

## Improving the efficiency of monitoring of old age people at Primary health Centre in “Health Treatment at Door steps” scheme using IoT

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### ABSTRACT:

Due to the upsurge of non-communicable diseases challenged to communicable diseases, grown-up people are more affected by the disease. so monitoring is unavoidable to diminish the mortality rate. In this paper by using embedded and IoT technology, the monitoring of multi-physiological parameters is probable in a single kit. First, the human interaction with the sensor and second, the data acquisition process, and finally the data communication with the primary health center. The system can collect the data and display multi-physiological parameters like temperature sensors, glucose sensors, and heartbeat rate sensors unified with oxygen detection sensors.

*Keywords:* IoT, Sensors, Wi-fi

### INTRODUCTION:

Sensors play a vital role in all IOT devices. The stepping stone Behind every IOT field is the sensors. sensors are the heart of the IOT field. The sensors are used to distinguish the physical phenomenon and deliver the output.it is smaller in size, faster and more offer able.

This paper represents the design and implemented of health care monitoring using IOT. The Internet of Things (IoT) portrays the network of physical objects- “things”-that are embedded with sensors, software, and other technology for the purpose of connecting and exchanging data with other devices and over the Internet. Before the internet of Things, patients are used to visiting the hospital or through text communication with the doctor about their health conditions. There is a limitation to the continuous monitoring of individuals. In present days, specialists are looking forward with innovation of electronic device used to monitor the irregularities of body. Remote patient monitoring is the most universal application of IOT devices that can inevitably collect health metrics like heart rate, and temperature. When an IoT device collects patients’ data, it forwards the data to software applications where healthcare professionals and patients can sight it. An algorithm may be used to examine the data in order to recommend treatments or generate alerts. The major advantages of IOT in healthcare industries include:

**Cost reduction:** IOT enables monitoring the individual in real-time significantly reducing the risk of visiting the hospital.

**Faster disease diagnosis:** Continuously monitoring the patients using IOT leads to identifying the diseases in prior based on the symptoms

**Improved treatment:** IOT devices offers new opportunities for continuous monitoring of patients

Artificial intelligence is the recreation of human intelligence processes by machines, especially computer systems. Specific applications of AI embrace expert systems, natural language processing, speech recognition, and image vision. Machine learning is a subset of artificial intelligence, which is the capability of machines to imitate intelligent human behavior. The biggest risks are in improving the patient’s outcomes and reducing costs. Major medical industries are put on machine learning technology to make better and fast diagnoses. The most commonly used algorithms are linear regression, logistic regression, naive Bayes algorithm, and random forest algorithms. linear regression is the model to find the best fit linear line between independent and dependent variables. The naive Bayes is used for classification tasks like test classifications, and spam classifications. Random forest is a way of averaging multiple deep decision trees. The logistic regression algorithm

is used for prediction and classification problems. This algorithm is used to analyze the data that produce a binary output (yes or no) (0 or 1), that is the person is distressed or not according to the threshold value.

After the corona our general public is facing a lot of diseases especially compare to communicable diseases the non-communicable diseases are broadening quickly. so, our society is foremost to a lessening in population. Diseases like diabetes, hypo-pressure, and hyper-pressure one-third of the population are reduced due to inadequate monitoring of patients. so, we offer a scheme called DOOR STEP SERVICE. This data is obtained in a labor-intensive way. even though we come up with so many primary health centers, they will have some boundaries, and also will not extend to the bucolic as well as elevation zones. so, in this scheme, the physiological detection parameters sensors (like temperature, glucose detection, and heartbeat rate with oxygen detection) are multilingual into a single kit. This kit is afforded to the people for monitoring. whenever the patients need to monitor their health condition by using the kit, it is offer able. Behind the primary health centers using machine learning which is a subset of artificial intelligence. The data will be classified according to the threshold value with the help of a LOGISTIC ALGORITHM

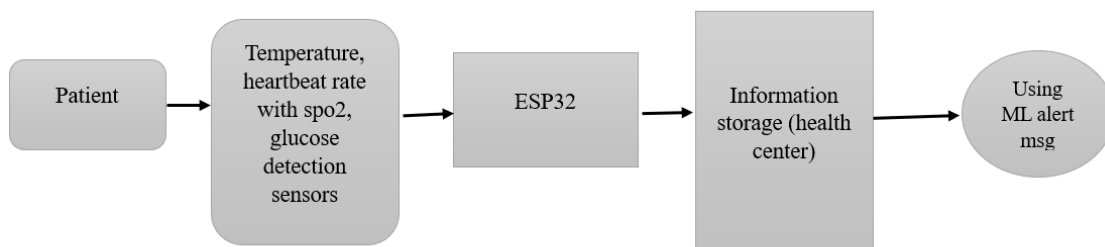
**EXISTING PERCEPTION:**

To monitor the different physiological parameters, separate devices are used for monitoring the patients. To collect the data from the sensors, distinct Arduino was desired and also for communication purpose the separate Wi-Fi modules are used.so that the system design is very bulky and the cost of the device is high.

**PROGRESSION:**

The overcome of existing concept is Our proposed concept, the physiological parameters detection sensors like temperature, glucose detection and heart beat rate and oxygen saturation sensors are integrated into a single care kit. The kit is provided to every patient for continuous monitoring and not to take risks of visiting doctors. whenever the patients feel uncomfortable with their health, they used to monitor their physiological parameters. By using ESP32 the data will send to the primary health care center. By using machine learning technique, the received data from sensor are classified according to the preset threshold value. At the same time for patients’ satisfaction the data will visible to the patients with help of LCD (liquid crystal display).

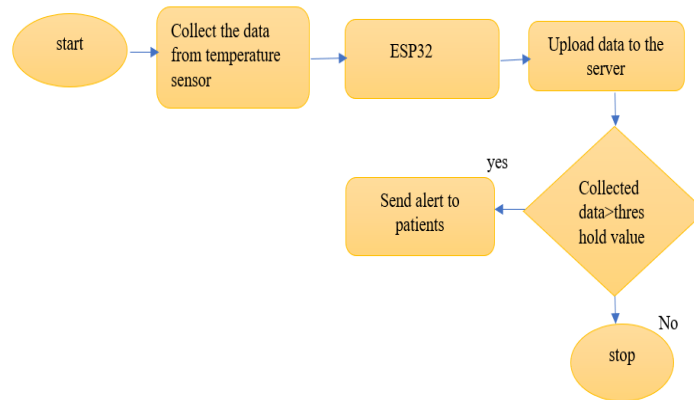
**BLOCK DIAGRAM**



**Temperature sensors:**

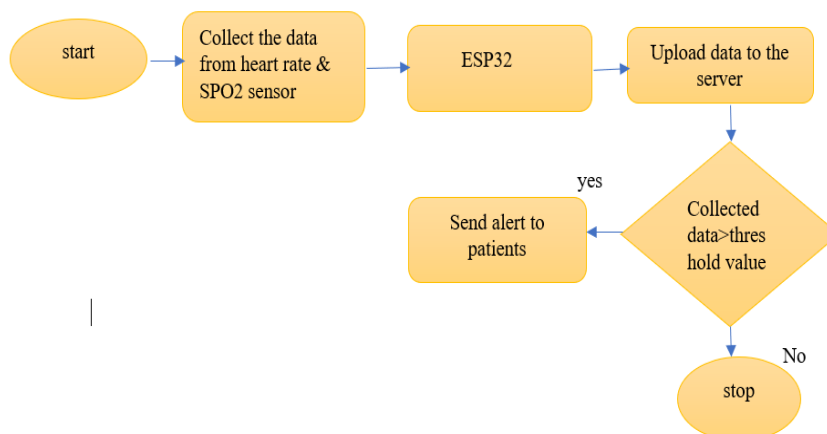
Temperature sensor is used to detect the temperature in human beings. The excess temperature called hyperthermia, leads to feverish and the temperature below the normal range is hypothermia. Both of them cause several damages to humans. so the detection of temperature is unavoidable. Here we are using MLX90614, a contactless temperature sensor. In spite of using a very high accuracy

temperature sensor like LM35, here MLX90614 sensors are preferred because, after the corona, touching the object is the source of the diseases. Here by using MLX90614, without contact, the temperature of the human body is detected. By using machine learning technology, the data will separate if the temperature is greater than 90 F. And give the alert to the patients for consulting the doctor.

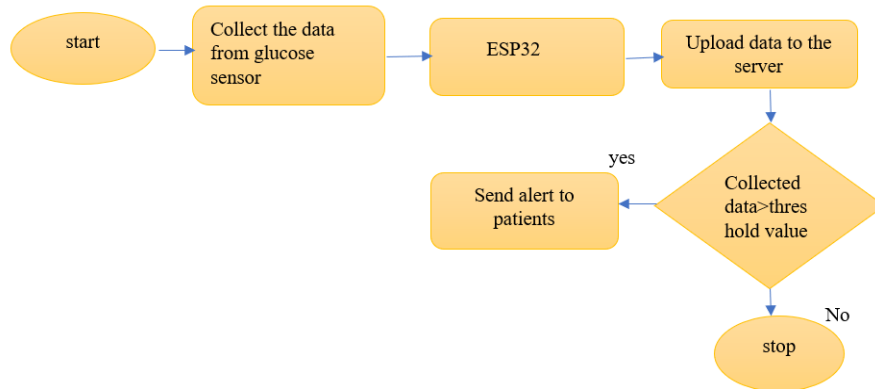


ESP32: ESP32 is a board having a microcontroller with integrated Wi-Fi and Bluetooth modules. It is a lower power-consuming device and low cost compared to the Arduino. In spite of having Arduino, here ESP32 is preferred because of having the capacity for both data prediction and also the Wi-Fi module. In Arduino, we are using a separate Wi-Fi module for transferring the data, so the size of the kit is bulk, and also the cost is very high compared to the ESP32. so ESP32 is a very efficient device. It has a 25-digital pin configuration. The 15 pins in this 25, are used as both digital and analog pins. The power supply to the board is given by data cable, It has capable of a maximum range of 12 v. Beyond that it will cause damage to the ESP32.

MAX30100: This sensor is integrated with both a pulse oximeter and heartbeat rate detection. The pulse oximeter is used to detect the oxygen level in the body. The heart beat is normal (60 to 100 beats per minute) when he/she is relax condition. After doing some exercise the heart beat rate is increased. it is not just the rate that at which your heart beats that matter. when heart is beating, the blood pump throughout the body and makes the blood volume inside the finger artery changes too. The fluctuation the blood is detected around the fingertip. The increase of heart beat should lead to severe medical issues. The accuracy rate for MAX30100 is 97.11% to 98.84% for heart beat and oxygen saturation respectively. One of the major advantages of using MAX30100 is low power consumption. it consumes less than 600 $\mu$ A in measuring mode and in standby mode it consumes 0.7 $\mu$ A.

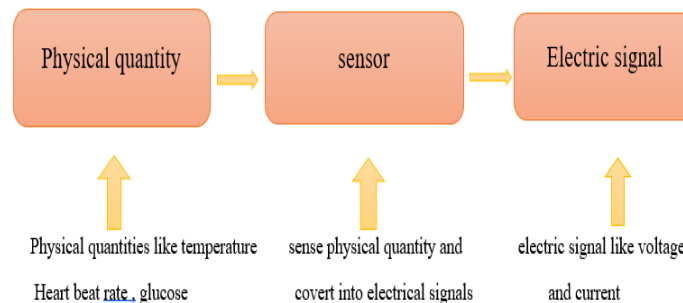


Glucose detection Process:



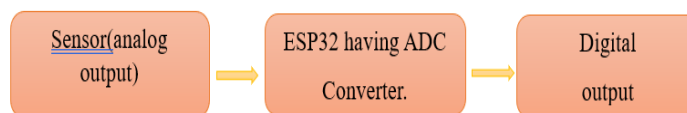
HUMAN INTERACTION WITH SENSOR:

In this paper, we want to know the physiological parameters of patients some following sensors are integrated in a single kit. Sensors are used to detect the physical phenomenon and produce the proportional output. Temperature sensor MLX90614, the contactless sensor used to detect the temperature of the body, MAX30100, a heartbeat sensor integrated with an oxygen level sensor used to detect the heartbeat rate and SPO2 level in the body. A glucose sensor is used to detect the glucose level by using saliva or blood. This particular sensor is integrated into the single kit and provided to the patients for continuous monitoring. This module represents the interaction between humans and sensors.



SENSOR INTERACTION WITH ESP32:

This paper employs ESP32 as a controller in spite of using Arduino, it has both a Wi-Fi module and a data receiver from sensors. ESP32 supports different wireless communication protocols like WIFI, Lora, MQTT, GSM, and ESP-NOW. The analog output like current, voltage, and frequency from sensors is converted into digital by using analog to digital converters. This board has two integrated 12-bit ADC also known as SAR (successive approximation registers). ESP32 board is capable of connecting 18 analog inputs which means sit is capable of connecting 18 different sensors and receiving the input from the sensors.



**CONCLUSION:**

In telemedicine, the embedded system can analyze and judge the patient's physiological information in time. In addition, transfer these data to the primary health centre using IoT improves the monitoring of health of old age people at primary health centre. Basic physiological values of old age people can be regularly monitored, if deviation from the threshold value medicines can be given immediately thus prevents critical situation of health. In the future a complete diagnosis of health system can be developed such that all the diseases can be detected early. The doctors can monitor and gives treatment completely from remote places.

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