IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.125129

An Internet of Things (IoT) Application for Predicting the Quantity of Future Heart Attack Patients

Shijin Jose (71917755D)[1], Lokhande Rahul Pandurang (72170264D)[2], Kandekar Narendra Bhimraj (72032816M)[3], Gore Abhishek Vilas (72170258K)[4]

G H Raisoni College of Engineering & Management, Ahmednagar ·Gate No.: 1030, Village Chass, Nagar Pune Road, Ahmednagar, Maharashtra 414008[1-4]

Abstract: Now days the heart disease is the leading cause of death worldwide. It is a complex task to predict the heart attack fora medical practitioner since it is required more experience and knowledge. However, heart rate monitoring is the most important scale of measurement that is the influence factor for heart attack with other health fitness like blood pressure,serum cholesterol and level of blood sugar. In the era of rapid revolution of Internet of things (IoT), the sensors for monitoring heart rate are growing in availability to patients. In this paper, I explained the architecture for heart rate and other data monitoring technique and I also explained how to use a machine learning technique like kNN classification algorithm to predict the heart attack by using the collected heart rate data
and other health related perimeter.

Keywords: IOT, ML, Healthcare, ECG, Temperature, Sensors**.**

I. INTRODUCTION

for the impact on the Internet and economy are remarkable, with some expecting as many as 100 billion(8,17,16,50,000(ARAB)) connected IoT devices and a global economic impact by 2025. IoT for healthcare is playing significant role for monitoring some health activities and diagnosing the problem related with these activities. The devices connected with internet have been hosted to patients in various forms. Whether data comes from connected blood pressure monitoring devices, electrocardiograms, temperature or blood sugar levels checking, tracking regular health information is vital for some patients. Many of these measures require follow-up interaction with a healthcare professional. An enormous healthcare data generated by the Internet of Things (IoT) are considered of high business value.

Data mining algorithms can be applied to IoT to expose unknown information from these data. Using data mining knowledge, technique and application, including classification, clustering, association analysis, time series analysis and outlier analysis can make also a prediction report for future diseases of a patient. Government or respective authorities may use this analysis and can take the further step to cure or prevention for the diseases. In this paper, I have explained the process of data collections, necessary tools and methods for using these data for data analysis. For this instance, a demo data analysis report also given here. A popular data mining algorithm k Nearest Neighbour (k-NN) used here for predicting the future patients of heart diseases using the applicable heart related data.

efficiency improvement in years. The article looks at the working of the electrohydraulic camless engine, its general features and benefits over conventional engines. In this article we focused on a basic overview of camless engine along with its design principle, components and its merits over other conventional engines. combustion engine valve actuator. Furthermore, in conjunction with variable timing, the piezoelectric control based pilot allows for direct regulation of other engine valve parameters including variable lift and seating velocity.

[1]. Different health related sensors and protocol they have discussed and raised some issues need to be solved. The Decision Support and Home Monitoring System were designed by Chiuchisan and Geman in 2014 [2]. This system contributes in diagnosis, home monitoring, medical treatment, medical prescriptions, rehabilitation and progress of his patients with Parkinson's disease. Their paper suggested for future extended research on
Neurological Disorders with the help of eHealth and Internet of Things technology.

International Journal of Advanced Research in Computer and Communication Engineering
ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023
DOI: 10.17148/IJARCCE.2023.125129

15 attributes are related with predicting heart attract and data mining technique like ANN, time series, clustering and association rules can be approached for this prediction (Soni & Sharma, 2011) [3]. For accuracy of the Decision Tree and Bayesian Classification theysuggested to apply genetic algorithm to reduce the actual data size to get the best subset of attribute appropriate for heart disease prediction. Durairaj & Ranjani, 2013 also compared many approaches and different tools and its impact on the healthcare sector [4]. They used the data mining application for identifying and publishing relevant healthcare information. For diagnosing breast cancer, data mining technique can be used by reducing the number of features of diagnosis. Ahmad, 2013 applied the Adaptive Neuro Fuzzy Inference system (ANFIS) with the reduced dataset. He found 98.24% accuracy from his approach [5].

Heart rate variability has substantial potential to judge the role of autonomic nervous system fluctuations in normal healthy individuals and in patients with various cardiovascular and non-cardiovascular disorders. HRV studied by Task Force of the European Society of Cardiology (1996) and boost up the understanding of physiological phenomena, the actions of medications, and disease mechanisms [6]. This Task force suggested - "Longitudinal studies are needed to determine the sensitivity, specificity, and predictive value of HRV in the identification of individuals at risk for subsequent morbid and mortal events". Stein & Conger (1994) approached to measurement of heart rate variability (HRV), time and frequency domain [7]. Their calculations are based on the analysis of inter beat intervals of normal beats determined from a routine 24 hours ambulatory electro cardiogram, International Journal of Computer Applications (0975 – 8887) Volume 164 – No 6, April 2017 37 Machine learning is now a day important in IoT. Different type of data mining results like prediction or others from IoT data can be measured by machine learning tools [8].

In his paper Yue Xu (Recent Machine Learning Applications to Internet of Things) described some technique and example scenarios regarding IoT data and its use on the machine learning tools. Masethe & Masethe, 2014 used Classification algorithm for predicting of heart diseases [9]. They used some data mining algorithms such as J48, Naïve Bayes, REPTREE, CART, and Bayes Net for predicting heart attacks. Their research result shows prediction accuracy of 99%. Beside heart diseases data analysis technique also uses for other health related issues. One of them is spinal cord injuries (SCI). Kraft, Desouza & Androwich, 2003 published some case studies related in this field. Including data cleaning, aggregation, integration, they discussed whole process to find the result from the data analysis [11]. They used artificial neural networks to predict the length of stay is presented.

THE REASON OF HEART ATTACK

Cardiovascular disease is the leading global cause of death. The statistics prepared by the American Heart Association, the Centres for Disease Control and Prevention, the National Institutes of Health and other government sources (Mozaffarian & Huffman 2015) accounting for 17.3 million deaths per year, a number that is expected to grow to more than 23.6 million by 2030 [16]. Canto & Iskandrian, 2003 analysed some risk factor of heart diseases [17]. Some traditional myths relating with heart rate and heart attack are published in health related website(http://www.webmd.com) are as follows:

- A normal heart rate is 60-100 beats per minute.

However, heart rate higher than 76 beats per minute when in resting may be linked to a higher risk of heart attack. Having an irregular heartbeat doesn't mean having a heart attack. But if it's a new symptom, or if you have chest pains or problems breathing, may be the preliminary symptom for heart attack.

- Slow rates are only a problem if also pass out, feel dizzy, are short of breath, or have chest pain.

In this paper different health related data with heart rate used for the prediction of heart attack and reveal these myths.

METHOD OF DATA COLLECTION

I can divide six types of data into three different levels for predicting heart attack. First one is personal fixed data like age and sex. Second level is periodic data which comes in a day or in a week like blood sugar and Serum Cholesterol. The third data level is live data like blood pressure and heart rate. Web service technology has been used here for first level data collection. Patients will be registered on the platform by giving all required fixed information. They will have the option to change the perimeter after a certain time. Wearable devices and home health monitoring IoT devices will be used for monitoring second and third level data collection. The devices are capable enough to transmit data from a patient home to the remote cloud server. Some devices allow having a real time monitoring blood pressure and heart

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

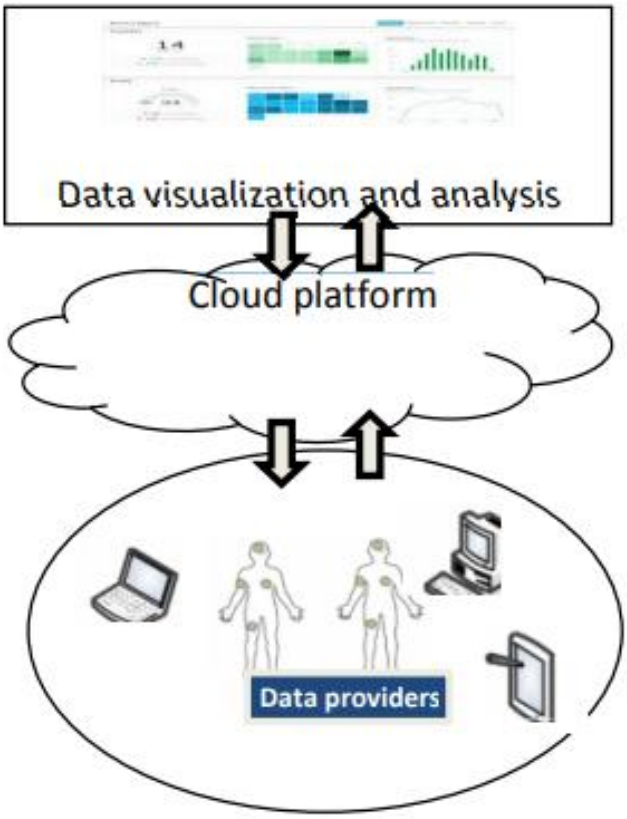
ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.125129

II. RATE OF PATIENT'S. SOME DEVICES HAVE TRIGGER SYSTEM THAT GIVE

the result after a certain period or by using manual trigger. Wireless connected digital glucometers and cholesterol tester with triggering system use for this purpose. Devices helping in monitoring real time heart rate and blood pressure are indeed a big part of IoT. Live data always go to the remote cloud using these sensor based wearable devices to 14th pin of L293D(output).

The 4th,5th and the 13th,12th pins of L293D are grounded. L293D has an enable facility which helps you enable the IC output pins. If an enable pin is set to logic high, then state of the inputs match the state of the outputs. If you pull this low, then the outputs will be turned off regardless of the input statesDepending upon our power requirements we can use Transistors/MOSFETs as switches.



A conceptual diagram of IoT-based heart attack prediction.

III. CONCLUSION

Multiple parameters like Blood pressure ,retinal size ,age ,and weight can be include as controlling parameters in the future .The whole health monitoring system ,which we have proposed can be integrated into a small compact unit as small as a cell phone This will help the patients to easily carry this device wit them wherever they go .Wearable devices are getting enough receptiveness because of patient mind set with these devices and also allergy diseases need to be considered with this wearing.

Energy related problems like battery failure or other issues that may be cause of power down of the devices that can be sent bad or interrupted result. This result may be the cause of non-accurate analysis report. Subsequently, a mature infrastructure for everything related with this testing and finalizing it for real calculation, must be the first priority of every task.

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.125129

REFERENCES

[1] Zhao, W., Wang, C., & Nakahira, Y. (2011, October). Medical application on internet of things. In Communication Technology and Application (ICCTA 2011), IET International Conference on (pp. 660-665). IET.

[2]Chiuchisan, I. U. L. I. A. N. A., & Geman, O. A. N. A. (2014). An Approach of a Decision Support and Home Monitoring System for Patients with Neurological Disorders Using Internet of Things Concepts. WSEAS Transactions on Systems, 13, 460-469.

[3]Soni, J., Ansari, U., Sharma, D., & Soni, S. (2011). Predictive data mining for medical diagnosis: An overview of heart disease prediction. International Journal of Computer Applications, 17(8), 43-48.

[4]Durairaj, M., & Ranjani, V. (2013). Data mining applications in healthcare sector a study. International Journal of Scientific and Technology Research, 2(10), 29-35.

[5]Ahmad, M. A. B. (2013). Mining Health Data for Breast Cancer Diagnosis Using Machine Learning.

[6]Task Force of the European Society of Cardiology. (1996). Heart rate variability standards of measurement, physiological interpretation, and clinical use. Eur Heart J, 17, 354-381.

[7] Stein, P. K., Bosner, M. S., Kleiger, R. E., & Conger, B. M. (1994). Heart rate variability: a measure of cardiac autonomic tone. American heart journal, 127(5), 1376-1381.

