Patient Room Monitoring System

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Abstract— In the current scenario of technological developments the healthcare infrastructure is still underdeveloped and facing a lot of issues.It is estimated that 2.4% of the deaths in the country are incurred due to improper hygiene and non-monitored medical facilities.The main goal of the project is to built a working system which can help monitor the environment of the patient's room.

The system is aimed at monitoring the temperature, air quality, humidity and light intensity in the room of the patient. The major aim is to provide a monitored facility to avoid chances of any mishaps and to enhance our existing infrastructure.

INTRODUCTION

Continued deterioration of public health resources and poor environmental conditions is a major public health concern in developed and developing countries. It is estimated that the pollutants responsible for poor air quality cause nearly 2.5 million premature deaths per year world-wide. Significantly, around 1.5 million of these deaths are due to polluted indoor air, and it is suggested that poor indoor air quality may pose a significant health risk to more than half of the world's population. Due to its link with industrialization, societal health problems associated with poor air quality disproportionately affects developed and developing nations – it is estimated that improper environmental conditions in the room of the patient may account for premature deaths. Remedial action is needed to improve the existing infrastructure and our idea of project is focusing in helping to overcome the existing problems.

I. OBJECTIVE

The main objectives of the model are described and mentioned as the following :

1. To develop an integrated system for patient room monitoring.
2. To build a cost effective solution model.
3. To measure and display the temperature and humidity level of the environment.
4. To combine advanced detection technologies to produce an air quality sensing system with advanced capabilities to provide low cost comprehensive monitoring.
5. To display the sensed data in user friendly format.

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II. SYSTEM HARDWARE AND SOFTWARE COMPONENTS

Node MCU ESP8266

NodeMCU is an open-source LUA based firmware developed for the ESP8266 wifi chip. By exploring functionality with the ESP8266 chip, NodeMCU firmware comes with the ESP8266 Development board/kit i.e. NodeMCU Development board.

DHT11 Sensor

The DHT11 is a basic, digital temperature and humidity sensor. It detects temperature, humidity, heat index and other related parameters. DHT11 reads it data in small scale and the read data is processed in two second intervals.

MQ135 Sensor

MQ-135 is gas sensor that senses gases like ammonia nitrogen, oxygen, alcohols, carbon die-oxide aromatic compounds, sulfide and smoke. MQ135 operate within 2.5 to 5.0 voltages. In this project sensor has been used to detect carbon die-oxide level of particular environment, the level has been detected in PPM (part per million).

LDR Sensor

In order to detect the intensity of light or darkness, we use a sensor called an LDR (light dependent resistor). The LDR is a special type of resistor that allows higher voltages to pass through it (low resistance) whenever there is a high intensity of light, and passes a low voltage (high resistance) whenever it is dark.

BredBoard

Arduino Uno breadboard is a board that enables ground connection i.e. circuit to be designed using male and female jumpers wires, it allows different sensors, LED and other required device to be plug and configuration.
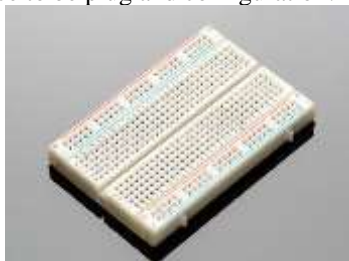

Jumper Wires

Jumper wire, also known DuPont wire is an electrical cable for connecting of components of bread board and testing of some made prototypes and circuit. Jumper wires are of two categories, there are male and female jumper wire. And each jumper wire has either pin or connector at the end.


SYSTEM BLOCK DIAGRAM

A simple block diagram of the system is shown below where each block represents a foremost component of the system.
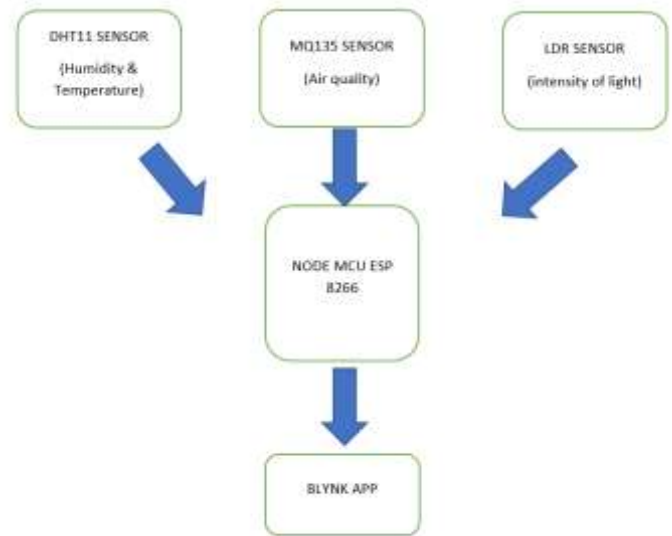
SYSTEM IMPLEMENTATION

The model is assembled according to the connections required by the sensors. After the connections are successfully made, the NodeMCU is interfaced with the sensors and the Blynk application.

The connection with the Blynk application is made by providing a authentication code. The sensors take up the necessary parameters and send the data to NodeMCU which is further sent to blynk cloud and displayed visually.
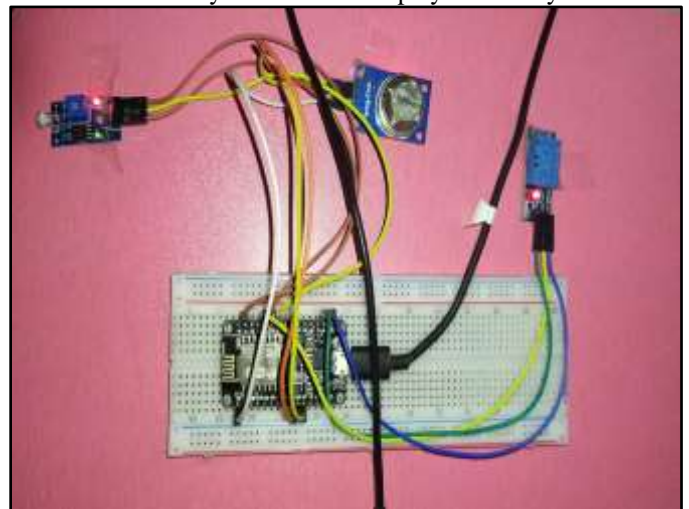
CONCLUSION

In this project, a patient room monitoring system is developed that allows patients to be mobile in their social areas. The system is intended to help monitor the room conditions of the patient like the air quality, room temperature and light intensity. The main purpose of the device is to make sure that they get medical aid as soon as possible, in case of a possible discomfort. So there will be an increased chance of survival of patients.
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