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AGRISYS: Revolutionizing Agriculture through an Intelligent and Everywhere Controlled Environment Farming Solution.

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ABSTRACT:

The development of a CEA system that is exceptionally scalable and highly efficient is the main goal of the Agrisys project. With this state-of-the-art technology, it seeks to accomplish three goals. Its primary goal is to increase crop yield, enabling farmers to produce more with less input. Second, Agrisys works to reduce resource usage in order to meet the pressing need for more environmentally friendly and sustainable farming methods. Finally, it gives farmers unprecedented control and insights into their agricultural operations by enabling remote monitoring and management. Fundamentally, Agrisys is a vital step toward conquering the difficulties that come with traditional agriculture, which frequently struggles with erratic weather patterns, inefficient use of resources, and labor-intensive procedures.

1.INTRODUCTION:

This paper presents Agrisys, a revolutionary solution. It is an example of cutting-edge technology combined with innovative farming methods that will completely change the way we approach farming. Agrisys is a controlled-environment agriculture (CEA) system that is intelligent, widespread, and incredibly flexible. It is intended to redefine modern agriculture's future while simultaneously satisfying its immediate demands. By leveraging advanced technologies, It reinvents how we grow food by fusing automation, data analytics, and the Internet of Things (IoT) to bring science and agriculture together. Agrisys wants to be at the forefront of this innovative era by promoting resource-conscious, efficient, and sustainable crop cultivation. In the end, we hope to close the gap between the challenges of traditional farming and the changing demands of the world's population.Agriculture is essential to human survival in the fight for global food security and the capacity to satisfy the rising demands of a growing population. Conventional farming methods, however, are attempting to navigate a challenging and complex environment. These include the unpredictable nature of the weather, inefficient use of resources that harm the environment, and labor-intensive practices that frequently turn out to be unsustainable over time. It's becoming more and more clear that our conventional farming practices might not be adequate to meet the world's food needs. Innovative solutions that can optimize crop cultivation while reducing the consumption of precious resources are desperately needed in order to overcome these constraints and begin the transition to a more

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sustainable and efficient agricultural journey.We also explore the challenge of introducing advanced technologies into the lives of those who may not be very familiar with them. The main challenge we tackle is how to provide the best care for the different types of plants loved by elderly gardeners, taking into account their specific watering needs. In the following sections, we take a close look at existing systems and highlight the difficulties that elderly gardeners often encounter.

One revolutionary development in the field of controlled-environment agriculture (CEA) is Agrisys. This system is intended to fully utilize cutting-edge technologies, acting as a ubiquitous and intelligent means of enhancing agricultural practices. Through the smooth integration of automation, data analytics, and the Internet of Things (IoT), Agrisys ushers in a new era of intelligent and sustainable agricultural cultivation. Fundamentally, this system makes use of sensors, actuators, and clever algorithms to precisely control and monitor important environmental parameters like temperature, humidity, light, and nutrient levels in real time.

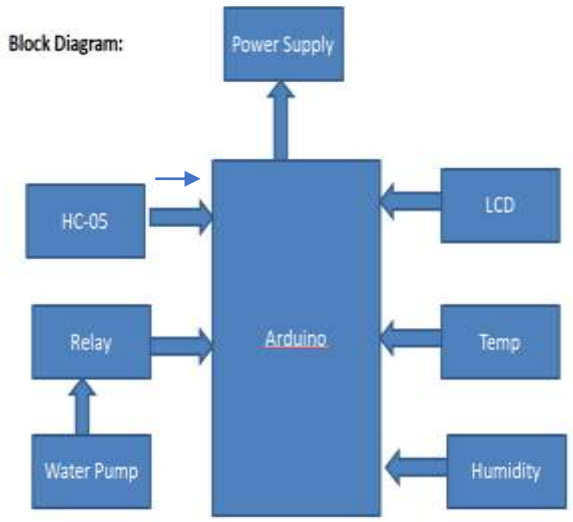
2.LITERATURE REVIEW:

2.1 INTRODUCTION:

Agriculture plays a critical role in the global economy. Pressure on the agricultural system will increase with the continuing expansion of the human population. Agri-technology and precision farming, now also termed digital agriculture, have arisen as new scientific fields that use data intense approaches to drive agricultural productivity while minimizing its environmental impact. The data generated in modern agricultural operations is provided by a variety of different sensors that enable a better understanding of the operational environment (an interaction of dynamic crop, soil, and weather conditions) and the operation itself (machinery data), leading to more accurate and faster decision making.

Machine learning has emerged with big data technologies and high-performance computing to create new opportunities for data intensive science in the multi-disciplinary agri-technologies domain. In this paper, we present a comprehensive review of research dedicated to applications of machine learning in agricultural production systems. The works analyzed were categorized in (a) crop management, including applications on yield prediction, disease detection, weed detection crop quality, and species recognition; (b) livestock management, including applications on animal welfare and livestock production; (c) water management; and (d) soil management. The filtering and classification of the presented articles demonstrate how agriculture will benefit from machine learning technologies. By applying machine learning to sensor data, farm management systems are evolving into real time artificial intelligence enabled programs that provide rich recommendations and insights for farmer decision support and action.

3.BLOCK DIAGRAM:



3.1 COMPONENTS:

- **Arduino:** The Arduino board serves as the central controller for the system. It processes data from sensors, communicates with the mobile app, and controls the watering mechanism.

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Fig 3.1.1: represents arduino layout

- **Power Supply:** You'll need a suitable power supply to provide power to the Arduino, water pump, and other components. Ensure it can provide the necessary voltage and current.
- **LCD (Liquid Crystal Display):**

  The LCD screen can display essential information about plant hydration levels, system status,

  and.

Fig 3.1.2: represents lcd display

- **Soil Moisture Sensor:** This sensor is used to measure soil moisture levels. It helps in determining when to water the plants.

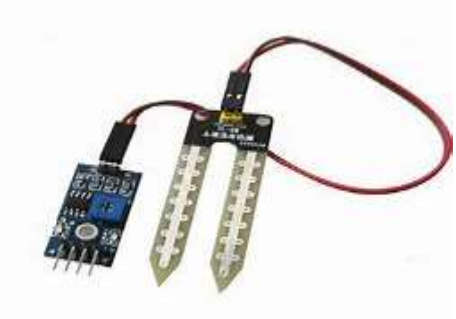

Fig 3.1.3: represents soil moisture sensor

- **Relay Module:** The relay module is used to control the water pump. It acts as a switch to turn the pump on and off based on sensor readings.

Fig 3.1.4: relay module

- **Water Pump:** The water pump is responsible for delivering water to the plants. When activated, it pumps water from a reservoir to the plants.

Fig 3.1.5: water pump

- **HC-05 Module:** The HC-05 is a popular Bluetooth module commonly used for wireless communication between devices. If you're looking for a brief description, here are two lines about the HC-05 module:

Fig 3.1.6 Hc-05 module

- **DHT sensor:** The DHT sensor, specifically the DHT11 or DHT22, is used to monitor temperature and humidity levels in the environment,

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providing essential data for optimizing plant care.

Fig 3.1.7: dht22

- **Power supply:**

A battery is a portable energy storage device that converts chemical energy into electrical power, commonly used to power various electronic devices and vehicles

3.1.8 Battery

4.DESIGN FLOW :

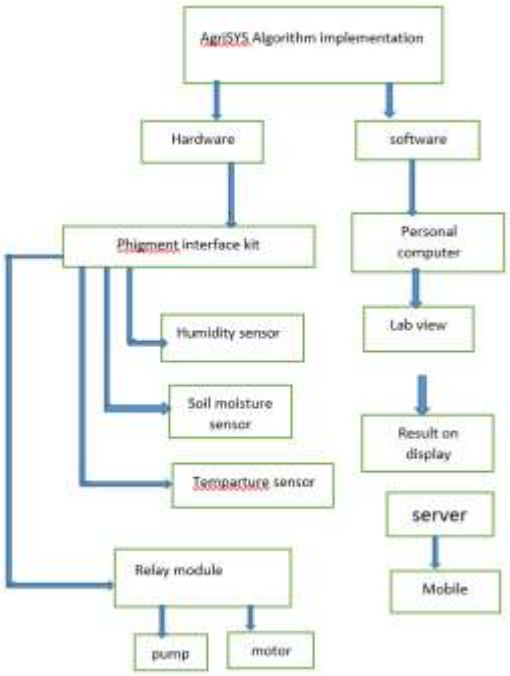

Fig 4.1: design flow of the project

5.WORKING:

This smart irrigation system effectively manages garden irrigation through the harmonious interaction of hardware and software components. Sensors including the light, humidity, soil moisture, and environmental sensors are part of the hardware. While the light sensor determines whether it is day or night by detecting ambient light, the soil moisture sensor continuously assesses the soil's moisture content. Additional information about the environment, including temperature and other pertinent variables, is provided by the humidity and environmental sensors. The brains of the operation are a microcontroller running the system software, which gathers and processes this data

After analyzing the sensor data, the software decides in real time when and how much watering the garden

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should be done. To ensure that the garden is watered as efficiently as possible, it considers a number of variables, including soil moisture, the time of day, ambient light levels, and environmental factors. Water is directed from a reservoir to the garden by the software, which triggers the dual relay and controls the pump and motor when watering is necessary. There is an interface that is easy to use on the LCD display. To further improve the convenience and flexibility of the system, users can modify irrigation schedules and settings from their smartphones thanks to the HC-05 Bluetooth module's remote monitoring and control capabilities. All things considered, this integrated system maximizes irrigation while preserving water and enhancing garden health.

6.RESULT

As it relates to "Agrisys," the outcomes are encouraging. This creative system has shown that it is capable of converting traditional agriculture into a clever and effective field. "Agrisys" shows how it can provide real-time monitoring and control over crucial agricultural parameters by combining IoT technology, automation, environmental sensors, and data analytics. Thus, farmers can optimize temperature, humidity, light, and nutrient levels for crop growth by maintaining precise environmental conditions. With the system's remote access feature, farmers can conveniently manage their agricultural environments from any location, negating the need for physical presence on-site.

Additionally, "Agrisys" has optimized its use of resources by maximizing crop yields while consuming the least amount of energy and water. This achievement minimizes resource waste and the environmental impact, which is important for sustainable agriculture. The system successfully handles the difficulties that come with traditional farming, such as labor-intensive operations and erratic weather. It is a major player in the future of controlled-environment agriculture because it offers a scalable and intelligent solution that not only increases crop productivity but also encourages resource efficiency, with the potential to completely transform modern agriculture.

CONCLUSION:

The "Agrisys" project, in summary, signifies a noteworthy advancement in the field of agriculture. By offering a highly effective, technologically advanced solution, it has proven that it has the ability to completely transform conventional farming methods. Real-time monitoring and control of critical agricultural parameters are now possible thanks to the integration of IoT technology, automation, environmental sensors, and data analytics. With this degree of accuracy, farmers can maximize crop yield by establishing the best growing conditions. Agrisys's remote management capability makes it even more useful by enabling farmers to oversee and manage their farms from any location in the globe, negating the need for physical presence on the property.

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In summary, "Agrisys" is a key innovation for the future of agriculture, marking a major turning point in the history of agriculture by promising increased productivity along with a more technologically advanced and sustainable approach to farming in controlled environments

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