

# Smart Asthma Patient Assist System Using IOT and Android Technology

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**Abstract-** This paper is all about assisting asthma patients who are perceptible to things which may not bother conventional people at all. Because when they are exposed to some new surroundings aspects such as smoke, dust, moisture and temperature may prompt asthma in them. Though asthma cannot be eradicated completely patients can avoid circumstances which cause asthma. It is essential to keep track of what triggers asthma attack in a patient, because indications do not occur right after the acquaintance to the triggering constraints. With the help of IOT and android application we have proposed a device which consists of sensors like temperature, humidity and dust which keeps tracking the values of a unstated location. This device can be placed anywhere and the value of that place is updated automatically to the cloud. These values are sent into the cloud using a Wi-Fi module which is present in the device. An android application is designed in such a way that when the values exceed the pre-set value an alert is sent to the patient's mobile which may help him/her from entering that location.

**Index Terms-** IOT; Android application; cloud values; Sensors; Alert .

## I. INTRODUCTION

According to the survey report the number of people suffering from asthma has increased more than 600 million from the year 2015-2017. Today, the inadequacy of dusty and grubby air quality information is obstructing awareness among public of health issues arising from pollution. Air pollution levels are one of the important public health problem in this present world. With the help of this device Patient who likes to go into new circumstance is possible with asthma free.

Here we use humidity sensor, temperature sensor, and dust sensor which senses and display those

values in LED display. This is possible by interfacing these sensors and display with the help of arduino. This can be transmitted to cloud using Wi-Fi module, so that these stored values can be visible in online websites as well as we can view these values in our mobile application. This comes at price of limited processing resources, which make them significantly more difficult to program and to interact with

The person suffering from asthma can view the details of the places which can cause asthma from the cloud using IOT. By using these values the patient can decide whether he can go to that place or not. A system is created with sensors like humidity, temperature and dust sensor which are integrated together using Arduino board which is connected to a WIFI module. An android app is created where the values from the cloud are updated in the application automatically. However, by building intelligence mechanisms on top of the hardware one can both optimally manage network levels as well as provide augmented functions. This system is kept in different areas and the databases are collected in the application. An alert can be given in the user's phone as vibration when the values in the cloud exceed the threshold value.

## II. EXISTING SYSTEMS

### A. FIT BIT WEARABLE

Fit bit wearable watch is one of basic device which gets additionally designed with calorie meter in it. At that time this watch gets used by many fat people and athletes to maintain their fitness upon to the level. Later on it gets an additional features like measuring heart rate, silent alarm, display caller ID with time and LED light. This fit-bit provides automatic

continuous pulse rate without an uncomfortable chest wrap. The fit-bit is made up of a soft rubber material with plain pattern texture and internally they used optical sensor which measures your pulse. Then it gets upgraded with water resistant. This device can be charged up by USB charging cable

**DRAWBACKS**

Fit-bit watch gets used only to find the pulse rate and to check calories in our body. Later on it gets used by asthma patients to maintain and to check their heart rate in normal, but this is not enough to predict or to control asthma. Because asthma gets induced by temperature, dust and moist factors which present around us. Though this device gets used only for those athletes and others, Fit-bit wearable will not be able to switch the wristband to change colours as the electronics are embedded inside this watch.

**B.WEARABLE CART FOR PREDICTING ASTHMA ON TELEMONITORING DATA**

In this system they use a smartphone-sensing wearable device which gets used to evaluate the behaviour and recognize depressive and manic states of patients with bipolar disorder using CART for prediction of asthma. By this our data can be collected and gets stored in our phone or systems.

**DRAWBACKS**

Wearable cart gets used only to store the depression And manic situation of patient, but it is not useful for asthma patient as it does not consider any single air parametric values in surroundings. Thus it gets used lesser in amount among asthma patients, so that patients cannot predict asthma before at any situation. They required some device which helps them to analyse all air quality which presents around them to move free to all places with asthma free

**III. PROPOSED SYSTEM**

The proposed system gives the value of temperature, humidity, dust, pollen in the air using the sensors for each parameter. A threshold value is set in the device so that an alert can be sent to the person’s mobile which is synchronized with the device when the sensor values exceed the threshold value. This system is kept in asthma prone areas where the values are taken automatically and send to the cloud storage

through Wi-Fi. The values in the cloud get updated with every change in the sensor values. These values are viewed through android application by getting the data from cloud storage. The main objective of the device is to alert the patient from entering the area which can cause them asthma. A vibration is made in the person’s mobile when the sensor values exceeds the threshold value. The device is placed in some particular places where there is more dust content because dust is the main parameter that triggers asthma.

Various proposals have been made for assisting asthma patients but those devices do not give alert to a patient. With the help of an android application the values in the place where the device is placed is obtained within a certain interval of time. The temperature, humidity and dust sensors are interfaced with the Arduino along with the Wi-Fi module. Wi-Fi module is used for establishing a connection between the device and the person’s mobile.

**IV. SCHEMATIC REPRESENTATION**

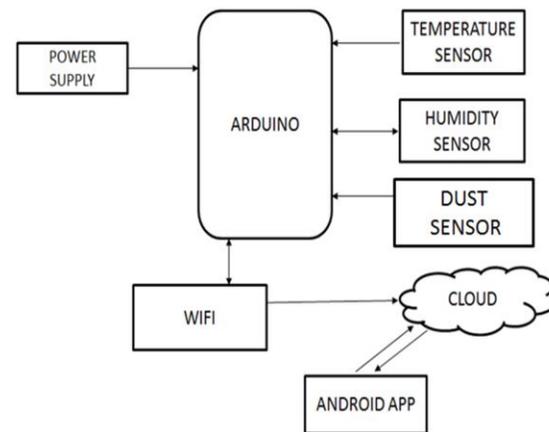


Fig.1 Block diagram

**A. TEMPERATURE SENSOR**

Temperature sensor is a thermocouple or a resistance temperature detector that collects the temperature from a specific source and alters the received information into comprehensible type for an apparatus or an observer. The LM35 temperature sensor is used to detect temperature in centigrade. The output of this sensor changes linearly. The operating voltage ranges from -55 to +150 degree Celsius. In this project this LM35 gets used to gather the temperature value around its surroundings and display it with the help of LCD display.



Fig.2 LM35 Temperature sensor

The LM35 does not need any exterior calibration and maintains an exactness of  $\pm 0.4^{\circ}\text{C}$  at room temperature. The operating voltage ranges from -55 to +150 degree Celsius. In this project this LM35 gets used to gather the temperature value around its surroundings and display it with the help of LCD display.

**B. HUMIDITY SENSOR:**

Humidity Sensor is one of the most important sensors that are generally used in industrial and in other environmental to find the mass of water vapour to the volume of air. The water content in

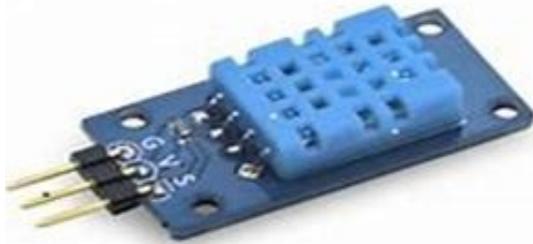


Fig.3 Humidity Sensor

air is the main factor in wellness of human being. If the temperature is more than 100C then obviously the humidity will be high, it stats that the water content of air is higher, this humidity sensors shows the reading in values, so that we can avoid such uncomfortable moments. Absolute Humidity doesn't take temperature in to account, it takes temperature and pressure. The ratio of moisture in the air to the highest amount of moisture at a particular air temperature is called relative humidity.

**C. DUST SENSOR**

GP2Y1010AU0F is a dust sensor by optical sensing system and it is an optical air quality sensor, designed to sense dust particles. LCD display and the Wi-Fi module. An infrared emitting diode (IRED) and a

phototransistor are transversely arranged into this device. It detects the reflected



Fig.4 Dust Sensor

light of dust in air. Specifically, it is effective to detect very sufficient particle like the cigarette smoke. In addition it can separate smoke from house dust by pulse pattern of output voltage. This dust sensor used here to analyse the dust, smoke, and other fine particle which is harmful for breathing. Then send their present values to the display with the help of Arduino interfacing. The sensor has a very low current consumption (20mA max, 11mA typical), and can be powered with up to 7VDC. The output of the sensor is an analog voltage proportional to the measured dust density, with a sensitivity of 0.5V/0.1mg/m<sup>3</sup>. To interface with the sensor you need to connect to its 6-pin, 1.5mm pitch connector.

**D. ANDROID UNO**

Arduino can be connected to any open source medium. AVR microcontroller with varying amounts of flash memory, pins, and features Most Arduino boards consist of 8-bit. Uno provide 14 digital I/O pins, six of which can produce pulse width modulated signals, and six analog inputs, which can also be used as six digital I/O pins.

Arduino board uses single or double-row pins or female headers that smooth the progress of connections for programming. This board works under 5 V linear regulators and a 16 MHz crystal oscillator.



Fig.5 Arduino UNO

In this system Arduino is used for interfacing the temperature, humidity and dust sensor. The output

from the Arduino is given to the Arduino microcontrollers are pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory.

**E. TRANSFORMER**

The transformer will step down the power supply voltage (0-230V) to 0-9V. If the secondary has less turns in the coil than the primary, the secondary coil's voltage will drop and the current will rise or fall depend on the wire gauge then, it is called step-down transformer. Then the secondary of the potential transformer will be joined to the rectifier.



Fig.6 Transformer

**F. WI-FI MODULE**

The module has 80 MHz low power 32 bit processor which can be used for custom firm wares. This also means that you can host small webpages without any external controller. It supports APSD for many applications and Bluetooth. Through this we send the resultant values to the cloud with the help of internet.

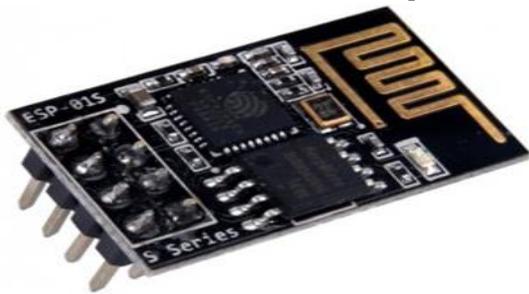


Fig.7 Wi-Fi Module

It contains a self-calibrated RF allowing it to work under all operating conditions, and needs no exterior RF parts. It is transforming the world with its low cost and high features which makes it an ideal module for Internet of Things. It can be used in any application where you need to connect a device to your local network.

**G. ANDROID APPLICATION**

Android application is one of the important and successful one, which gets updated day to day with some additional features. With this android app we can control almost everything in this developing technology.

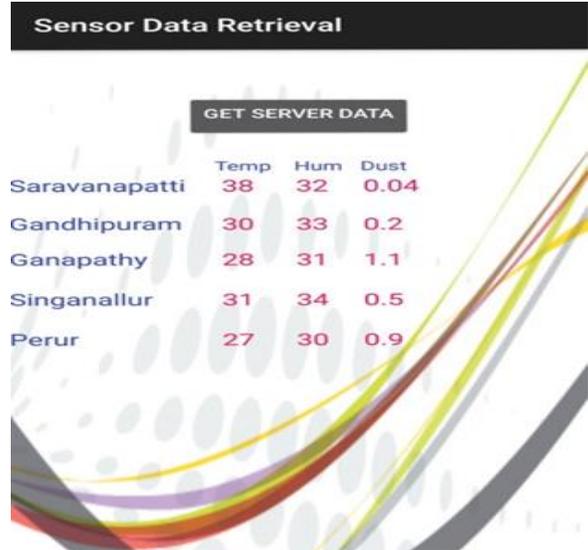


Fig.7 Android Application

Sensor data retrieval application gets developed with its required coding and then the locations gets installed in that application, so that we can fetch the data from cloud storage to this application. Through this application the people can be alert themselves by feeling the alert vibration from this application in mobile phone.

The vibration gets only when the acquired value is greater than the threshold value. We can also get updated result by refreshing this application through get "server data" option.

**V. CONCLUSION**

The paper proposes a model of a system which will take into consideration, the most important parameters before arriving at a conclusion whether to alert the user or not. By using IOT the values of the sensors are sent to the cloud and it gets displayed in the android application. This device helps the patient by providing values of asthma triggering factors and to decide whether to go to a place or not. There are some parameters which have not been addressed yet. Asthma can be prevented if proper monitoring of the patient is done on a regular basis to avoid such dangers by their surroundings.

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