

# IOT Based Blood Disorder Disease Prediction and Detection System

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## ABSTRACT

In the 21<sup>st</sup> century technology has played a major role in our day to day life. This technology has made our life more comfortable and easier. One of the fields where advance technology played an important role was Medical field. The development made in advance technology helped it easy to detect diseases in minutes and also in its treatment.

This paper presents one such advance technology which is cheapest to detect diseases related to blood without taking sample and also helps in transferring that data of blood through mobile App with the Help of IOT (Internet of Things). This paper helps in detecting SPO2 (Oxygen Saturation), Heart Rate monitoring and Temperature.

**Keyword-** Arduino, ESP 8266, max 30100, Lm35

## INTRODUCTION

During 20<sup>th</sup> century death rate were more as compared to that of today and out of that 40% death rate were because of lack of knowledge, no proper equipment, time taken for identifying that disease. Medical team were lacking to understand the disease of the patient due to poor equipment. Some of them died due to improper treatment at proper time. But today there is a great variation in death ratio. This is all because of the developments made in the

field of advance technology which has ultimately helped in developing modern equipment and devices for detecting various diseases. Detecting diseases as early as possible helps in its treatment as fast as possible. It also helps in availability of medicines at proper time. This is all possible due to increase in the development in advance technology used in medical field.

Today in the era of these advance technologies, this paper is looking forward to contribute to a project which helps in detecting diseases related to blood and providing latest technology to communicate with authorized person. This paper helps in detecting SPO<sub>2</sub>, heart rate monitoring and body temperature.

SpO<sub>2</sub> is also known as Oxygen Saturation. Oxygen saturation means detecting amount of Oxygen supply through blood. It can be simply specified as detecting the amount of hemoglobin present in the blood. The lack in SpO<sub>2</sub> can lead to various skin diseases like Hypoxemia, and many more. This paper has put forward to a technology which will lead to detect SpO<sub>2</sub> without taking blood sample and this is made possible with the help of sensor.

Blood Disorder is one of the major problem happening across the world. The ratio of blood disorders happening across the world is 2:100. Blood disorders means there is no proper blood supply and body cells of any part is not functioning properly. This can lead to paralysis if it is not detected in its early stage. This paper will be helping to detect this disease with the help of a cheap sensor.

Another feature which this paper has incorporated is continuous heart rate monitoring. According to the survey made by various medical researchers, the yearly death rate are increasing day by day. Amongst that 40% deaths are because of heart related diseases. It is important to detect the pulse rate, while a person is walking, running, etc.

The data of these sensors are stored in the server with the help of IOT technology which is one of the best communication technology. All of this features works with the use of a simple sensor LM35 which makes it worth and cheapest project. Working of this project will be elaborated more briefly by this paper.

## LITERATURE SURVEY

As this technology is looking forward towards improvement in medical equipments, Some of the projects which were related to this paper has helped in developing this project. Some of the ideas of those projects have been elaborated in this paper.

Design system, body temperature and blood pressure monitoring based on IOT paper published by Alamsyah, Mery Subito, Ardi Amir. This paper has put forth advance features like real time monitoring system for body temperature as well as for pressure. This paper helped in leading to get through the real time monitoring. But it had a drawback, it forgot to provide additional alarm sensor or gyroscope sensor to provide information to medical personnel if a patient falls unconscious.

IOT based patient health monitoring portable kit published by Praveen Kumar Maduri, Yuvaraj Dewangan, Durga Yadav, Shivam Chauhan, Kushargra Singh. This paper lead towards measuring of blood pressure, temperature and heart beat. The coolest feature of this paper was recording of the electrical activity of the brain and muscles. It also had shown changes in the

sweat gland activity. It also had a feature of detecting the oxygen carrying molecules in the blood. As noted, had a small drawback alarm indication.

IOT based health monitoring system published by Md.Rifat Rahman Akash, Yosuf Kawshik Shikder. This paper had an advance detecting technique which helped this paper to detect more diseases in our body such as Sphygmomanometer, glucometer and ECG. This paper had some additional features like pulse ox meter, temperature check, heartbeat monitoring which made this project to be at its best. The drawback of this paper was lack of communication technique and alarm indication.

## COMPONENTS

Before going through the working and flowchart of this paper let's take a glance through some of the major components used in this proposed project.

### 1) **Arduino Nano**

This device is the main part of the project. The purpose of this product is mainly described by the features that it has. It has 16 Mhz crystal oscillator which leads in precision transferring of data. The IC used in the Arduino board is Atmega 328p which is compatible to both analog and digital sensors.

### 2) **LCD Display**

It is a 16\*4 LCD display which has been used in this project. It thus helps the sensor to detect fingertips and show the sensor output.

### 3) **LM35**

LM35 is a temperature measuring device having an analog output voltage proportional to the temperature. It provides output voltage in Centigrade (Celsius). It does not require any external calibration circuitry. The sensitivity of LM35 is 10 mV/degree Celsius. As temperature increases, output voltage also increases. It is used to detect temperature of the body through finger tips.

### 4) **MAX30100 SENSOR**

The MAX30100 is an integrated pulse oximetry and heart rate monitor sensor solution. It combines two LEDs, a photo detector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals. The MAX30100 operates from 1.8V and 3.3V power supplies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times.

### 5) **ESP 8266 -12e MODULE**

Popular Arduino is interfaced with ESP8266-12e WiFi module which helps to get raw temperature voltage, Pulse from Lm35 And other sensor converts the voltage in actual temperature by utilizing its analog to digital converters. Final temperature is calculated in Celsius form. Once Celsius temperature is calculated it is converted to Fahrenheit and both values are forwarded to clients connected to thinkspk server. One can see the temperature on mobile and desktop devices.

## FLOWCHART

As we are familiar about the components of the proposed project, now let's see how these sensors are interfaced and how it is going to work. The diagram below shows the flowchart of the proposed project in this paper

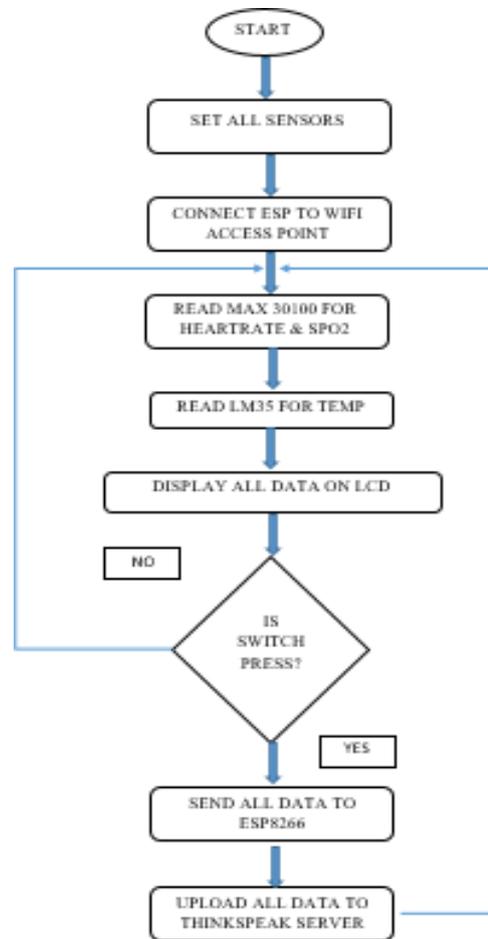
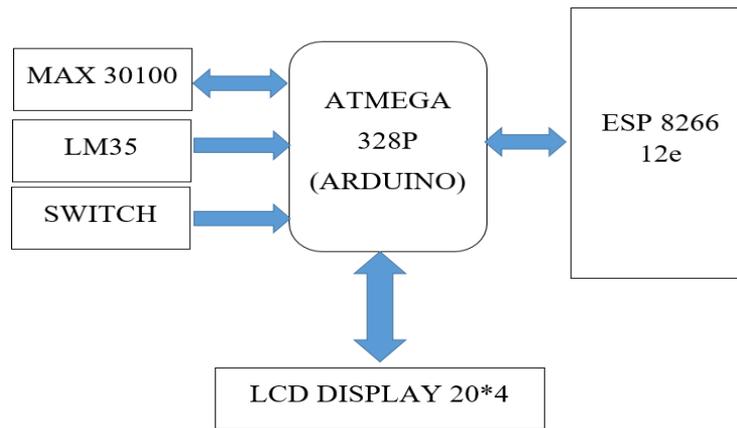


FIG (1.0)  
(FLOWCHART)

As shown in above flow diagram initially all the sensors are on when the device is turned on. And when we place our fingertip on the sensor it will get activated and starts to sense the temperature, SPO2 and heart rate. All the raw data are sent to arduino with help of thinkspeak server. The data which have been sent to server is made available to the user in mobile application in the form of an information.

## WORKING

This proposed project completely works on an embedded system as shown in diagram below. The diagram below helps all the readers to understand and examine how the project works.



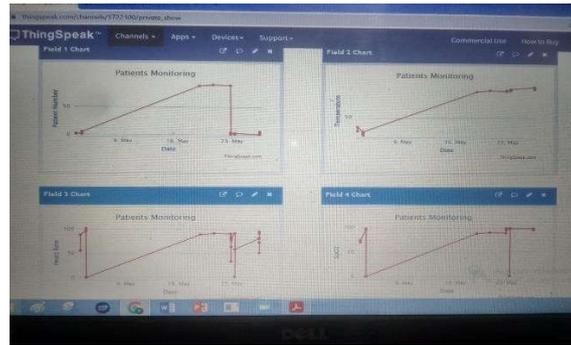
FIG(1.1)  
(BLOCK DIAGRAM)

As we have seen from the above block diagram the heart of this project is AtMega328p Arduino board. The raw data from LM35 gets transferred to Arduino at a specific temperature based on the calculation stored in AtMega328p through display. Values are shown in the display. Same processes are done for heart rate monitoring and Spo2. With the help of MAX30100, data of heart beat are collected. Based on this Spo2 and Heart rate can be detected.

After calculating the values of this sensors, it gets compared with standard data (WHO standard). Based on this data it will alert the respective person to visit nearby hospital or not. This data are more elaborately shown in mobile application with the help of ESP 8266 -12e. This is here the data of Arduino gets transferred to ThinkSpeak server and through this server user get details in mobile application.



(FIG 2.0)  
(SOFTWARE VIEW)

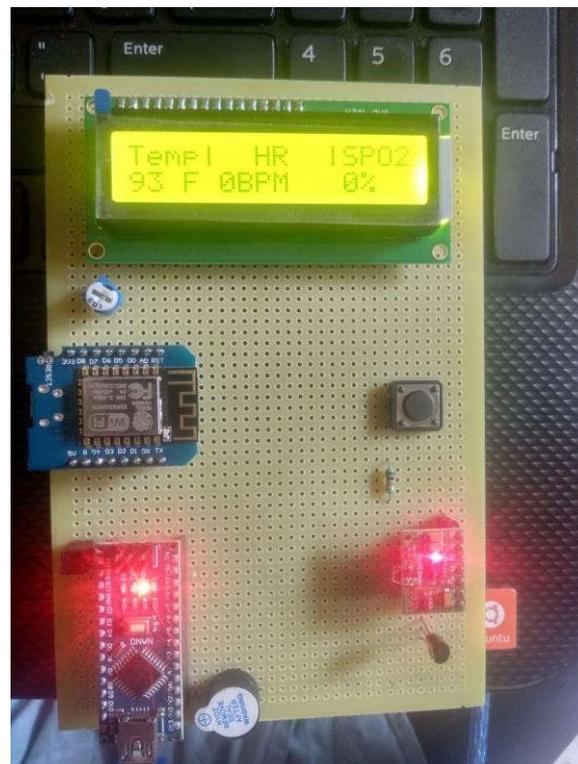


(FIG2.1)  
(GRAPH OF HEALTH IN SOFTWARE)

As the fig 2.0 & fig 2.1 shows output of the proposed project in web development and mobile application in which the data are elaborately shown with the help of graph

## RESULT

The proposed project in this paper has been successfully proven. With addition to this, graphs of continuous monitoring can be made available through mobile application and web browser. With continuous monitoring at all time it helps the individuals to take care of themselves and also helps in preventing further risks.



(FIG2.2)  
(HARDWARE IMAGE)

During the prototype made the Ethernet shield was taking time for transferring the data. In order to rectify this, a solution has been proposed. This involves getting an arduino of 16 Mhz frequency which made communication faster at the same time. The raw count of LM35 was not stable which was cleared with the help of programming and mean calculation.

## CONCLUSION

The proposed project in this paper has been successfully proved to be working. All the testing of the sensors have been compared with the standards and was proven to be working accurately. The IOT technology has made this project to its level best. It also has got an advantage of showing graphs which helped in predicting the diseases. The major highlight of this proposed project is that this project is putting forward one such technology which is very cheap so that any individual can have an opportunity to afford it because of the use of products like arduino, etc. In future, this can even lead to get you information to the doctor without even visiting and taking prescriptions.

The proposed project will be leading toward easily prediction of disease to doctor based on the graph. It also has an feature of keeping the past history of disease which make the doctor not look over paper get the history of patient as well as last checkup of te patient. Disease causing due to blood disorder can be predetected and can be cured with the help of this technology and doctors

## REFERENCE

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