

## STRAW MUSHROOM CO<sub>2</sub> AND CO CONDITION CONTROL

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**Abstract** - The Straw Mushroom Monitoring and Air Condition Control System has developed because of news which showed that family's farmers which consist of parent and their children when lack of respiration within the mushroom greenhouse. The cause of group dead may come from Carbon Dioxide (Co<sub>2</sub>) or Carbon Monoxide (Co) gases. This project has developed by using a Node MCU board with Carbon Monoxide and Carbon Dioxide (MH-Z14A) sensors to measure the level of Co<sub>2</sub> and Co gases and using a Raspberry pi boards to be a field server and an airflow controller. The network communication inside greenhouse has been using Wi-Fi router to be an access point for communication between the field server and sensor boxes through Message Queuing Telemetry Transport (MQTT). The network communication between the mushroom greenhouse and the main server has used a 3/4G router to connect the INTERNET for sending Co<sub>2</sub> and Co values to the database server. Warning and airflow control depend on the level of Co<sub>2</sub> and Co values which has conditions to alert and turn on the red light signal and buzzer to protect farmers when lack of respiration within the mushroom greenhouse and turn on exhaust fans for controlling the airflow condition until the normal level of air condition. Image processing is used to about Harvesting time.

**Key Words:** Raspberry Pi, Node MCU, Mushroom, Buzzer, Gas sensors, Image processing

### 1.INTRODUCTION

Problems about air quality in a straw mushroom farms as news which farmers died from Working in a Mushroom Cultivation House, Province because of unconsciousness when The owner came into the farm while others try to help until all death together.(1) Doctors Identified death because of

asphyxia as in . At that time, it was not clear about what caused Of the problem. (4)The cultivation room is defined as in to be a confined space identification Because it has restricted means of entry and exit, is not intended or designed primarily as A place of work and is at atmospheric pressure or high temperature while persons are in It and it has an atmosphere with potentially harmful contaminants. So here gas sensor is Used to measure toxic gases .The dangerous atmosphere in the mushroom cultivation house is caused by biogas in the Fermentation process which materials use clear plastic to cover all sides of the nursery And then flow hot steam which temperature of the steam for nursery materials uses a Constant temperature of 65 degrees Celsius as in to kill the fungus and the mushroom Enemies so that the materials were fermented to be a biogas which consists of methane (CH<sub>4</sub>), Co<sub>2</sub>, Jane (H<sub>2</sub>), hydrogen sulphide (H<sub>2</sub>S), nitrogen (N<sub>2</sub>) and water vapour. (2)Those Gases and Co are called asphyxiates which are a group of gases that cause asphyxia as in the flowed hot stream, farmer prepares straw mushroom fungus and sprinkles it on the Fermented material for every layers. Then, the cultivation house will be taken care of the Temperature and the weather within the house until the mushroom grows and the Harvesting. Some mushroom cultivations implement by using application with the Internet of things technology to control in smart farms mushroom for temperature and Humidity by using microcontroller such as Node JS with NETPIE REST API over mobile Phone .(3)

#### 1.1 Raspberry Pi

By using image processing farmers comes to know the harvesting time , with the sensors toxic gases can be measured and alerts farmers by using a buzzer. The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV,

and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.

### 1.2 Node MCU

Node MCU is an open source firmware for which open source prototyping board designs are available. The name "Node MCU" combines "node" and "MCU" (micro-controller unit). The term "Node MCU" strictly speaking refers to the firmware rather than the associated development kits.

## 2. Methodology

Here node MCU acts as a server box inside the greenhouse and the raspberry pi acts as field server and airflow controller. The network communication inside greenhouse has been using Wi-Fi router to be an access point for communication between the field server and sensor boxes through Message Queuing Telemetry Transport (MQTT).

### Image processing:

Image processing is the process of manipulating pixel data in order to make it suitable for Computer vision applications or to make it suitable to present it to humans. For example, changing Brightness or contrast is a image processing task which make the image visually pleasing for Humans or suitable for further processing for a certain computer vision application.

### Gas sensor:

A gas sensor is a device which detects the presence or concentration of gases in the Atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential Difference by changing the resistance of the material inside the sensor, which can be measured as Output voltage. Based on this voltage value the type and concentration of the gas can be estimated.

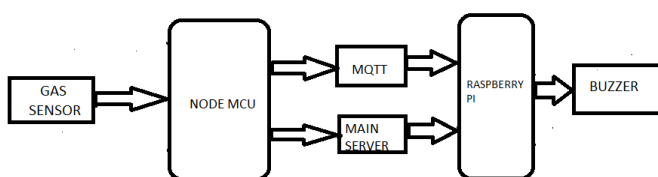


Fig -1: Block diagram

The network communication between the mushroom greenhouse and the main server has used a 3/4G router to connect the internet for sending Co2 and Co values to the database server. Warning And airflow control depend on the level of Co2 and Co values which has conditions to alert and turn On the red light signal to protect farmers when lack of respiration within the mushroom greenhouse .And turn on exhaust fans for controlling the airflow condition until the normal level of air condition

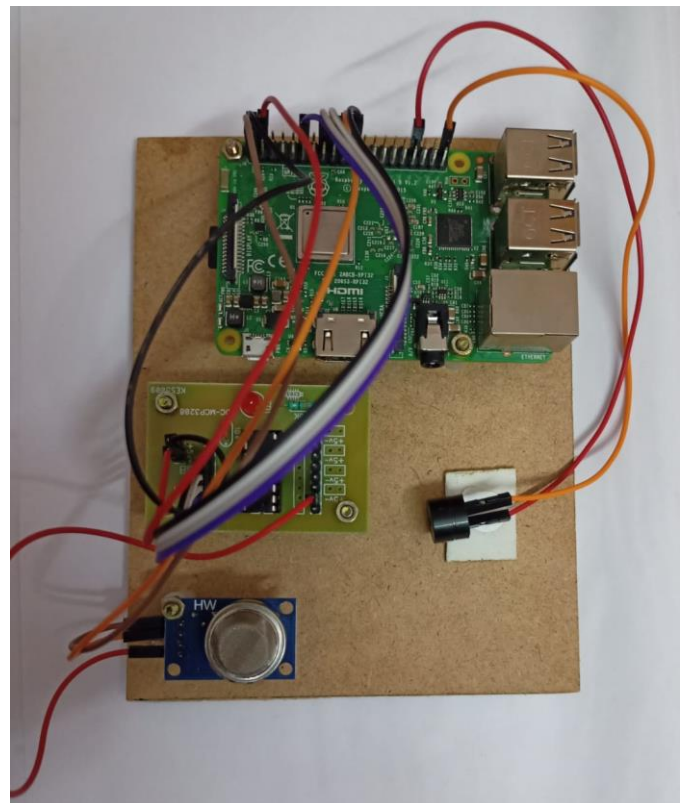


Fig -1: Hardware kit

## 3. CONCLUSIONS

The formation of Co gas is caused by the fermentation Process of materials which are used for straw mushroom Cultivation. The system will start collecting data within the House by collecting from the 1st day. The level of Co gas Will increase significantly in the 1st day, which will begin to Decrease until in the 5th day in Table III because of the hot Stream process which is caused to increase the amount of Smoke and it will be high in the 1st to

2nd day which the System had turned on the warning light When detected Co gas over condition. By using image processing farmers can find the size of mushroom.

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