Internet of Things
(COCSC20)

Topic: Project Summary

Branch: COE - 1
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1. Overview of Node-MCU ESP8266:

Node-MCU is an open source firmware for which open source prototyping board designs are available. The prototyping hardware typically used is a circuit board functioning as a dual in-line package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna. The ESP8266 Wi-Fi Module is used to give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of hosting an application or it also offloads all Wi-Fi network functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set so you can simply hook this up to your Arduino device and get about Wi-Fi-ability. The ESP8266 Wi-Fi module is used to transfer the data from Arduino to dummy server and from server to Arduino.

2. Working Methodology:

Soil moisture sensor, a relay circuit to control the water pump. Single bus data format is used for synchronization between DHT22 and MCU sensors. One communication process takes about 4ms. Data consists of integral and decimal parts. A complete data transmission is of 32 bit, and the sensor sends higher data bit first. Data format: 8bit integral humidity data + 8bit decimal humidity data + 8bit decimal temperature data + 8 bit checksum (Error bits). If the data transmission is right, the check-sum should be the last 8bit of "8bit integral humidity data + 8bit decimal humidity data + 8bit integral temperature data + 8-bit decimal temperature data". All these sensors are interfaced to an open source Node-MCU (ESP8266) which will act as a microcontroller. This microcontroller is also interfaced with 5V power supply. Valves and solenoid Pumps are being controlled by the Node-MCU for efficient working of the system. All this information is being sent to a Blynk app. The control of the whole system is automated using NodeMCU and IoT systems. The dispenser is employed to combine the nutrients with the water. The water containing nutrients is passed to the pipes which facilitate submersible pumps.

3. Implementation using Thinger for graphical representation

Thinger.io is a cloud IoT Platform that provides every needed tool to prototype, scale and manage connected products in a very simple way. Our goal is to democratize the use of IoT, making it accessible to the whole world, and streamlining the development of big IoT projects. **Hardware agnostic:** Any device from any manufacturer can be easily integrated with Thinger.io's infrastructure.
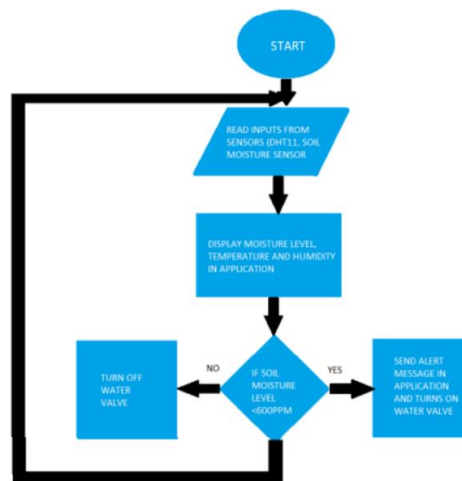
4. Overview of soil moisture sensor

Soil moisture sensor is a low cost and user friendly device, which is used as to detect soil moisture value. Different crops required the different level of moisture so that productivity increases . By Using soil moisture value, farmers should know about how much water is present in the farm. Human intervention is not needed. In soil moisture sensor is low power device operated in 3.3V-5V.soil moisture sensor has both digital and analog outputs

5. Working principle of DHT-22

DHT22 is a more accurate, low cost and more precise temperature and humidity sensor. DHT22 has an ability to collect digital signals with humidity and temperature sensing technology. This sensor consumes less power and produces output reliably and stable.It is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data.

References :
- https://ieeexplore.ieee.org/abstract/document/6582678
- https://www.researchgate.net/publication/320546009_A_low_cost_smart_irrigation_system_using_MQTT_protocol
- https://www.researchgate.net/publication/342175470_IoT_Based_Plant_Monitoring_System
- https://dl.acm.org/doi/abs/10.1145/3001913.3006639
- https://www.irjet.net/archives/V8/i5/IRJET-V8I5703.pdf