is the process of extracting useful information from the existing datasets. This can be done using various tools and techniques in various fields and application .the various tools and techniques of data mining are, there are two major techniques of data mining: supervised learning and unsupervised learning. Supervised learning model are provided with class labels ie specific target to classify record, supervised learning technique are classification. Classification in data mining technique is used to predict group membership for data instance. The classification technique widely used in the health data. Some of the classification techniques are decision tree, neural networks, k-nearest neighbor, support vector machine, Bayes classification. Unsupervised learning is without class labels does not provided with specific target class, unsupervised learning method are clustering and association. Clustering is

used to cluster the similar object some group and dissimilar object into another group. Some of the clustering techniques are partition based, hierachal based clustering, density based clustering, kernel based clustering. Association, in association the items is predicted using the relationship between items in the same transaction. The association technique widely used in the marked based analysis. Data mining used in various application like healthcare, agriculture, education , market analysis, customer relation management, fraud detection, intrusion detection financial banking, crime detection .Data mining in healthcare :In the field of medical or health care, there is need of data mining for treatment, identification of different diseases and management of healthcare, data mining widely used in analyzing microarray data diagnosis dataset and identifying significant factor in health care services coverage and predicting the health status. Health care: Heath care is an important aspect than other application. Now-a -days the ever growing number of elderly people coupled with limited resource in the terms of medical facilities and personnel in many countries, the burden that conventional healthcare system carry is becoming heavy. The current trend in internet of things and cloud computing and big data analysis make it believable to build smart technologies resident for the improving healthier life. Where, smart healthcare system cannot be ignored due to the rapid growing elderly people around the world. On the other thing is Traditional communications are mostly replaced by networking in social and cyber spaces. When the technology increases in medical field along with the cost are increase by side. Technology increase the cost also increases, therefore, it is a great challenge to design a cost -effective healthcare system for handling disease, and especially considering the large population elderly people and empty nester most of whom suffer. To address the frequent repeated issue, we should lower the operating cost and improve their scalability, reliability, of healthcare organization so in order to provide basic service like, patient monitoring, early warning about their abnormal condition. Privacy and security plays an important role in the healthcare service, many fraud and intrusion are rapidly increase happening in the healthcare organization. Quality healthcare is one of the most important factors in how individuals perceive their quality of life. People use health care services for many reasons: to cure

illnesses and health conditions, to mend breaks and tears, to prevent or delay future health care problems, to reduce pain and increase quality of life, and sometimes merely to obtain information about their health status and prognosis. Healthcare organizations today are capable of generating and collecting large amounts of data. The huge amounts of data generated in the healthcare transaction are too complex and voluminous to be processed and analyze by traditional methods. This increase in volume of data requires automatic way for these data to be extracted when needed. With the use of data mining techniques it is possible to extract interesting and useful knowledge and regularities. Knowledge acquired in this manner, can be used in appropriate area to improve work efficiency and enhance quality of healthcare. In healthcare data mining is becoming increasingly essential to receive better and more affordable healthcare service.

2. RELATED WORKS

In parallel, networking technologies focused on the healthcare monitoring sectors have attained a great penetration in the market during recent years and they certainly are a key factors improving elderly peoples quality of life[1]. Mobi health is a platform allowing of patients to be fully mobile whilst undergoing health monitoring, the patient wear a light weight monitoring system. The mobile health BAN (body area network) home sensor network, human monitoring sensors, habit application [2]. Over the past two years, the unbelievable evolution in data mining technique has improved and a major impact on the revolution of human life style by prediction [3]. No proper technique is developed to find great potential economics values from big healthcare data, these data might not became meaningless but also required a large amount of space to store and manage[4]. Patient empowerment is considered as an philosophy of health based on the perspective than better outcomes [5]. To improve the diagnosis time and improve the diagnosis time and improve the diagnosis accuracy, a new system in the healthcare should be work hard to provide a much cheaper and faster way for diagnosis [6]. To analyze data to drive meaning information is highly essential for studying health related raw data and to predict the future health condition [7]. In hospital emergency department patient is predicted using a local big data driven random forecast model. However, only clinical data of patient are considered in the existing models ignoring the history of symptoms [8]. In future health condition prediction is very crucial and important for the patient with different health status [9]. An data mining algorithm artificial neural network technique are used for prediction but ANN takes longer time for training the model due to diversified weight and for the small changes in the

input data set is affected the complete model and which produced an unstable output[10].

3. PROPOSED SYSTEM AND METHODOLOGY

In traditional healthcare system, the patient data are collected stored and analysis in the traditional manner, which cannot support the diagnosis of complex health condition however in our proposed data model are predict the future health status of the patient on their current health parameters. A patient who admitted in the hospital frequently to know the future health condition. The future health status may save life of lives so to avoid frequent visit to hospital or any healthcare center. The patients are provided with the wearable (sensor) devices the wearable device is embedded with the sensor.. The sensor tightly attach to the skin and accurate produce of data from the body sensor the data based on the sensor feature. Data collector will collect the data from the data provider. The data provider is patient the from the patient body collect from the sensors. The collected sensors data are stored in the cloud storage for future use they are encrypted and transmitted to the cloud. The data are encrypted by blow fish encryption algorithm. The continuous data collect from the patient body are predicted to know the current health condition. The prediction is done by data mining technique with classification and clustering method. In prediction of future health condition by trained data set the real data is compared only with two conditions yes (or) no ie if yes the condition is ab-normal if no result return to normal condition. Suppose if the result turn to abnormal condition, in what variation the result turn to ab normal condition from normal condition to calculate the variation in propose system we use clustering algorithm. Data collector will collect the data from the data provider. The data provider is patient the from the patient body collect from the sensors. The collected sensors data are stored in the cloud storage for future use they are encrypted and transmitted to the cloud. The data are encrypted by blow fish encryption algorithm. The continuous data collect from the patient body are predicted to know the current health condition. The prediction is done by data mining technique with classification and clustering method. In prediction of future health condition by trained data set the real data is compared with only with two conditions yes (or) no ie if yes the condition is ab-normal if no result return to normal condition.

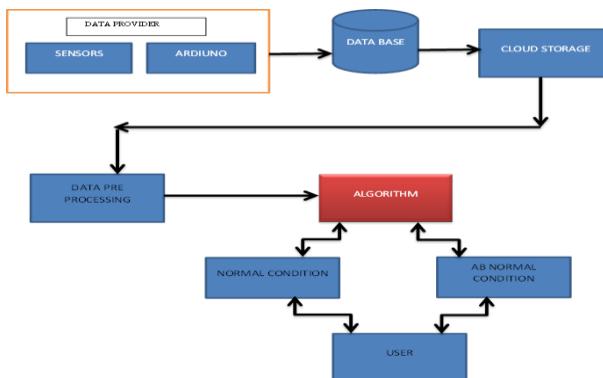


Fig-1: Architecture Diagram

4. ALGORITHM & METHODOLOGY USED

A. NAÏVE BAYES CLASSIFICATION ALGORITHM

Naïve Bayes classification algorithm is easy to diagnosis the health condition, naïve Bayes is independent of one another which has trained set of data here a patient data is continuously collected and stored in the cloud storage every value in the dataset is compared with the trained data set. By this we can accurately find the health condition of the patient, naïve Bayes plays a crucial role in accuracy. Firstly, Naïve Bayes algorithm has trained dataset. The program receives patient record from the interface and uses this data to Naïve Bayes algorithm. By using the Naïve Bayes method, possible attributes will be determined and probability of each attribute will be calculated. Then yes or no probability of each attribute will be computed, and depending on these results the information about risk will be returned. If the probability is yes then return the condition is ab-normal else return as normal condition

B. K-MEANS CLUSTERING

Firstly, clustering algorithm is simply effective to find the variation between the values, here in prediction of health condition we use clustering algorithm, when the patient data are collected using sensors ,the collected data are transmitted to the k-means clustering algorithm the data are clustered by calculating the centroid and distance using k-means clustering algorithm by this we can find the variation of the data ,if the patient result return to ab-normal condition,the k-means clustering find the variation between the normal and abnormal condition that is in what value the patient result return abnormal condition.

C.BLOW FISH ENCRYPTION ALGORITHM

Blow fish encryption algorithm is symmetric key encryption only one key is used for both encryption and decryption of data. One secret key is used for both encrypt and decrypt the data values. The data collected from the patient body using

sensor are transmitted to the cloud storage the value that is encrypted before transmitted to the cloud storage. Blow fish encryption algorithm is used to encrypt the value transmitted from the data provider. Firstly it generates a key and encrypts the plain text and become cipher text. Similarly using a same key the cipher text is decrypt to original plain text.

5. RESULT AND DISCUSSION

The main objective of the project is to predict the disease in the earlier stage using sensors and technique of data mining. Firstly the patient data is collected using sensors, the data is collected by a microcontroller which generate the sensors value by crystal oscillator. The collected data transmitted to the database, from the database the data is encrypted by blowfish encryption and transmitted to the cloud storage namely drop box. Then the data is uploaded into r tool, and then pre-processor the database using data mining technique predict the normal and abnormal condition of the patient in earlier. Different classification algorithm is compared with naïve Bayes algorithm. In proposed the disease is predicted using the physical value of that patient using naïve Bayes with the accuracy 95%.

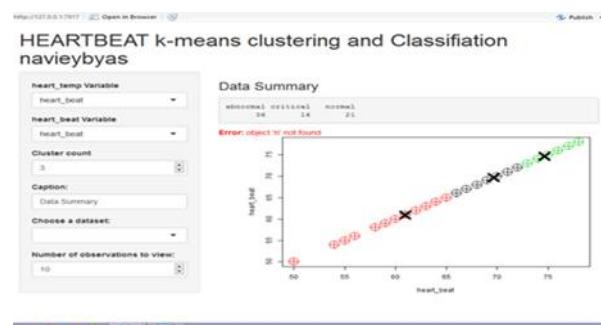


Chart-1: Prediction of Disease

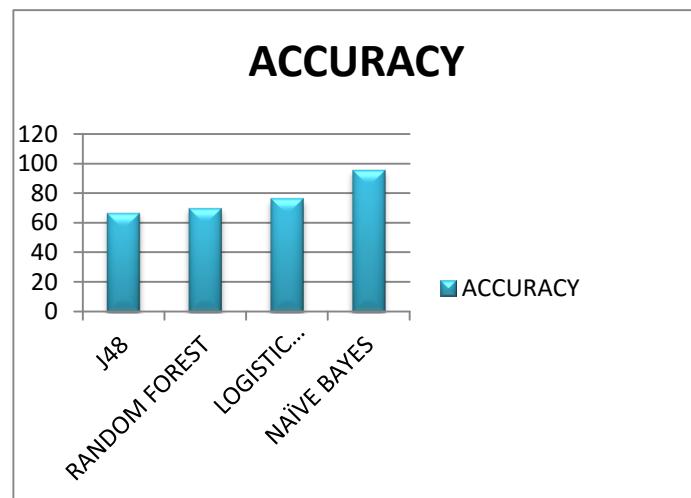


CHART-2: Comparisons of Accuracy

6. CONCLUSION

In this paper, we propose a sensor based prediction of future health condition using classification, clustering algorithm and r programming .we can utilize wearable devices to collect users data and in order to protect users privacy, we use encryption mechanism to make sure the transmission of users data to the cloud in security for the purpose of prediction we use data mining technique to predict the future health condition. In the proposed system firstly, the user's physiological data is collected and transmitted to the cloud storage. Secondly, the collected Data are correlated with predictive analysis to analysis the future health condition of patient based on the health status. Thirdly, for privacy data protection in cloud we use blow fish encryption for data encryption .The encrypted data are stored in the cloud storage namely drop box. Finally, the encrypted data are analyzed using classification and clustering technique and also integrated with r tool.

REFERENCES

- [1] Guanzheng Liu, Kunyang Li, Lianrong Zheng, Wen-Hui Chen, Guangmin Zhou, Qing Jiang, "A Respiration-Derived Posture Method Based on Dual-Channel Respiration Impedance Signals", Access IEEE, vol. 5, pp. 17514-17524, 2017, ISSN 2169-3536.
- [2] Mehdi Rahim, Bertrand Thirion, Danilo Bzdok, Irène Buvat, Gaël Varoquaux, "Joint prediction of multiple scores captures better individual traits from brain images", NeuroImage, pp. , 2017, ISSN 10538119.
- [3] K. Ho, R. Iansek, C. Marigliani, J. L. Bradshaw, S. Gates, "Speech impairment in a large sample of patients with Parkinson's disease", Behavioural Neurol., vol. 11, no. 3, pp. 131-137, 2017
- [4] Alexander Benkmann, Eike Smolinski, Torsten Jeinsch, Peter Westerhoff, Thomas Wustrack, Hagen Hommel, "Concept of iterative optimization of minimally invasive surgery", Methods and Models in Automation and Robotics (MMAR) 2017 22nd International Conference on, pp. 443-446, 2017.
- [5] Qing Wei, Hui Zhu, Rongxing Lu, Hui Li, "Achieve efficient and privacy-preserving online fingerprint authentication over encrypted outsourced data", Communications (ICC) 2017 IEEE International Conference on, pp. 1-6, 2017, ISSN 1938-1883.
- [6] Hui Zhu, Fen Liu, Hui Li, "Efficient and Privacy-Preserving Polygons Spatial Query Framework for Location-Based Services", Internet of Things Journal IEEE, vol. 4, pp. 536-545, 2017, ISSN 2327-4662.
- [7] K. Hung, Y. Zhang, and B. Tai, "Wearable medical devices for telephone healthcare," in Engineering in Medicine and Biology Society, 2004. IEMBS'04.26th Annual International Conference of the IEEE, vol. 2. IEEE, 2004, pp. 5384-5387
- [8] R. Zhang and L. Liu, "Security models and requirements for healthcare application clouds," in Cloud Computing (CLOUD), 2010 IEEE 3rd International Conference on. IEEE, 2010, pp. 268-275.
- [9] C. Zhang, J. Sun, X. Zhu, and Y. Fang, "Privacy and security for online social networks: challenges and opportunities," Network, IEEE, vol. 24, no. 4, pp. 13-18, 20
- [10] Griffin and E. De Leistar, "Social networking healthcare," in Wearable Micro and Nano Technologies for Personalized Health (pHealth), 2009 6th International Workshop on. IEEE, 2010, pp. 75-78.