

Survey on IOT Based Heart Attack Prediction

Dr.I.Carol MCA, M.Phil., PH.D., MBA¹, Mr. D.Richard, M.Sc(CS), M.Phil², Ms. T.Kiruthika³

Assistant Professor, Department of Information Technology, St. Joseph's College, Trichy^{1,2}

M.Sc. I.T., Student, Department of Information Technology, St. Joseph's College, Trichy³

Abstract: The main objective of this paper discuss the various technologies consisting of the internet of things that is used to predict heart attack disease. This paper not only explains the existed heart attack prediction, which is also discussing the aware and monitoring system to the patient who is under the cardiovascular disease probably. In this paper, we revisit convinced kinds of literature and present a survey on heart attack prediction techniques.

Keywords: Internet of Things, Healthcare, coronary failure prediction, Heart Attack, Prediction

I. INTRODUCTION

In today's contemporary world, heart disease is the most toxic one. The disease heart attack is the prominent origin of death worldwide. It is very intricate to predict a heart attack without any medical experience and knowledge. But the symptom of the heart attack is used to predict easily. A heart attack will occur anytime and anywhere, likewise, IoT healthcare province is to proposal better for people anytime and anywhere in the world in a more profitable and patient-friendly way. The Internet of Things is a world of interconnected things that are capable of sensing, stimulating and collaborating among themselves and with the environment. IoT for healthcare is playing a substantial role in monitoring some health activities and diagnosing the problem interrelated to these activities. The Internet of Things inflates the potential for using technology to livelihood healthcare. In this survey paper, we are going to consider a much-predicting heart attack. This paper aims to help the reader at least to know about the possibility of finding out the heart attack prediction is also available in the growing technology of the internet of thing. Hopefully, this survey will explore and provides an overview of the heart attack prediction which detected by the use of the internet of things with different techniques.

II. REVIEW OF LITERATURE

The author Aieshwarya B. ChavanPatil, Prof. S. S. Sonawane e et al. labels the heart attack prediction detected by two data mining techniques (the Artificial Neural Network and Naïve Bayes), existing system architecture, system analysis respectively from various heart attack prediction research papers. They focused on the comparative study of Artificial Neural Networks and Naive Bayes classification techniques. They also deliberated about the health care system such as real-time wireless health monitoring, U- health care system, Health care key management proposed solution, Security for health care systems. In their paper, not only discussed the technologies which are also consist of components of a system named as the LM35 temperature sensor, ECG sensor, Heartbeat sensor, Wi-Fi module(ESP8266), electric buzzer, Arduino/Genuino UNO, Bluetooth controller, cloud server, heart attack prediction system. The author described also about the system analysis which is experimental setup and data source. Finally, he concludes the predictive power of ANN classification is much higher than Naïve Bayes classification in terms of performance. [1]

The author Samr Ali et al. conferred about the two techniques as namely as voice-controlled RHAMDS model and gesture-controlled RHAMDS model. They proposed RHDMS's architecture comprising VANET (VehicularAdhoc Networks, SDN (Software Defined Network) and Fog and MEC (Mobile Edge Computing). Here the author focused the concept of, to improve the response time of crisis service for heart attack patients, in vehicular networks in particular, and to prevent the possible resulting vehicle collisions, after predicting the heart attack when the particular person driving. [2]

The author Fizar Ahmed et al. explains how to test collected heart rate data and predict heart attack by using IoT and Machine learning. Here, supervised machine learning algorithm k-Nearest Neighbour has been used for analyzing the dataset. The author fragmented six types of data hooked on three diverse levels for predicting heart attack. The initial one is personal data like age and sex. The second level is periodic data which comes in a day or a week like blood sugar and Serum Cholesterol. The next data level is alive data like blood pressure and heart rate. Web service knowledge has been exhausted 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. The smart 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 the patient home to the remote cloud server. The aggregate precision of the prototypical was 96 % that means model performance is better. [3]

The author YosufElSaadany et al., done his paper about heart attack prediction using embedded sensor system with smartphones. The author used various technologies to analyze the data from the person whom all are using the project. Here used the hardware to collect data explicitly as Arduino UNO, Bluetooth chip, pulse sensor, and temperature sensor. The technique such as baseline wanders removal and smooth Mat Lab function to analyze the data. The thresholding technique to predict the heart attack. When the patient's condition should be abnormal, then the mobile application alerts the user. [4]

The author Kriti Gupta et al. describes comparative study paper and it gives a better result than from the existing paper in which they are taken. They use fuzzy c means algorithm to predict the heart attack for a better result. They used Arduino UNO, heart rate sensor, GSM module to collect the data. [5]

The writer Md. Ashrafuzzaman et al. used to detect heart attacks using smartphones. He approached how to detect heart conditions using blood and heartbeat both by using smartphones. Here to detect the peak of blood by placing an index finger on the mobile camera and placing a mobile phone on the left chest and press start to record the heartbeat which will be used to detect the heartbeat. The author used Fuzzy logic here. [6]

The author Abhiyash Hodge et al. only used his propose system to find the real-time heart rate. The heart rate is detected by the photoplethysmograph technique. The data transmission is done by using the NFR module. By using GSM, it sends the SMS to the concern persons when the patient met the perilous condition. Here the whole process is done by Arduino UNO. [7]

In this paper the author Femi Antony et al. presents the WSN, wireless sensor network to acquire the speediest data transmission. Here the Raspberry Pi used and which is connected with cloud server because of the massive amount of data should be collected from multiple locations and that can be handled and analyzed to create significant information for the end-user. When the patient got abnormal ECG signals that should be informed to the specific persons such as caretaker, doctor and sometimes ambulance by using GSM and which also informed the patient's location by using GPS. And the android application acts as an intermediary to patient, doctor, and caretaker. [8]

In this paper the author PonugumatlaKalyan et al. used to find out the heart function using Arduino UNO, Raspberry Pi, ECG electrodes and GPS to find the patient's location. The result analysis view made up of a web page using HTML and Python code. This paper said about only the condition of heart functionality and which do not give any alert techniques when the patient is under the hazardous stage. Here the author accomplished his work to find the real-time heart rate and displayed by the webpage. [9]

The author Valliappan.Sp et al. concentrated his paper which signifies the low cost of remote health monitoring and alert system for elderly heart patients. In their paper, they used Arduino UNO and Arduino Nano. Arduino Nano contains the three different sensors such as pulse, temperature and GSR sensor. Arduino UNO firms the RF module which is used to send and receive signals between two devices wirelessly. The GSM module connected with Arduino UNO to alert the families and doctors. In this paper, the author introduces one different feature which is an Arduino based music player to reduce the stress level. [10]

S.NO	TITLE OF THE PAPER	TECHNIQUE
1	To Predict Heart Disease Risk and Medications Using Data Mining Techniques With an IoT Based Monitoring System For Post-Operative Heart Disease Patients.	Artificial Neural Networks and Naive Bayes
2	Real-time Heart Attack Mobile Detection Service (RHAMDS): An IoT Use Case for software-Defined Networks	Voice-controlled RHAMDS model and gesture-controlled RHAMDS model with SDN and VANET
3	An Internet of Things (IoT) Application for Predicting the Quantity of Future Heart Attack Patients	k-Nearest Neighbour
4	A Wireless Early Prediction System of Cardiac Arrest through IoT	Embedded sensor system with baseline wander removal and thresholding technique
5	An Efficient Algorithm for Heart Attack Detection using Fuzzy C- means and Alert using IoT	Fuzzy c means algorithm
6	Heart Attack Detection Using SmartPhone	Fuzzy logic
7	Wireless Heart Rate Monitoring and Vigilant System	Photo plethysmograph technique with NFR module

8	Detection And Warning System for Heart Attacks using IoT	WSN and IoT-Cloud computing technology
9	IoT Based Heart Function Monitoring and Heart Disease Prediction System	It is a real-time web page based so which is used Python and HTML code
10	Design of Low-Cost, Wearable Remote Health Monitoring and Alert System for Elderly Heart Patients	Photo-Plethysmography (PPG), Galvanic Skin Response (GSR), RF Transreception, GSM module

III. TECHNIQUES USED IN EXISTING SYSTEM

3.1 Artificial Neural Network

A neural network is a type of machine learning which models itself next to the human brain. This generates an artificial neural network via an algorithm. Artificial Neural Network is that network that works like the way of simulation of the human brain analyses and manner. It has three strategies spirit by three methods as follows as Supervised Learning, Unsupervised Learning, and Reinforced learning.

Supervised learning is a type of machine learning which gives the output by trained data set of input and output. In supervised learning which is used trained data or labeled data to get result prediction. Here there are two tasks are encompassed such as Classification and Regression.

Unsupervised learning is another type of machine learning which entirely different from supervised learning. It is be pitted against supervised learning. In supervised learning which is used trained data or labeled data to get result prediction. Here there are two tasks are encompassed such as Classification and Regression.

Reinforcement learning varies from supervised learning. in a way that in supervised learning the training data has the trained data with it so the model is trained with the correct answer itself whereas in reinforcement learning, there is no trained data but the reinforcement representative decides what to do to perform the given task. In the absence of a training dataset, it is assured to learn from its experience.

3.2 Naïve Bayes

Naive Bayes classifiers are a group of classification algorithms constructed on Bayes' Theorem. It is not a single algorithm but a clan of algorithms where all of them share a common principle.

3.3 k-Nearest Neighbour

The k-Nearest Neighbour algorithm used for classification and regression. Both cases classification and regression consist of featured vector space. For the human, we would decide by using our old, experience. Likewise, we put some restrictions gathered by our experience to the machine and that machine will carry the decision without knowledge of the human is the concept of machine learning. Hence the machine learning needs the huge data then data will represent a model that will be retrieved by using an algorithm and finally we got a result accuracy by using the data. So the machine learning is fully dependent through the data. The list of traits used to solve a problem is called a feature vector. The feature vector is a subset of data that is used to tackle a problem. The k-nearest neighbor algorithm is the modest algorithm that holds all available cases and craft new cases based on the similarity.

3.4 Fuzzy C Algorithm

Fuzzy clustering is a kind of clustering in which each data point can be shared with more than one cluster. It simply means that data can belong to more than one cluster Clusters are nothing but a collection of data points and thus similar data points are called the same cluster and different data points are called a dissimilar cluster. The cluster is mostly classified based on the similarities. The similarities may be on the measures of distance connectivity and intensity.

IV. CONCLUSION

The idea of the internet of things which is evolving quickly on finding out their way to our modern life, aiming to improve the skills of the life by linking many smart devices, technologies, and application together. The various heart disease prediction techniques and applications are analyzed in this paper. Heart disease is a temporal disease by its nature. Some paper describes the real-time heart rate detection, some as using different hardware IoT components such as Arduino Uno, Raspberry pi and so on, some paper should exist the prediction of a heart attack but with few shortcomings.

V. FUTURE WORK

So In the future, going to look forward the IoT device using some robust machine learning algorithm which is used predicting the heart attack, wary the caretakers and healthcare professional persons. Because nowadays an emergent technology is machine learning so further we used to implement the heart attack prediction using an IoT device with a machine learning algorithm namely as SVM (Support Vector Machine) algorithm. The extension work of this paper will be used to predict the heart attack and give alert to the particular caretakers, doctors.

REFERENCES

- [1]. D.Richard, Dr.R.Mala, GI-ANFIS APPROACH FOR ENVISAGE HEART ATTACK DISEASE USING DATA MINING TECHNIQUES, IJIRAE, Scopus Index-Journal, ISSN -2349-2163, Mar 2018
- [2]. D. Richard, Dr. R.Mala, Gr-Anfis Data Mining Approach For Envisage Heart Attack Disease, WWJMRD International Journal UGC Approved Journal Impact Factor MJIF: 4.25, e-ISSN: 2454-6615, Jan 2018.
- [3]. D.Richard, Dr.R.Mala, BOOTSTRAP APPROACH FOR ENVISAGE HEART ATTACK DISEASES USING COMBINE AD-BA ALGORITHM, IRJCS, Scopus Index-Journal, ISSN -2393-9842, Apr 2018.
- [4]. D.Richard, Dr.R.Mala, Feature Selection Approach Using for Filtering on Prediction Algorithm, Journal of Emerging Technologies and Innovative Research, Print ISSN 2349-5162, May 2018.
- [5]. To Predict Heart Disease Risk and Medications Using Data Mining Techniques With an IoT Based Monitoring System For Post Operative Heart Disease Patients. Aieshwarya B. ChavanPatil, Prof.S. S. Sonawane
- [6]. Real-time Heart Attack Mobile Detection Service (RHAMDS): An IoT Use Case for Software-Defined Networks Samr Ali & Mohammed Ghazal Electrical and Computer Engineering Department, Abu Dhabi University Abu Dhabi, UAE
- [7]. An Internet of Things (IoT) Application for Predicting the Quantity of Future Heart Attack Patients Fizar Ahmed Ph.D. Student Business Information Department Corvinus University of Budapest Hungary
- [8]. A Wireless Early Prediction System of Cardiac Arrest through IoT, YosufElSaadany, AKM Jahangir A. Majumder, Donald R.
- [9]. An Efficient Algorithm for Heart Attack Detecting Fuzzy C-means and Alert using IoT Kriti Gupta, Pallavi Kaul, Arashdeep Kaur
- [10]. IOT Based Heart Function Monitoring and heart disease Prediction System Ponugumatla Kalyan I, Mr. Gouri Shankar Sharma
- [11]. Heart Attack Detection Using Smart Phone Md.Ashrafuzzaman, Md.MazaharulHuq, Chandan Chakraborty, Md. Rafi Monjur Khan, Taslima Tabassum, Rashedul Hasan
- [12]. Design of Low-Cost, Wearable Remote Health Monitoring and Alert System for Elderly Heart Patients, Valliappan.Sp, Prithvi Raj Mohan B, Rakesh Kumar S
- [13]. Wireless Heart Rate Monitoring and Vigilant System Abhiyash Hodge, Hrishikesh Humnabadkar, Akshay Bidwai
- [14]. Detection And Warning System for Heart Attacks using IoT Femi Antony, 2 Ann Mary Joseph, 3 Jency K Davis, 4 Diffeena Stenislawoos