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TOPIC : Smart Farming system

Introduction

- Smart Farming System is a way to help farmers grow crops better. It uses sensors to measure how much water the crops need and gives them the right amount of water. Farmers can also use the app to adjust how much fertilizer to use based on the nutrient levels. This helps farmers waste less and grow more crops. Smart Farming System is unique in that it allows farmers to break away from the traditional NPK ratio and use any type of ratio they want. Additionally, it can connect to Wi-Fi, so farmers can control it from their phones even when they are away. It can also be run using voice commands through devices like Google Home or Echo Dot. With Smart Farming System, farmers can use resources like water and fertilizer more efficiently, making farming more sustainable and productive, while also enjoying the convenience of remote control through Wi-Fi and voice assistants.

Scientific Principal involved

- Smart farming system uses advanced technologies such as water level sensors, moisture sensors, and solenoid valves to optimize the application of fertilizers and water to crops. This system is based on the concept of precision agriculture, which involves providing the right input, at the right time, and in the right amount to increase crop yields and reduce waste.

- The water level sensors measure nutrient levels in tanks and adjust the application of fertilizers accordingly. This approach helps to improve nutrient use efficiency, which is the ratio of crop yield to fertilizer usage

- The moisture sensor measures soil moisture levels and supplies water automatically to the fields, which helps to improve water use efficiency, the ratio of crop yield to water usage.

- Overall, Smart farming system is a great example of how precision agriculture can help farmers optimize their resource usage and improve their agricultural output.

Working

- The moisture sensor senses the moisture level in the soil and sends the data to the NodeMCU microcontroller.

- The NodeMCU microcontroller reads the data from the moisture sensor and sends it to the app via Wi-Fi.

- The farmer can view the moisture level data on the app and can adjust the water flow to the crops by turning on the 220-volt solenoid valve to increase or decrease the water flow.

- The farmer can also adjust the NPK levels by turning on the corresponding solenoid valves for nitrogen, phosphorus, and potassium. This helps the farmer to use any type of NPK ratio they want.

- The relay controls the solenoid valves based on the data received from the moisture sensor and the farmer's inputs on the app.

- The farmer can control the Smart Farming System remotely through the app, even when they are away from the farm.
- The system can also be controlled using voice commands through devices like Google Home or Echo Dot.

Benefits

- **Improved efficiency:** – Smart Farming Systems can help farmers use resources such as water and fertilizer more efficiently, resulting in less waste and more sustainable practices.

- **Increased crop yield:** – By providing crops with the optimal amount of water and nutrients, a Smart Farming System can help improve crop yield.

- **Remote control:** – With wifi connectivity and voice commands, farmers can control the Smart Farming System even when they are away from their fields, making it more convenient to manage their crops.

- **Customizable nutrient ratios:** – Smart Farming Systems allow farmers to break away from traditional NPK ratios and use any type of ratio they want, giving them more flexibility in their farming practices.

- **Better decision-making:** – With the help of sensors and data analytics, Smart Farming Systems can provide farmers with valuable insights into their crops and soil conditions, helping them make better decisions for their farms.

Materials used

1. NodeMCU (esp8266)
2. Jumper wire
3. Bread board
4. Relay module
5. Water level sensor
6. Solenoid valve
7. Pipes
8. Plastic containers
9. Ply board
10. Pvc pipes
11. AC to DC converter
12. Switch
13. Syringe
14. Roller clamp
15. 16-channel-multiplexer