IoT BASED HUMAN TEMPERATURE MONITORING SYSTEM FOR INTELLECTUAL VIRUS SPREADING LIKE COVID-19

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ABSTRACT

In this paper, IOT based human temperature monitoring system has been proposed. The process is involved without the help of any resources, and it also saves the time. In the proposed system a tunnel is maintained, each and every person is insisted to cross over the tunnel. The temperature sensor is placed on the tunnel which automatically senses the temperature of that person, in case any issues it automatically helps that person to take the necessary treatment according to the critical situation. In the current scenario an individual person handling with affected person is not advisable. To avoid this temperature checking Tunnel is placed in front of the gate like schools, college, administration, etc. The proposed system is very efficient and effective.

Keywords: Arduino Uno3, TMP36, PIR sensor, RFID tag, Tunnel, Cloud memory, DC Motor, Frequent check,etc

I INTRODUCTION

The Internet of Things is one of the upcoming technology in which the device are communicated over the internet. In the current pandemic situation it creates a critical environment to the human being. The infection rate gets increased when there is a close contact between the individuals. But this criterion is not suitable in all situations. For this we need to develop an advance monitoring system to safe guard the life of human being.

The Internet of things are the huge connected network, so instantly we take the necessary action and also provide the higher security of their personal data. Here the IoT doing the major part of the work. Nowadays many of the companies and Education institution, malls and many of the environments are having the IoT based devices at security purpose. These Devices are fully automated and there is no need

for human interference. It quickly senses the data and also keeps data on to the cloud without the intervention of human. And it will not occupy the too much space. This will transmit the sensed data to a cloud through on Think Speak for generating the data analysis then keep that same in to graph analysis report to a statistical data management and analysis.

The Covid-19 situation people are not ready to handle the persons, due to the problem of easy causes to affect themselves. Here I planned to take that causes at the single tunnel. In this tunnel may help the people to diagnose themselves, and also get the awareness about to take the necessary treatment and the guidance about to take action. In this tunnel had a advantage is no need to install any other physical component, just upgrade the door automatic open and close.

II PROBLEM STATEMENT

In the environment like schools, colleges and offices or any other public sectors are not allowing the people to do their work. In India the extreme Situation better to avoid the people to enter on the public environment those who are affected by the viral fever. Whatever the viral infection at first vital symptoms is an fever. It will need to monitor the human regularly. For these symptoms it is necessary to monitor the human temperature regularly. At present can't able to fix the person for manual checking because of that they may be affected easily. In this kind of bad situations to avoiding the issues, to refer the robotics. Sometime the thermometer will not work properly. it may take time to refresh and conquer the surface temperature. To solve this problem, is to fix all at automatically without interference of manual work.

III RELATED WORK

At critical situation the person or people are not ready to handle the patient due to the reason for fast spreading virus. Initially the swab test has been conducted by the human manually, at this stage as a person they may used many medical tools frequently. Even it may spread from the tester because of their reused tool. That kind of reason may avoid to go the medical unnecessary test before without any symptoms. [1]It can able to increase the good communication between the patient and the doctor. In this health monitoring system is useful to 24/7 monitoring the patient health like blood pressure, heart beat rate and etc. But it doesn't require the patient to visit the hospital, and also reduce the unwanted doctor's visit. [2]Which is enough to measures and monitor the human body temperature and it send it to the doctor via the cloud data storage and capable to access from anywhere. This medical history will may help them to recover easily from any kind of critical situation without having the patient knowledge. In case the patient can't to explain their previous medical history. [3] The Window Opening System will make it in to automatic based on the room temperature. In this same way to monitor the human

temperature with the help of the door slide attached with automatic open and shut progress and it fixed with temperature sensor for monitoring the human body temperature history and help them to do take care of them at the initial stage.

IV PROPOSED SYSTEM

In this proposed system give most important to reduce the number spreading, easily can monitor the human temperature who crossed the tunnel and also keep their data securely. Then will may reduce the human safety to stay distance from the peoples who may affected by that virus. To avoid the number of human resource who may involved to monitoring at any kind of public sectors. It will sense their mobile number with the help of GPS tracking system. In personally guide the peoples and what kind of necessary action they must want to take and symptoms all other related information.

In this system we have the following sensors components:

- Temperature sensor
- PIR sensor
- RFID
- Arduino Uno3
- GPRS Tracker

4.1 Temperature sensor

The temperature sensor is used to sense the Temperature of the object. Here TMP36 temperature sensor been used to find the human body temperature, which may greater than the 98.7 degree Fahrenheit will be consider as viral fever, immediately their status into database as abnormal otherwise set the status as normal. The TMP36 is used to detect the temperatures of the human who crossed the tunnel.

Fig 1.1 TMP36 Temperature sensor

The TMP36 is used to find the temperature of object and it also compares the surface temperature with the human body temperature.

4.2 PIR Sensor

The Passive Infrared Sensor is used to detect the moving object within the wide range of surface. It finds the whether the object or human coming near to the tunnel. At that time of object detection the RFID Tag will activate the object temperature sensor and the same time it will activate the GPRS sensor to detect the mobile with that object. And that the door will open instantly. That temperature will compare with the current surface temperature and that person past temperature data base.

Fig 1.2 IRA-S210ST01 PIR sensor

For this purpose IRA-S210ST01 PIR sensor has been affordable. Which contain the vast surface to detect the object and consume lesser memory in arduino.

4.3 RFID Tag

The Radio Frequency Identification Tag is used to transmit the data into cloud in the form of digital signals. This electromagnetic field which automatically track the object which may attached within it. Internally it contain the ISO/IEC 29167 on-chip cryptography method for the data encryption. It also have the good bandwidth to transmit the data without any interference.

Fig.1.3 Onmi-ID flex UHF RFID Tag

In this proposed system, This Omni-ID flex UHF tag has been preferred. Because it is especially which occupy only smaller amount of space and it has the wide range of data transmission up to 9 meters.

4.4 GPRS Tracking

The GPRS tracking technique will help to find the mobile number of that person. The RFID tag will manage the data and the transmitter will transfer the temperature data and mobile number to cloud. All these will control and managed by arduino uno3.

4.5 Arduino Uno3

The arduino Uno3 is preferable to this proposed system. The arduino board is very comfortable to the IoT based devices. It contain the RFID tag and the receiver in build.

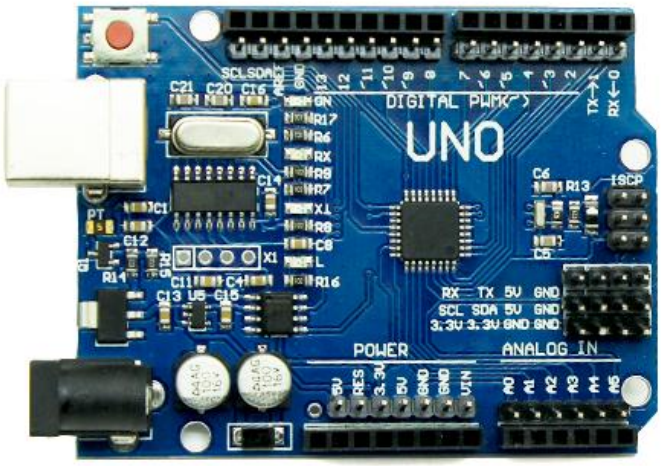

Fig 1.4 Arduino R3 CH340G ATmega328p

The CH340G board is assembled with the USB serial port and Atmega16U2 chip. This chip is used when execution of programming to control overall activity of an device.

V. SYSTEM ARCHITECTURE

In this proposed system, there are seven modules has been enclosed. Each module have it own roll and responsibilities.

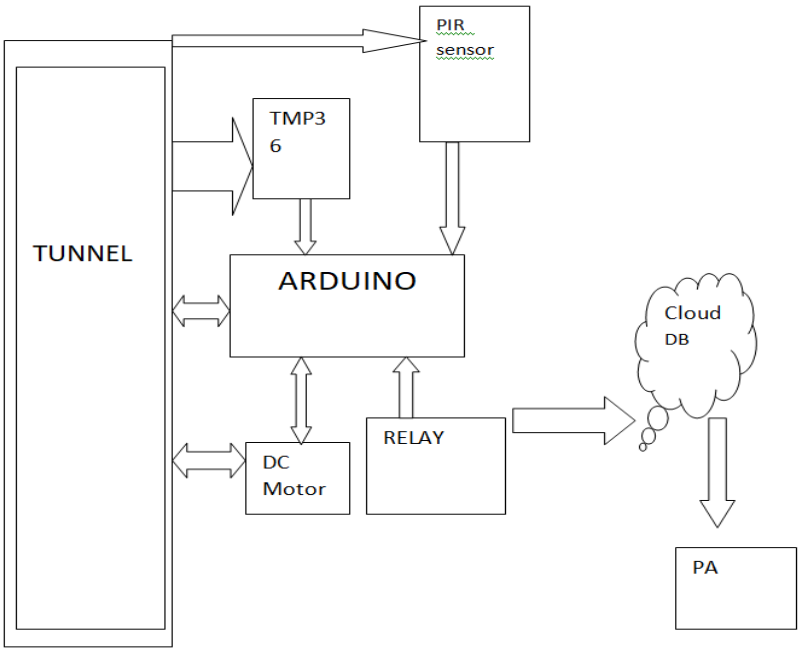

Fig 2.1. Proposed system Architecture

The tunnel is nothing but a metal detector or automatic door open and close. It May act as an gateway of the environment. We may use this tunnel as an the starting point of the environment. It will fix on to main entrance of the public sector. And it can use this tunnel to sanitizer dispenser also. To fix this device component into the top of the door or already existing entry point of the sectors. No need to buy any special robotics or any other special physical devices.

- **Object detection**
- **Temperature calculation**
- **Condition relay**
- **Detect Contact detail**
- **Data Transmission**
- **Cloud data analysis**
- **Guidance message**
- **Tracking data**

5.1 Object Detection

In this module, the detection of object is to find which object may appear closest to the door. The range of the surface is in between the 30 cm to 40 cm. The object which may appear front or rear. It consist the bi-directional object detection.

The IRA-S210ST01 sensor will detect object appearance of the limited surface. It detect whether any object is near to the device. After detection of the object then it pass the command to activate the temperature sensor to monitor their temperature and so on.

This sensor will detect the moving object within the surface range of 10 meter. Every time it will refresh the sensor to detect the sensing data and kept on to the cloud memory within the timestamp

IRA-S210ST01 (PIR sensor) ⟺ **Finding Object Sensing data**

5.2 Temperature calculation

The TMP36 temperature sensor will may sense the object temperature as a form of Celsius. That the data must store on to the cloud using the RFID tag in the form of digital signal.

After this, the monitored data will compared with cloud data status of the temperature. Then the status may be as normal or abnormal. Based upon the status the relay will take into the part of further communication and corresponding actions taken.

Based upon the status of the temperature the relay will communicate to the GPRS Tracker to send the related information through on the attached mobile number.

5.3 Condition relay

The relay will have a major role of controlling the device wireless. In relay (ESP8266) to enforce the device into wireless communication. To make them effectiveness proves with the help of an IR Sensor. By the time of object detection the relay will may activate the GPRS to read the data which has enclosed with the corresponding object.

Relay ⟺ GPRS Tracker

(ESP8266) (GPS303-F)

5.4 Detect Contact detail-GPRS

The GPRS tracker is to used to find the device which has been connected with the human body. For convenient usage may prefer the GPS303-F tracker for the purpose of tracking the device mobile number for the further communication.

5.5 Data Transmission

To keep all the data into an database for the purpose of managing the data in efficient way. The information has been transferred to an the cloud memory which has detected by temperature sensor and the relay. These data base are kept in the form of digital signal with the help of RFID tag.

The Onmi flex RFID tag will works as a converter and also the transmitter. It will manage the data into an cloud data storage.

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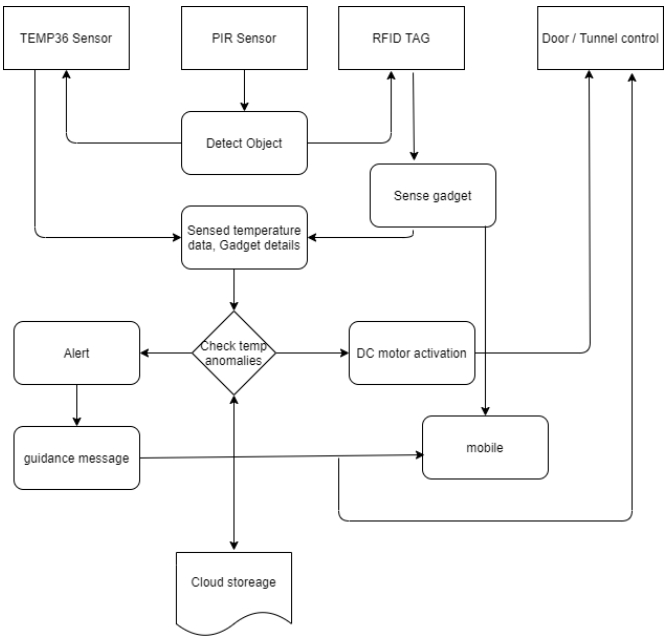


Fig 3 Work Flow of PIR Sensor

5.6 Cloud data analysis

Initially the PIR sensor will sense the data about object has detected. Then it will activate the temperature sensor and also RFID tag to detect the mobile. Then it will keep on

After reading term value it will compare is not normal human body temperature or greater than the 98.3. Then it will transfer the control to DC motor for opening the door automatically. Then finally

the data will be transferred to cloud at the same time it will find the statistical form data for every individual person.

5.7 Guidance message

After storing the data into an cloud, the cloud will send the message to on the particular mobile which has adapted with the corresponding object.

Based on the status of the temperature the guidance message will be passed to an the attached mobile number. At the same time it will keep the data into an suspected data to prohibit on next day to present at the same situation for avoid the community spreads.

The message is an awareness information and precaution to take at the time. And also the necessary actions beyond the limit.

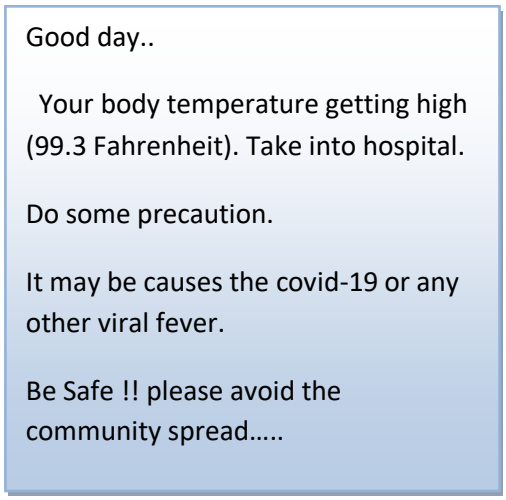


Fig 3.2 Guidance Message to Gadget

This kind of awareness information has been passed to the particular mobile or any other handheld device which has matched with the same human being.

5.8 Tracking data

After completion of all these process, Then it will keep tracking of their status at the time of next visit to the same environment. At finally it will keep all the related information to the cloud memory. It may refers the present situation and body temperature and health factors of the particular human.

VI IMPLEMENTATIONS

The working model has been designed only to find the movement of an object in between the tunnel and also the temperature of the detected object.

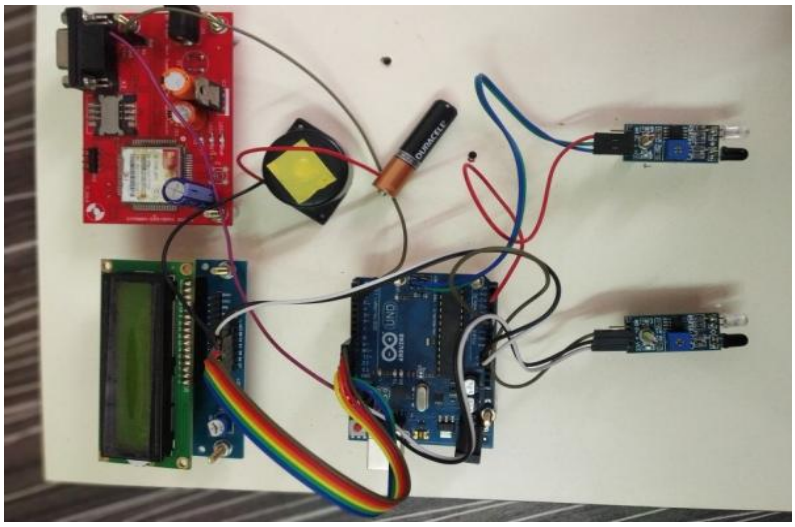


Fig 4 IR sensor and relay with PIR Sensor working model

The PIR sensor will sense the object moved from the certain distance. After sensed the object it will give the signal to the temperature sensor to monitor the temperature of that object at the same time it will give the instruction to Arduino board to open the door. At that time the arduino to activate the DC Motor , this will open the door. We may add the sanitizer dispenser means it will dispense the sanitizer to the object.

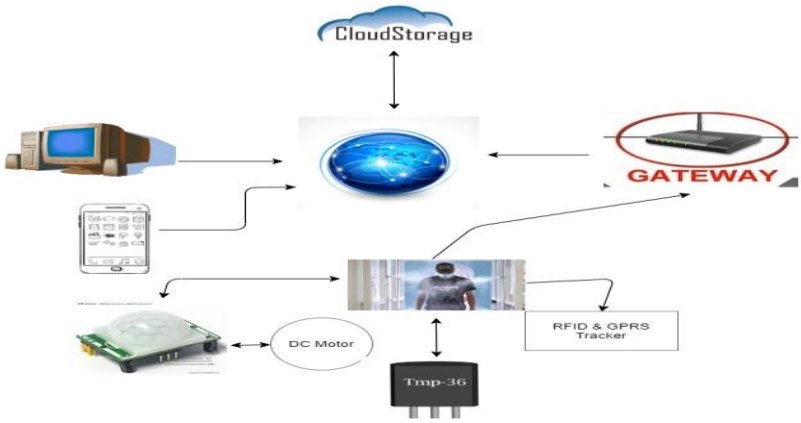


Fig 5 Component workflow

After temperature sensed by the device, it may compare with that to normal or any suspicious temperature. If it is normal temperature, will keep the data to an cloud frequently. Incase of that temperature is abnormal. If that it could be sensed, then it check their mobile gadget is activated with that person. In cause of any abnormal temperature has been sensed, then it will give the alert them to avoid get enter on to the public place. At the same time it will guide the person to how to handle the critical situation, what are the preventions they have to follow, and they can check the symptoms related to covid or any other viruses related to body temperature. If that temperature is greater than the 98.3 F, the it will sense the mobile gadget activated with that person.After it will send the guidance about to handle the current covid-19 situation.

VIII TABLULATION MATRICES

The table will shows the overall report related to temperature and mobile details. In any person's temperature may crossed that normal condition, the status will change as into abnormal. This condition is used to follow them easily and guide them without inference of any other resources.

Data storage format in cloud						
Date	In-Time	Person-Id	Temperature	Mobile	Status	condition
03-03-2020	10.04 am	779	98.3 °C	72002920****	Normal	Stored DB
03-03-2020	10.10 am	778	97.4 °C	72002920****	Normal	Stored DB
03-03-2020	10.11 am	789	96.6 °C	72002920****	Normal	Stored DB
03-03-2020	10.12 am	431	98.34 °C	72002920****	Normal	Stored DB
03-03-2020	10.12 am	545	95.5 °C	72002920****	Normal	Stored DB
03-03-2020	11.5 am	786	98.1 °C	72002920****	Normal	Stored DB
03-03-2020	14.03 pm	568	98.33°C	72002920****	Normal	Stored DB
03-03-2020	14.03 pm	586	98.34 °C	72002920****	Normal	Stored DB
03-03-2020	14.03 pm	567	98.34 °C	72002920****	Normal	Stored DB
03-03-2020	14.03 pm	886	97.4 °C	72002920****	Normal	Stored DB
03-03-2020	14.03 pm	823	100.4 °C	72002920****	Abnormal	Guided
03-03-2020	14.03 pm	455	98.34 °C	72002920****	Normal	Stored DB

Table 1.1 basic information

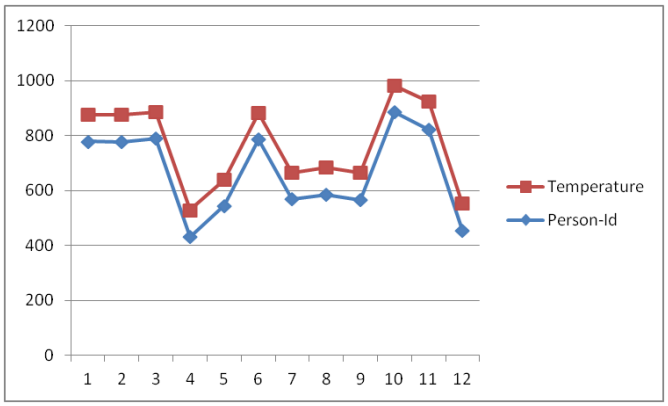
Since the table has the seven attributes which may designed by MYSQL. The information are date and time of the object detected in the near tunnel which may trying to cross the environment or trying to enter on the organizations. All the sensed data will be kept on the database for the further communications. The data as employ identification number and their body temperature as most important which mobile has adapted with that human. After reading the temperature then it will compare with the surface and human body variation. Then it will set as the normal incase of their body heat as normal, otherwise set as abnormal. Based on the status, then it will send the guidance message to the particular

person for the reason of actions must be necessary. The next time also it will read the data and compares with the previous history.

IX RESULT

In this system to monitor the human temperature and also keep that data into cloud storage. This data may help to find the related queries regarding the one of the most symptoms of the virus fever like covid & infectional virus and etc.

This resultant data will causes the graphical representation of the temperature for each humanity as side by side it will monitor their health system frequently.



It shows the human temperature statistical report by individually and it helps to follow them easily for their future references.

Every time of trespass the data will be carried and check the already existing data into an data then finally prepare the chart for the individual person. To monitor their current situation and health factors.

X CONCLUSION & FUTURE WORK

In this paper, we may able to avoid the manual checking of the human temperature. With help of this system, to reduce the covid-19 related virus spreading causes. Especially to avoid the community spread to over an the working environment. And could manage the details of the every employ in securely. At the same it guide the affected person without knowing others. It secretly handling them and giving the better suggestion for the necessary action must want take for the critical situations. In future it can able to implement with all thumbs or face recognizing attendance register. And it keeps track of the data in cloud memory.

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