

# A Survey Paper on Virtual Doctor – Health Monitoring System

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## ABSTRACT

The utilization of advanced and intelligent medical equipment in the virtual doctor system is transforming the community healthcare system. Studies in the healthcare field have revealed encouraging trends towards the extension of human life. Nonetheless, accessing healthcare services in rural areas remains challenging due to the need for patients to travel long distances for treatment. The implementation of IoT technology offers a solution to this issue by enabling real-time monitoring of vital signs using sensors such as heartbeat, SpO<sub>2</sub>, temperature, and sweat sensors that measure pulse rate, blood oxygen level, body temperature, and lactate level, respectively. The integrity of the data received is guaranteed, and Pychram software transmits the collected data to the cloud, enabling the provision of professional healthcare services to those who need them. Notably, data shows that in India, the ratio of doctors to patients is 1:854, emphasizing the critical importance of this technology in addressing healthcare needs in rural communities.

## 1. INTRODUCTION

Unhealthy eating habits and lack of physical activity are responsible for an increase in common health diseases like lung failure, coronary heart disease, and obesity. These ailments cause a current death rate of 8.2 million people annually, highlighting the need to address the inadequacies in the medical healthcare system. The goal of this project is to alleviate the burden on doctors for monitoring patients' health by utilizing IoT and embedded sensor technology.

Electronic sensors play a critical role in the healthcare system for diagnosis, and monitoring patients is a significant advancement in the research field. The proposed system employs E-sensors, such as heartbeat and temperature sensors, for diagnosing patients. However, separate devices for different diagnoses are costly, and using traditional thermal meters for temperature checks is inefficient. The proposed system addresses these issues by utilizing gloves as a diagnostic tool, making it more convenient for doctors and financially feasible. The integration of an advanced-performance Arduino microcontroller enhances the health monitoring system's functionality.

Remote monitoring is a solution that can overcome barriers to health services, providing professional healthcare services in both urban and rural areas through Informational and Communicational Technologies (ICT). This system allows doctors to observe and diagnose patients' health conditions remotely, enabling the early detection of disorders that can be prevented.

## 2. LITERATURE SURVEY

The writers Jose Reena K and R Parameshwari proposed the system that employs a method that monitors people. For the data derived from various readings from digital meters,

there are many data mining technologies in use. Two of the top algorithms for precise prediction and recognition of human behaviors connected to healthcare are the Support Vector Machine and Random Forest algorithms.[1]

Authors A Divya Priya and S Sundar proposed the thing which involves the proper usage of the various sensors which helps to measure body temperature, pulse rate, oxygen saturation level. So that the person who is monitoring the patient can treat him right with immediate effect. If the condition of the patient is too worse than the matter will be escalated to the expert physician [2].

Authors Aleksander Kotevski, Natasa Koceska and Saso Koceski offered framework for data preprocessing. The vital parameters are considered as a high priority in this model. Patients can look over the prescriptions to get cured at the earliest. They proposed it is best for those who need to track the vital parameters regularly [3].

Authors Challenges Moeen Hassanali, Alex Page and Tolga Soyata audited the healthcare system and integrated the virtual observance of health mechanism and clinical practice of the medication. Well-equipped IoT intelligence-based sensors helps to get the values of vital parameters. The assembly of the data upon analysis are given to the physician for the effective treatment. Data Visualization needs to be contended which helps in the effective integration [4].

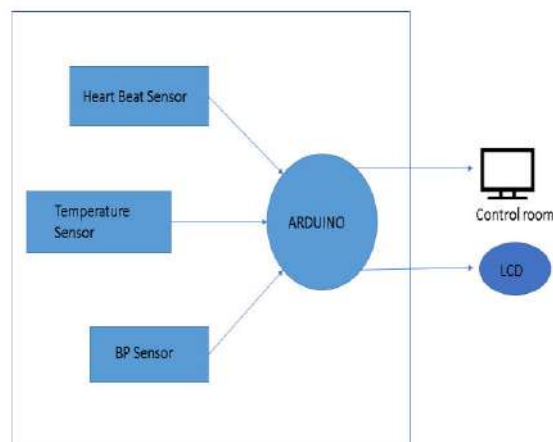
Authors Nawaf Alharbe, Anthony S. Atkin and Justin Champion assess the consolidation of cloud computing, sensor technology and IoT. The involvement of sensor technology is coming out as a most important thing of future generation real-time health services. They proposed coordinator node to collect the sensor information on the layer called data collection layer [5].

Authors Anuradha M and Vaishnavi Sindhol proposed robot which ease with medical procedure, easily emergency coordinated clinic factors that increases the concentration upon patients. This will be obviously helpful as there is scarcity of physicians [6].

Authors Amruta Unwane, Sneha Jadhaw and Sujit Jagtap proposed the framework for taking down the values of vital parameters and it is associated with Arduino. Cloud

processing plays a major role to keep reforming the status of the patients and keep tracking till their recovery [7].

### 3.EXISTING SYSTEM

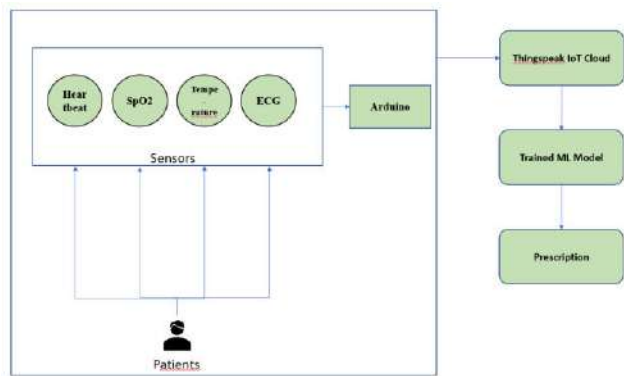


To monitor the health parameters of patients in the health monitoring system, various functions are required. These functions enable the system to conduct daily checkups by monitoring the patients' blood pressure and heart rate. Upon successful pairing with a microcontroller, the system immediately analyzes and calculates the heart rate and blood pressure of the patient. The readings are then displayed on an LCD screen in the control room. However, this technique has some limitations, including sudden malfunctions, synchronization errors, and problems with displaying accurate values. To overcome these limitations, a proposed system has been developed.

The proposed system performs the following operations:

1. Measures the temperature of the patient using a temperature sensor.
2. Monitors the patient's blood pressure using blood pressure sensors.
3. Calculates the patient's heart rate using heartbeat sensors.
4. Displays all readings on the LCD screen in the control room.

### 4.PROPOSED SYSTEM



1. Assessing a patient's health requires considering multiple health indicators. Instead of using multiple devices to collect data, a single IoT device can accurately gather real-time health data. The proposed solution involves an all-in-one device that combines multiple sensors to collect patients' biological data, which will then be transmitted to the cloud for further processing.

Once the data is stored, it will be analyzed and processed, and the proposed system will be able to identify significant changes in the patient's health status based on the resulting information.

## 2. Data Analysis

After collecting the data, it will be transmitted to the cloud for storage, and any changes in the data will be visually represented over time. By examining these graphs, doctors will be able to evaluate patients' response to medication.

To access their estimated data via a mobile app, users will need to log in using their credentials. Once they are logged in, they will be redirected to a page that displays their comprehensive estimated data, including limited data, predicted recovery rate, and medication information. The app also provides the option to have a video consultation with a medical professional.

## 3. Estimating the Recovery Rate

The proposed model employs machine learning algorithms to predict patients' recovery rate in real-time based on their health data. The machine learning algorithms are developed using the PYTHON programming language in the Anaconda Jupyter Notebook. The estimated recovery rate is then retrieved and displayed in a BLYNK mobile application. To ensure effective communication between the BLYNK mobile application and the Esp8266 wifi module, an ID selector is generated and included in the

code. The ID selector generates a hotspot region that facilitates the communication process.

## 5. RESULTS

Virtual doctor and health monitoring systems have the ability to transform the healthcare industry by providing remote monitoring and management of chronic health conditions. Through the integration of advanced medical equipment and IoT technology, patients can access healthcare services anytime and anywhere, leading to improved quality of care.

This research paper presents a comprehensive review of the literature on virtual doctor and health monitoring systems, outlining their benefits and drawbacks. The cutting-edge technologies employed in these systems, such as heartbeat sensors, SpO2 sensors, temperature sensors, and sweat sensors, are also discussed, emphasizing their role in facilitating real-time monitoring of patients' health conditions.

## 6. CONCLUSION

The adoption of virtual doctor and health monitoring systems is contingent on addressing numerous challenges, such as patient confidentiality and data security, dependable and precise health monitoring devices, and the requirement for qualified healthcare experts to interpret the data acquired by these systems.

The integration of virtual doctor and health monitoring systems has the potential to revolutionize the healthcare sector by providing patients with greater access to healthcare services and enhancing the quality of care they receive. However, to ensure successful adoption, it is vital to address the challenges associated with these systems and constantly innovate and improve the technologies supporting their use.

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