



HEALTHCARE MONITORING USING ARTIFICIAL INTELLIGENCE

¹Deepthy C A

¹Assistant Professor

¹Sanjo College of Management and Advanced Studies, rajakkad

INTRODUCTION

In modern life healthcare become the most important thing. Everyone wants to steady in their health and wealth. So it is important to apply the modern technology AI(Artificial Intelligence) in healthcare. It provides many tools for patient care and medicine management. So it can perform more better than humans for certain type of special care. AI suggest different form of technique for patient care as well as medicine management. Here the proposed system will manage paralyzed patients as well as the patients in critical conditions.

MACHINE LEARNING

It is one of the technique used in AI specifically for medicine selection and used for selection of treatments. Based on the patient's condition such as paralyzed, comma stage patients , the machine can predict their conditions and can suggest variety of treatment options.

The machine learning can also be applied for monitoring the patients in ICU's. To identify the variations in pulses, changes in blood pressure and temperature changes the applications of machine learning can be implemented.

This paper introduces a new Remote Patient Management System(RPS) for alert the doctor about the patients current condition. It uses sensors to track the patients conditions and transfer this information to the control unit with the help of local network. The control unit can compare the results with predefined values of patients temperature, heart rate and blood pressure values. Then the control unit can inform the changes in values to the doctor server system. The major aim of the paper can be summarized as following.

- To obtain the real time health information about a patient via AI
- Comparison of results with the normal values
- To interpret and predict any disease or disorder in the first stage itself.
- The doctor can monitor the patient, anytime, anywhere.

PROPOSED SYSTEM

The proposed system can generate final predictions depends on the previous health status by monitoring the various blood pressure values and the pulse rate values. By using the basic information the Remote Patient Management System(RPS) can perform comparative study on these values, if the patient suffering any kind of

discomfort, the system can inform the condition to the doctors server system.

The historical health information of each patient is stored on a cloud server database and can be displayed through the local network connected via through the internet to the doctors system.

The proposed system is designed for continuously monitor the vital parameters such as pulse rate, blood pressure, body temperature of a critical patient. The Remote Patient Management System can compare these values with the normal temperature, pulse rate, temperature values. If any mismatch occurs the control unit will pass this information to the doctors system and alert the doctor by a mail or notification alarm. It can also pass this alert to the patient's bystanders also.

RELATED WORK

A number of researchers have proposed various models for AI in Healthcare and the prediction of various types of disease using various techniques. This part focuses on the work in the same area.

Ahn et al. [1] implemented a system for measuring the physiological signals in sitting position such as ECG and BCG by using a smart chair that senses the non-constrained bio-signals and can be monitored using a monitoring system such as the one they had developed providing a classic example of the application of IoT in healthcare.

Almotiri et al. [2] proposed a system of m-health that uses mobile devices to collect real-time data from patients in and store it on network servers connected to internet enabling access only to a certain specific clients. This data can be used for the medical diagnosis of patients and is achieved by using a number of wearable devices and body sensor network.

Barger et al. [3] made a smart house facility using a sensor network to monitor and track the movements of the patient in home and a prototype of the same is also being tested. The primary objective of their work is to check if their system is capable to outsmart the behavioral patterns and have discussed about the same in their work.

Chiuchisan et al. [4] proposed a framework to prevent the threats to patient in smart ICUs. The proposed system intimates the patient's relatives and doctors about any inconsistency in their

health status or their body movements and also about the atmosphere of the room so that the necessary precautionary measures can be taken.

Dwivedi et al. [5] developed a framework in order to secure the clinical information that has to be transmitted over the internet for Electronic Patient Record (EPR) systems in which they propose a multi-layered healthcare information system framework which is a combination of Public Key Infrastructure, Smartcard and Biometrics technologies.

Gupta et al. [6] proposed a model which measures and records ECG and other vital health parameters of the patient using Raspberry Pi and can be of a great use for the hospitals and patients as well as their family members.

Gupta et al. [7] present an approach using Intel Galeleo development board that collects the various data and uploads it to the database from where it can be used by the doctors and also reduce the pain born by the patients to visit hospital each and every time to check their health parameters.

Lopes et al. [8] proposed a framework based on IoT for the disabled people so as to study and find the IoT technologies in healthcare segment that can benefit them and their community. They took two use cases to study the latest IoT technologies and its application that can be used mainly for the disabled people.

Nagavelli and Rao [9] proposed a novel method to predict the severity of the sickness from the patient's medical record using mining based statistical approach which they said as degree of disease probability threshold. And in order to meet their goal they have revamped an algorithm that is mostly needed to derive the hyperlink weight of the websites.

Sahoo et al. [10] studied the healthcare management system and about the large amount of patient data that is generated from various reports. They further analyzed the health parameters to predict the future health conditions of the patient or the said subject. They use a cloud based big data analytic platform to achieve the same using the means of probability.

Tyagi et al. [11] explored the role of IoT in healthcare and studied its technical aspects to

make it reality and identify the opportunities for which they propose a cloud based conceptual framework in which the patients' medical data and information can be securely transferred, with the permission of patient and their family by building a network among patient, hospital, doctors, Labs etc. The primary reason behind this is to relieve patient from the expensive clinical aid, overcome the shortage of doctors and therefore providing enhanced care and service to patients.

Xu et al. [12] presented a data model to record and use the IoT data. They designed and developed a resource-based Ubiquitous Data accessing method to collect and publish IoT data globally so that it can be accessed anywhere, anytime. They also present an emergency medical service based on IoT and how to collect and use the IoT data on different platforms.

SYSTEM ARCHITECTURE

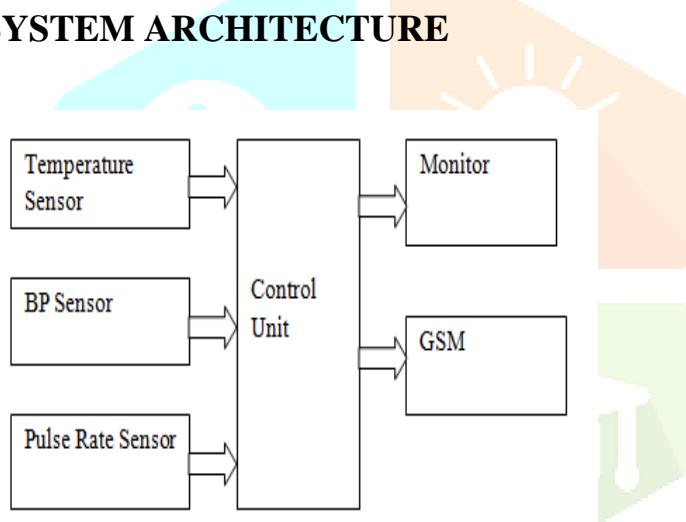


Figure: Architecture of Proposed System

The figure explain how the sensors will transfer the information to the control unit and then how it is displayed on the doctors computer with compared results.

PROPOSED METHODOLOGY

In this paper, we propose an automatic system to monitor patient's body temperature, heart rate, body movements and blood pressure. Further we extend the existing system to predict if the patient is suffering from any chronic disorder or disease using the various health parameter and various other symptoms that are obtained by the system.

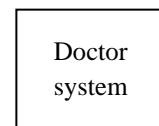


Figure: Proposed Methodology

The above figure explains the data comparison using the currently generated data with the predefined data in the knowledge base. After comparison an evaluation report is generated in the system. The pattern is then analysed to identify any mismatch .If any mismatch occurs it will alert the system and send an email message and notification alarm to the doctor system.

The system can predicts the disease that the patient is suffering from by asking them for various symptoms they may have and the options are based on the previous symptom. The final conclusion is made after at least 3-4 symptoms are identified. The result is most accurate if more and more symptoms are identified

CONCLUSION AND FUTURE WORK

In this paper, I have presented an automatic system that guarantees a constant monitoring of various health parameters and prediction of any kind of disease or disorder that prevents the patient from the pain of paying frequent visits to the hospitals.

The proposed system can be set-up in the hospitals and massive amount of data can be obtained and stored in the online database. Even the results can be made to be accessed from mobile through an application.

The system can be further improved further by adding artificial intelligence system components to facilitate the doctors and the patients.

The data, consisting medical history of many patients' parameters and corresponding results, can be explored using data mining, in search of consistent patterns and systematic relationships in the disease.

REFERENCES

- [1] B. G. Ahn, Y. H. Noh, and D. U. Jeong. Smart chair based on multi heart rate detection system. In *2015 IEEE SENSORS*, pages 1–4, Nov 2015.
- [2] S. H. Almotiri, M. A. Khan, and M. A. Alghamdi. Mobile health (m-health) system in the context of iot. In *2016 IEEE 4th International Conference on Future Internet of Things and Cloud Workshops (FiCloudW)*, pages 39–42, Aug 2016.
- [3] T. S. Barger, D. E. Brown, and M. Alwan. Health-status monitoring through analysis of behavioral patterns. *IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans*, 5(1):22–27, Jan 2005. ISSN 1083-4427.
- [4] I. Chiuchisan, H. N. Costin, and O. Geman. Adopting the internet of things technologies in health care systems. In *2014 International Conference and Exposition on Electrical and Power Engineering (EPE)*, pages 532– 535, Oct 2014.
- [5] A. Dwivedi, R. K. Bali, M. A. Belsis, R. N. G. Naguib, P. Every, and N. S. Nassar. Towards a practical healthcare information security model for healthcare institutions. In *4th International IEEE EMBS Special Topic Conference on Information Technology Applications in Biomedicine*, 2003., pages 114–117, April 2003.
- [6] M. S. D. Gupta, V. Patchava, and V. Menezes. Healthcare based on iot using raspberry pi. In *2015 International Conference on Green Computing and Internet of Things (ICGCIoT)*, pages 796–799, Oct 2015.
- [7] P. Gupta, D. Agrawal, J. Chhabra, and P. K. Dhir. Iot based smart healthcare kit. In *2016 International Conference on Computational Techniques in Information and Communication Technologies (ICCTICT)*, pages 237– 242, March 2016.
- [8] N. V. Lopes, F. Pinto, P. Furtado, and J. Silva. Iot architecture proposal for disabled people. In *2014 IEEE 10th International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob)*, pages 152–158, Oct 2014.
- [9] R. Nagavelli and C. V. Guru Rao. Degree of disease possibility (ddp): A mining based statistical measuring approach for disease prediction in health care data mining. In *International Conference on Recent Advances and Innovations in Engineering (ICRAIE-2014)*, pages 1–6, May 2014.
- [10] P. K. Sahoo, S. K. Mohapatra, and S. L. Wu. Analyzing healthcare big data with prediction for future health condition. *IEEE Access*, 4:9786–9799, 2016. ISSN 2169-3536.
- [11] S. Tyagi, A. Agarwal, and P. Maheshwari. A conceptual framework for iot-based healthcare system using cloud computing. In *2016 6th International Conference - Cloud System and Big Data Engineering (Confluence)*, pages 503–507, Jan 2016.
- [12] B. Xu, L. D. Xu, H. Cai, C. Xie, J. Hu, and F. Bu. Ubiquitous data accessing method in iot-based information system for emergency medical services. *IEEE Transactions on Industrial Informatics*, 10(2):1578–1586, May 2014. ISSN 1551-3203.

