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DESIGN&IMPLEMENTATION OF SENSEPACK: AN IOT BASED MUSHROOM CULTIVATION MONITORING

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Abstract: In this paper, the design and perpetration of SENSEPACK- a smart system to cover room terrain of mushroom civilization ranch is reported. The system measures the temperature, moisture, light and CO2 position with applicable detectors. The attained data can be employed to control the terrain of the nursing room with the help of external bias similar as water pump, exhaust addict, light bulb and air conditioner. An android/ web- grounded operation has been developed for the ease of covering the system. The software operation allows robotization and remote operation of the external bias to maintain and control the optimum environment.

Index Terms – Mushroom, Cultivation, Android, Raspberry pi, Wireless sensor networks, Sensors, IOT,Monitoring.

I. INTRODUCTION

Mushroom is a comestible fungus which is cultivated using seeds developed from towel culture fashion. Mushroom is cultivated methodically in a clean terrain without applying any chemical toxin and fungicides. To meet the high demand of mushroom because of its taste and nutrition, it is now cultivated over hundred countries. Of these countries, China is producing over 70 of the total comestible mushrooms produced in the world. Mushroom civilization can be divided into five phases. They're generally nominated as composting, begetting, containing, cascading and harvesting. A veritably important material for mushroom civilization is compost which is prepared from a combination of constituents that includes steed ordure and straw mixed with water. After medication, the compost is mixed with generate which produces mycelium. The mycelium is also allowed to spread through the compost. After two- three weeks, the mycelium protrudes the compost. At this point the compost is spread in a bed where mushrooms grow.

The beds should be placed in nights apartments where temperature needs to be around 23 degrees Celsius and the moisture needs to be in between 70 and 80. thus, it's necessary to include water scattering system. The optimum temperature for mushroom civilization is 22 to 26 degrees Celsius. still, it has been reported that, low temperature and low moisture produce lower mushrooms in large scale whereas high temperature and moisture yield larges mushroom on a small scale. In final stage, the temperature is maintained to crop the mushroom. also, the temperature can be varied from 17 to 23 degree Celsius to cultivate mushroom throughout the time. Mushroom civilization, although free from chemical toxin and fungicides, is critical since it requires careful examination and control of nursery terrain. The temperature and moisture are two crucial factors for growth and development of different types of mushrooms. Other important factors are the light intensity and air quality which also determine the quantum of the product. Generally, these factors are controlled manually by growers. Maintaining the optimum terrain for mushroom civilization manually is time consuming and challenging. robotization and addition of smart electronic

bias in mushroom civilization have been on the rise in recent times. This is substantially because of automated mushroom civilization system reportedly being more effective in controlling the optimum parameters and therefore performing in more yield.

In Thailand, Kaewwisetet.al. developed a fuzzy sense- grounded system to control temperature and moisture for three different mushrooms. In 2018, a exploration group grounded in Indonesia controlled the same parameters by developing an Arduino grounded system. They used an android app to cover and control temperature and moisture by totally turning on and off the heater and water pump. Mohammad et.al. developed an oyster mushroom civilization system grounded on Internet of effects IoT in Malaysia in 2018. Aditya et.al. compared fuzzy sense and neural network grounded mushroom civilization system and determined the optimum and effective system. Although bordering countries are espousing technology-oriented systems for effective and effective mushroom civilization, Bangladesh is still floundering with the traditional system. therefore, despite having a suitable climate for mushroom civilization, the periodic product of mushroom in Bangladesh is still veritably low. thus, an automated monitoring and civilization system is necessary to ameliorate the product and commercialization of mushroom. In this paper, the design and perpetration of an IoT grounded mushroom civilization monitoring system 'SENSEPACK' is reported which is developed by DataSoft, a leading software product and services company in Bangladesh. The optimal IoT grounded result takes inputs from the mushroom nursing terrain using light detector, gas detector, moisture detector and temperature detector. It displays the tasted values to its stoner for remote monitoring.

Using the device, it's also possible to control the optimum position of temperature, moisture, light intensity and CO2 position in the room by turning on/ off external bias similar as exhaust addict, light bulb, AC and water sprayer. A devoted operation especially developed for the system allows to fluently cover and control in the terrain in the nursing room. The operation allows controlling the optimum terrain both manually and automatically for four different mushroom species videlicet, oyster, milky, button and shitake mushroom. The system is designed to help a mushroom planter as an adjunct to cultivate mushroom and pave the way for effective and largely yielding inner gardening. Using the proposed result, it'll also be possible to produce mushroom efficiently throughout the time.

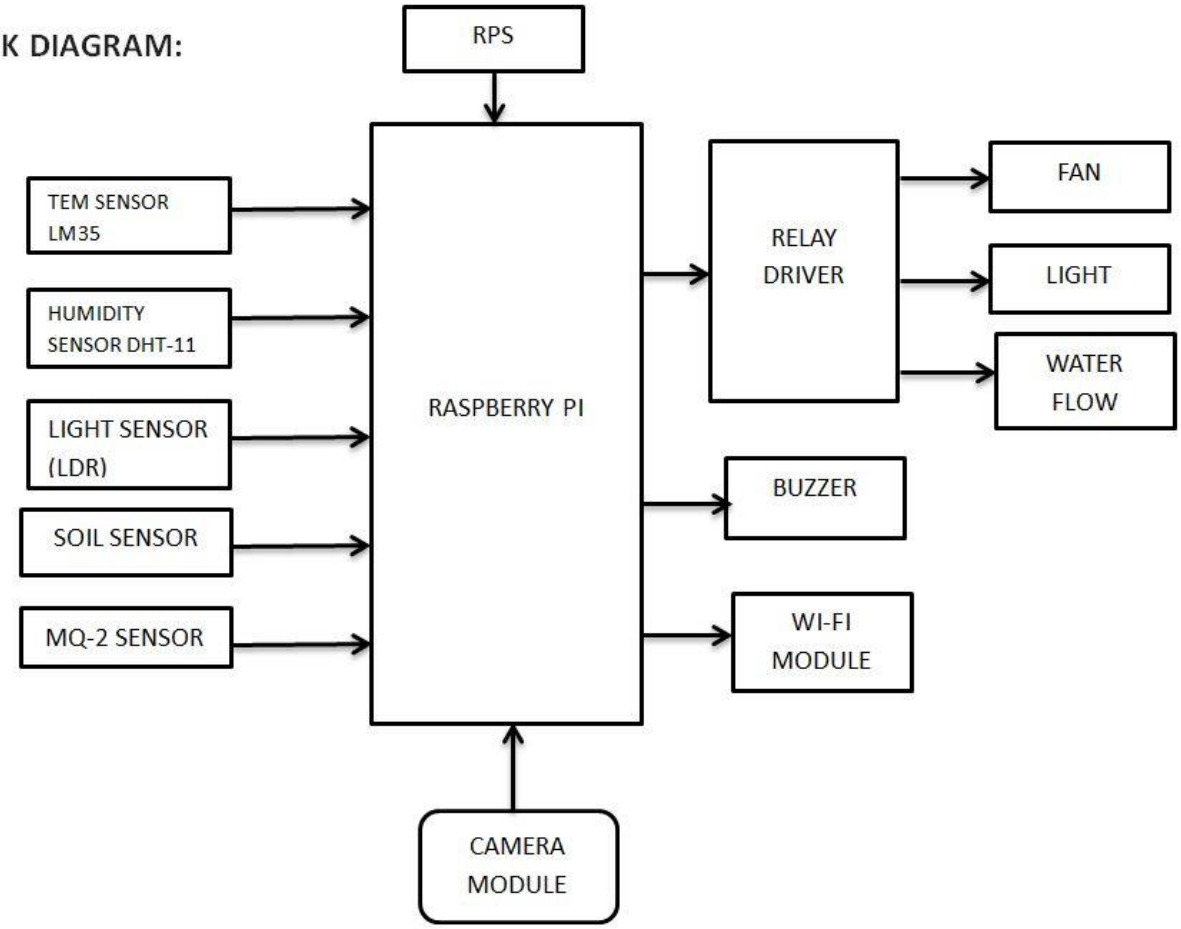
II. EXISTING SYSTEM

- In previous system there is failure of mild detection. H2. LPG, CH4, CO gases.
- Manual data acquisition calibrated.
- Manual data entry to bms machine.

III. PROPOSED SYSTEM

- We are adding additional sensors to detect these gases and also camera module to monitor the system.
- All the data collection connected via sensor system.
- Remote and local setting of sensors for alert and control messages.

BLOCK DIAGRAM:



- The IoT based mushroom cultivation system has been designed with Raspberry pi and Relay driver being at the core of its components. The two separate designs have been carried out for sensor system and control system. The first task of the system is to take inputs from the environment by sensing where it has been installed. For temperature and humidity sensing, a low-cost digital sensor DHT 22 has been used. For CO2 gas sensing, MQ – 135 has been used. These two sensors along with light dependent resistors (LDR) have been connected to Relay driver. The system takes inputs from these sensors and logs the data for remote monitoring and controlling. To control the room environment, there is a provision to connect four external devices to the raspberry pi board. An air conditioner, an exhaust fan, a water pump motor and light bulb can be used to control temperature, CO2 level, humidity and light intensity of the nursing room respectively.

IV. SCHEMATIC DIAGRAM

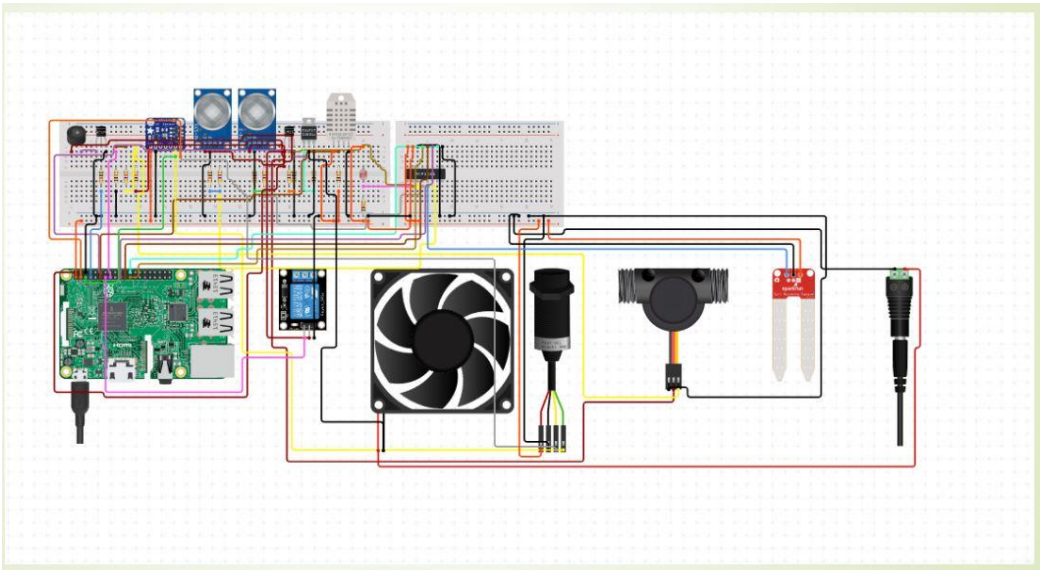
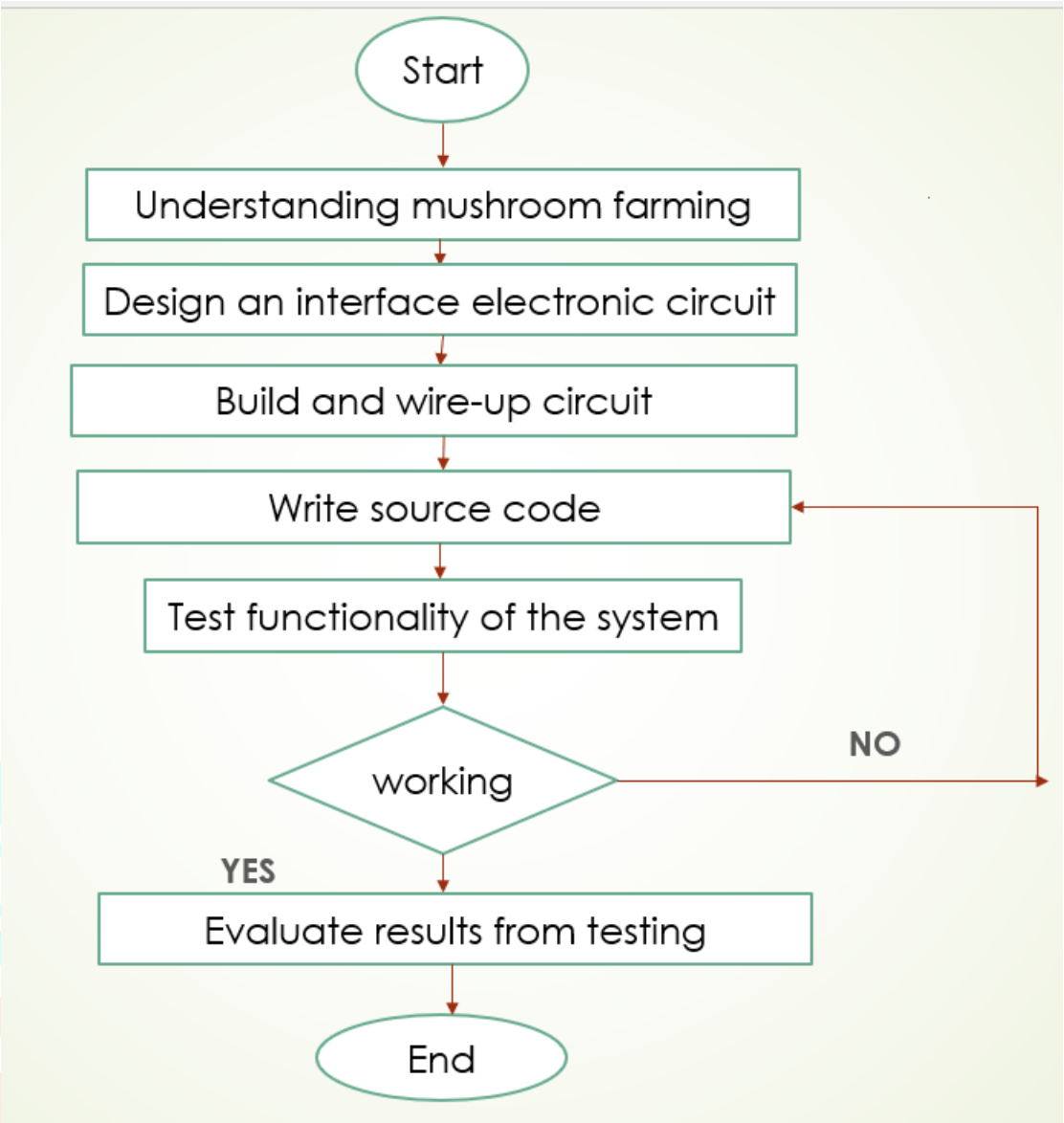


Fig 2: Schematic representation of the working model

V. FLOW CHART



VI. METHODOLOGY

- Stage 1: Literature survey related to mushroom cultivation which will enable to solve our problem.
- Stage 2: Hardware design & implementation using raspberry pi. The design has been carried out for sensor system & control system.
- Stage 3: Development of Graphical user interface for monitoring and controlling the system.
- Stage 4: The system is integrated with IOT for remote monitoring & controlling.
- Stage 5: An android application has been developed to control the room environment from anywhere anytime.

VII. CONCLUSION

- By using the above strategy and putting it into practise, the issues with temperature monitoring and control and water supply that are relevant to mushroom production will be effectively resolved. The ideal amount of moisture is necessary for mushroom growth. As a result, by keeping the bed's ideal moisture level, you can guarantee that button mushrooms grow properly and stop unwelcome fungus from spreading.

VIII. RESULT

- The above method and its application will effectively handle the temperature monitoring and controlling and water supply issues linked to the mushroom production. To grow, mushrooms need the ideal amount of moisture. Maintaining the ideal moisture level in the bed will therefore ensure healthy mushroom growth and also inhibit the formation of undesirable fungus.

IX. ADVANTAGES

- IOT can help to improve agricultural and farming industries by reducing labor cost through automation.
- Increase the yield by providing optimum conditions for growth
- The implementation of smart mushroom system has optimized that usage of resources such as water, fertilizer and also maximizes the quality & productivity of mushroom.

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