IOT Based Smart Single Phase Agriculture Motor Controller

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Abstract - *IoT campaigns and communiqué methods related with wireless devices confronted in agriculture applications are estimated in detail. What sensors are obtainable for exact agriculture request, like soil groundwork, crop position, irrigation, creature and pest detection are enumerated. How this expertise serving the cultivators through the crop phases, from spreading incomplete harvesting, stuffing and transport is clarified. Additionally, the use of unmanned midair vehicles for crop investigation and other satisfactory claims such as enhancing crop harvest is measured in this object. State-of-the-skill IoT-built architectures and stands used in agriculture are also tinted anywhere appropriate. Conclusively, founded on this detailed review, we classify current and upcoming tendencies of IoT in agriculture and highpoint possible research trials.*

Key Words: *Key Words*: **Internet-of-Things (IoTs), smart agriculture, advanced agriculture practices.**

1. INTRODUCTION

To improve the agricultural yield with fewer resources and labor troubles, considerable revolutions have been made during human antiquity. Though, the great population rate certainly not let the mandate and amount competition through all these whiles. Affording to the anticipated figures, now 2050, the biosphere population is probable to trace 9.8 billion, an growth of almost 25%. In directive to provender this greater, additional city, and better-off inhabitants, nourishment manufacture must dual by 2050. Not only for nourishment, but harvest production is flattering similarly dangerous for manufacturing positively harvests like fiber, rubber, and gum are playing significant roles in the cost-cutting Inopportunely, only a imperfect helping of the world's superficial is appropriate for farming usages due to numerous limits, like fever, climate, topography, and soil quality, and smooth greatest of the appropriate zones are not standardized. After increasing the adaptabilities of sceneries and plant types, countless new alterations jump to occur that can be problematic to count. Besides, like land and climate patterns and population thickness, though fast development is continually affectation intimidations to the obtainability of arable land-living.

1.1 Need of IOT Based Smart Single Phase Agriculture Motor Controller

- This system is cost actual, so that, the agronomists container has enough money it.

- The choice-creation module of this scheme are able to mechanise the irrigation procedure, so that, the farmer's physical effort with the irrigation procedure will be fewer.

- This will development to diminish human physical work for the crop-turf nursing process and regulatory development.

1.2 Objectives

- To encourage the good development of plants and preserving the right levels of moisture for the soil.

- Additional impartial can be seen as creation sure there is backup cover when there is a short period of dearth as this can withstand the turf sufficient when water levels are low-slung.

- Added reason is to calm the troposphere and soil which is an idyllic situation for plants. What's more, with steady irrigation you'll be intelligent to thinned any elements in soil or even disappointment damaging salts.

- Lastly, through irrigation you can inferior the hazards of soil high-pitched which can upsurge subsurface erosion from the unusual subversive water flow.
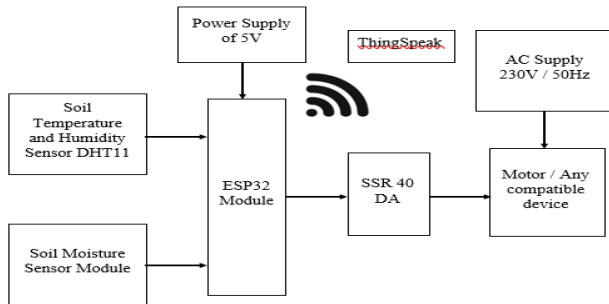
2. SYSTEM DEVELOPMENT
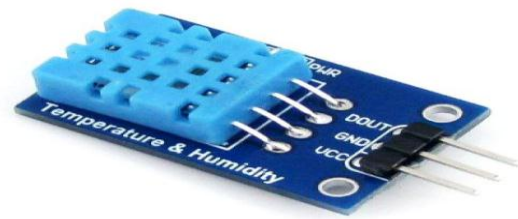

Fig-1: Block Diagram

3. COMPONENTS

3.1. ESP32 Module

ESP32-WROOM-32 (ESP-WROOM-32) is a influential, general Wi-Fi+BT+BLE MCU component that boards a extensive variability of applications, reaching from low-power sensor systems to the most difficult tasks, such as voice programming, music flowing and MP3 decryption.
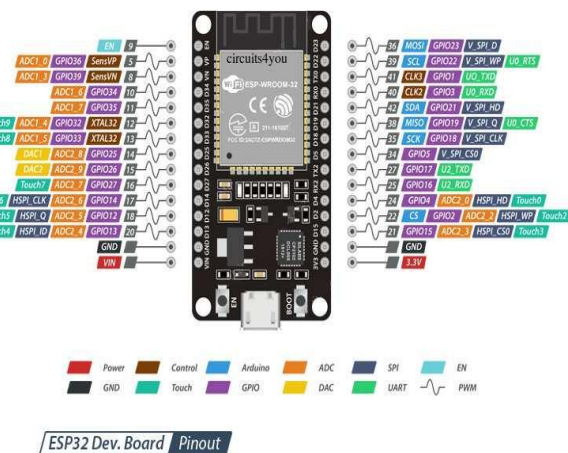

Fig-2: ESP32 Module

3.2. DHT11 Sensor

DHT11 is a low-slung-cost digital sensor for detection temperature and humidity. This sensor can be effortlessly interfaced with any micro-controller such as Arduino, Raspberry Pi etc... to portion humidity and temperature immediately.

Fig-3: DHT11

3,3. SOLID STATE RELAY

SSR-40 DA is slight-sized Arduino measured semiconductor device relay for smart regulator of high existing electric devices, such as influential single-phase or three-phase electronic motors, etc. Semiconductor device (SSR Solid state relay) take no affecting mechanical portions, they are lot of less prone contravention and are more consistent than conservative relays. They cannister also turn on and turn off quicker, but often survive less existing and its flows outstanding to use of semiconductor device such as transistors.

Fig-4: SSR 40 DA

3.4. Soil Moisture Sensor Module

The **soil moisture sensor component** is secondhand to sense the humidity of soil. It procedures the volumetric gratified of water confidential the soil besides provides us the moisture equal as output. The element takes together digital and analog productions and a pot to regulate the threshold level.
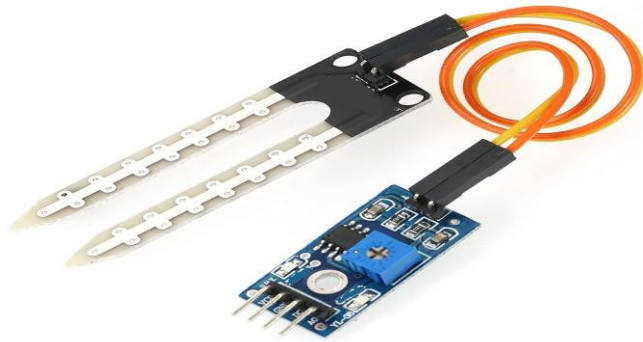
Fig-5: Soil Moisture Sensor Module

3.5. Single-phase Motor

We use the single-phase control system additional extensively than three phase system for national drives, profitable determinations and some amount in manufacturing uses. Because, the single-phase system is more inexpensive than a three-phase system and the power obligation in most of the communities, shops, offices are small, which can be easily met by a single-phase system.

Fig-6: Single-phase Motor

4. SOFTWARE

4.1 Arduino

Arduino IDE is open-foundation software program, which is rummage-sale to transcribe and upload cryptogram to Arduino bits. The IDE request is appropriate for diverse working organizations such as **Windows and Linux**. It provisions the encoding languages C and C++. IDE opinions for **Combined Development Situation**. The sequencer code printed in Arduino IDE is frequently termed as outlining. We essential to attach the Genuino, Arduino panel with IDE to upload draught printed in Arduino IDE package program. The draught is protected through the delay '.ino.'
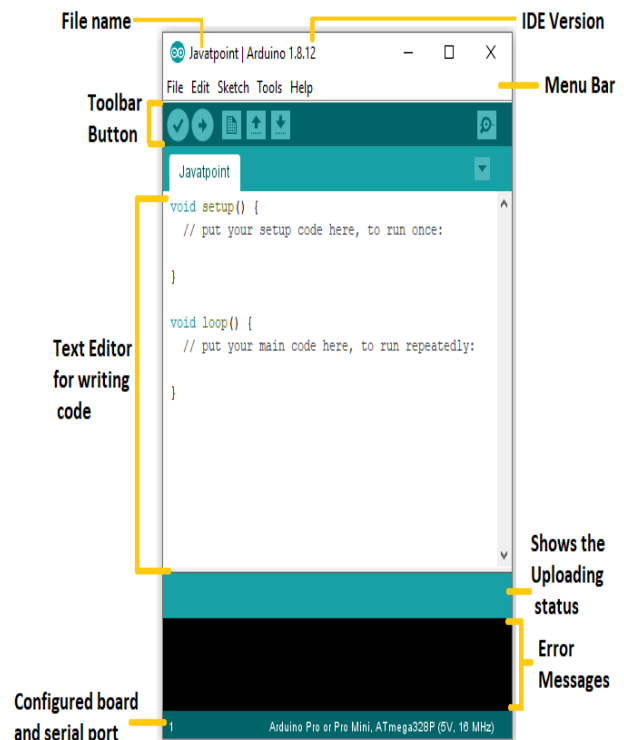

Fig-7: Arduino

4.2 ThingSpeak

ThingSpeak is IoT Cloud stage anywhere you container direct device information to the cloud. You container similarly examine and imagine your data with MATLAB or other software, counting creation your individual submissions.

The ThingSpeak facility is functioned by MathWorks. In order to symbol awake for ThingSpeak, you necessity generate a original MathWorks Account or log in to your present MathWorks Account.

Fig-8: ThingSpeak

5. WORKING

ThingSpeak can be accessed this information with mobile or computer easily. In this project there is a programed ESP32, which get inputs from the sensors and later on data get transmitted via Wifi to the ThingSpeak. The working principle of this mode or project is based on storing data from sensors with the ESP32 and then transmitted and stored on ThingSpeak and later on keep update on data given by sensors and then again updated on ThingSpeak which can be accessed with the API provided by the software. Now here some threshold value is settled down for the temperature and moisture. Now if the values the sensors gives to the ESP32 is less than the value of threshold then the respective device like water pump must get turned on and after this process now the values of sensors reach at ideal values the water pump goes off. Now here water pump have higher wattage and it works on 230V AC supply to migrate this challenge SSR 40 DA comes in frame this relay can handle upto the 200Watt and most the water pump work on the same wattage.
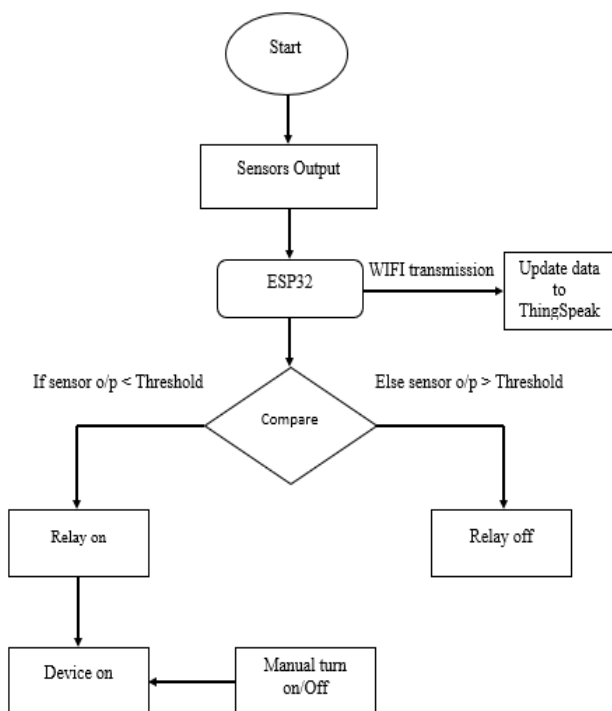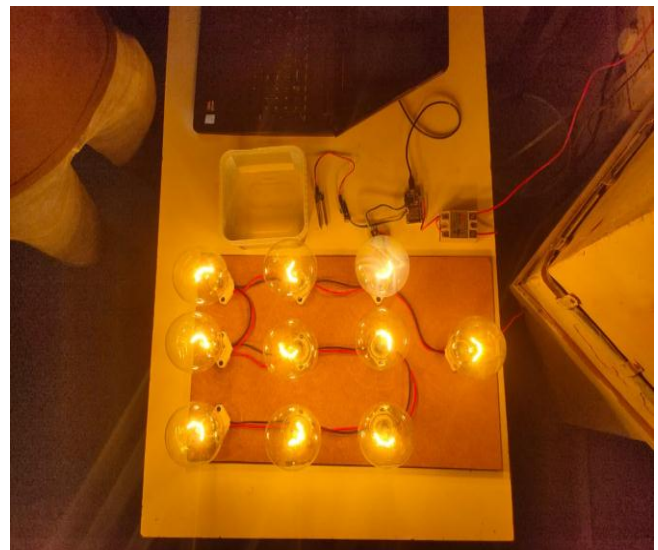
6. FLOWCHART

Fig-9: Flowchart

7. PRODUCT DESIGN

8. VISUALIZATION OF DATA WITH ThingSpeak

Fig-10: Output

9. CONCLUSION AND FUTURE SCOPE

9.1 Conclusion

In this project we used Moisture, humidity, temperature sensor, relay module completes our project. The attention on cleverer, healthier, and more well-organized crop mounting organizations is compulsory in command to meet the rising food demand of the cumulative world population in the face of the always-shrinking arable land. In order to make the agriculture keener and more well-organized to meet upcoming expectations. Additionally, a profounder vision on new investigate exertions is providing. In addition, numerous IoT-based architectures and stages are providing with admiration to agriculture applications. A swift of current trials fronting the manufacturing and future opportunities are enumerated to provide leadership to investigators and engineers. After complete our project, we examination this project in an agriculture field. Our project functioned successfully. Smart farming automatically turn on and off using various sensors. Based on all this, it can be decided that every inch of grazing is energetic to maximize crop production.

9.2 Future Scope

In the future lot of scope is here for IoT applications. Universal wide all overemployment the IoT application for human life urbane. In 2025 millions of things attach to the cloud. A lot of investigate also done on IoT and it's more uses for human life's coolest drive. Some research works on protection facilities for safety and shadowing, some on involuntary vehicle control and traffic signal control, some on the medical field for body control and health care, some on electronic devices, smart home, etc.

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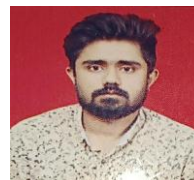
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