IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 7.918 ⁜ Vol. 12, Issue 2, February 2023

DOI: 10.17148/IJARCCE.2023.12204

LITERATURE SURVEY OF PREVIOUS WORKS ON SMART MOVE IN GREENHOUSE AGRICULTURE TO INCREASE FOOD PRODUCTION USING IOT AND ML

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Abstract: One of the environmentally friendly methods of intelligent agricultural production is the greenhouse. It is viewed as a different approach to dealing with the food issue brought on by accelerating population expansion, climate change, and environmental pollution. Off-season crops can be supported indoors using this method, even in regions with extreme climates. The crop parameters in a greenhouse must be accurately and safely controlled and maintained. There are already sophisticated methods for automating greenhouse farming practices like managing the internal atmosphere, controlling watering, and monitoring plants.

Keywords: Greenhouse, off season crops, microcontroller, protected environment, Sensors**.**

I. INTRODUCTION

A greenhouse is a building that is covered in glass or plastic and is primarily used to produce multiple crops in any season. The interior of the greenhouse is exposed to sunshine, making it much warmer than the outside temperature that is excellent for protecting crops from cold weather conditions. The farmer can boost growth and productivity with this method, where they have complete and partial control over the environmental conditions that any crop will grow in.

By controlling the appropriate conditions in various parameters with the least amount of labour, these greenhouse technologies offer the ideal environmental conditions in which to grow any plant, anywhere, at any time. This allows for the year-round cultivation of some crops while also protecting the plants from harmful climatic factors like wind, cold, precipitation, excessive radiation, extreme heat, insects, and diseases. In-arable land can be converted into arable land using light and temperature control in a greenhouse, enhancing food production in challenging areas.

The foundation and key industry of our nation is agriculture. Farmers make up a large portion of our Indian population. Only 58% of individuals depend exclusively on agriculture. Agriculture contributes 38% of the GDP of the Indian economy. It is still being developed and is dependent other monsoon and rainfall. Adoption of modern techniques and irrigation helps.

A sheltered and enhanced approach like a greenhouse increases yield. Many Indians practice agriculture, albeit the proportion of productivity is lower. Since we produce less than other nations like the United States, China, Germany, and Italy, we import their food grains. We must use contemporary farming methods like greenhouse farming (polyhouse farming), hydroponic farming, etc. if we intended to increase our agricultural profits.

The cultivation of flowers, vegetables, fruits, and tobacco plants is frequently done in greenhouse. Plant growth patterns can be adjusted to maximize both the quantity and quality.

It can be seen that plants grow roughly twice as quickly in a greenhouse than they do in an open field.

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Our goal for greenhouse farming is to create a highly automated system of smart agriculture with the minimum amount of manual labor and maximum output. Our model is designed to be less expensive, have a successful risk management strategy, and be more precision-driven in its decision-making.

II. OBJECTIVES OF THE PROPOSED SYSTEM

- Greenhouses are used where climatic conditions are not as expected. At those places greenhouses are used as an artificial environment to create required environmental conditions.
- Main aim of this project is to grow plants (like tomato, strawberry, cucumber) faster and to increase the production at any season by providing protected environment, automatic monitoring and controlling the climatic parameters.
- Sprayer is used for automatic spraying of pesticides and seed recognition for farmers are also provided.
- Usage of Telegram BOT allows the user to ask a query and access the system, which is also an advantage to access remotely.

III. EASE OF USE

The Main flaw in conventional greenhouse systems was that they lacked microcontrollers, making the system non-automatic. In the proposed system, however we employ microcontrollers making system automatic.

In Traditional systems, distance from the system had a limit, however in the approach we have employed, the distance factor is taken into account with less restriction because it can be used over a wider variety of distances.

An implementation that is missing from the conventional system is the right action that is performed to maintain the climate, humidity, moisture correctly in order to support the growth and increase the yield of the desired crop.

In addition, we have integrated Telegram BOT, which grant user access, along with a number of additional features including disease detection, seed recognition, and other aspects that help the system function better than it did before.

IV. LITERATURE SURVEY

Title: Smart Agriculture using IOT

Employing intelligent agriculture IoT is essentially the development of a wireless irrigation automation system that uses several different sensors, such as those for light, humidity, temperature, soil moisture, and more. Using these modern methods, farmers may keep an eye on their crops at any time and from anywhere.For these reasons, IoT-based modern agricultural technology is a very powerful and reliable persuasion weapon. It is a technique for improving farming's accuracy and precision.

Benefits: Smart agriculture with IoT offers us numerous benefits, including effective use of herbicides and water. Agriculture benefits from agricultural drones, livestock monitoring, intelligent greenhouses, and precision farming and other IoT applications. An alarm is set off to notify the farmer if the motion sensors detect any theft.
The lack of accuracy is a drawback.

Title: Using Arduino, a smart crop protection system against fire and living things.

In addition to providing people with the food they need, agriculture also generates a range of basic materials for industry. Nevertheless, there will be a huge loss of crops because animal interference and fire in agricultural fields. Crop destruction will be complete. There will be significant loss of farmers. It is crucial to preserve agricultural fields and farms from animals and fire in order to prevent these costly losses. To solve this issue, we propose to create a system that uses PIR to prohibit animals from entering the farm. Developing an intruder alert system for the farm is the primary goal of our project in order to prevent animal and fire losses. These intrusion warning systems prevent agricultural damage and hence indirectly boost crop productivity.

Benefits: prevents loss to farmers by ensuring that crops are completely safe from animals and fire.
Cons: less data samples are collected due to the longer execution duration.

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Title: IOT for the production of electricity and crop protection.

The farmer is able to achieve higher growth and productivity with this method, where they have full and partial environmental control over the circumstances under which any crop can thrive. By regulating the appropriate condition in various parameters with the least amount of labour, these greenhouse technologies offer the ideal conditions in which plant can grow anywhere at any time.

Advantage: Using a remote monitoring system is possible with very little electricity needed.
Disadvantage: No necessary training to recognize various animal species constructed taking into consideration the location of farmland.

Title: Animal Intrusion Detection System

Animals like wild boars, elephants, tigers, monkeys, and other cause serious damage to crop and other agricultural equipment. In recent years, farmers around the world have faced a unique challenge from wild animals. Animals trampling over crops cause financial difficulties to farmer. In this work, we offer a resolution to this issue. This project makes use of Raspberry Pi to safeguard land. This project uses a GSM modem and RFID module to achieve its goals. The RFID injector tag is made to be injected under the skin of an animal. If an animal enters farmland after being injected with RFID tag, the RFID reader will identify the animal and send an SMS message.

Farmers and Forest officers receive SMS alerts, which is advantageous.
Cons: Location detecting through GPS is not used.

Title: Greenhouse Automation System using PSOC3

Farmers in rural areas will profit from automatic monitoring and control of the greenhouse environment thanks to the technological advancement known as the greenhouse automation system. It takes the place of human direct monitoring. The Generic Architecture, which is used for numerous different Automation Applications, is another area of emphasis. The technology and processor that are currently being used for greenhouse applications are shown in this study. To define the upper and lower bounds for the parameters of the two crops, Psoc3 coding is used. The value is shown in the LCD if the parameters are within the range. If it is out of range, the controller will activate or deactivate the actuators in accordance with the situation. thereby automatically managing the greenhouse without human involvement. Additionally, the information can be updated to the user's mobile device via a GSM modem connected to Psoc3.

Title: Optimal Control of Greenhouse Climate Using Evolutionary Algorithms and Real-World Weather Data.

The optimization of climate growing conditions to achieve high yield at cheap cost, good quality, and lowest environmental burden has a significant impact on how efficiently plants are produced in greenhouses.

This study uses an integrated greenhouse climate model to optimise temperature, air, humidity, and CO2 concentration for short-term forecasting (15-60 minutes). The avoidance of stress and the optimization of crop development are two short-term control issues that can be addressed with this paradigm. The optimization target was achieved through the application of enhanced evolutionary techniques. There are two examples of evolutionary algorithms, and their benefits and drawbacks are discussed. The optimization was done with genuine weather data.

Title: Environmental Monitoring System Development for Disease Management

The substantial geographical heterogeneity in the microenvironment around a crop in a greenhouse significantly hinders this environmental method to disease management. A field crop's environment is thought to be more or less consistent, but a crop cultivated in a greenhouse may have a more variable environment. The exact placement of an object is difficult to determine. The crop is susceptible to environmental changes, and these changes are what they are. A huge network of sensors would be needed for high resolution geographical and temporal monitoring to regulate the environment for disease in a greenhouse crop. In order to identify the actual environmental conditions, the plants are experiencing, these sensors would need to be placed close to the plant canopy. Crop growers can pay fees and experience disruptions to their regular chores if a vast sensor network is integrated into agricultural operations. The disease monitoring system created for this study addresses these difficulties by being portable and taking up little more room than a miniature flowerpot. It also uses low-cost wireless technology. Point-to-point connection between sensor stations in the system is not necessary. The system offers a number of advantages, including short setup time, wireless connectivity that allows sensor stations to be moved around the greenhouse as needed, and the capacity to be scaled to any size business.

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V. POSSIBLE OUTCOME

- Readings of moisture, humidity, and temperature.
- Readings of the LDR's light condition.
- voice connection with the farmer; and updates will be provided.
- Seed identification, disease identification, and pesticide application.

VI. CONCLUSION

The research has shown that it is currently capable of remotely monitoring the greenhouse's parameters. We can track variables utilising IoT sensors and devices, such as CO2, PH, moisture content, humidity, temperature, and irrigation. We went into great detail in this poll about new IoT technology and IoT-based greenhouse agriculture approaches. Various modern and traditional production methods are discussed to aid farmers in understanding the technological underpinnings of a greenhouse. A network structure for IoT-enabled greenhouses has also been explored. This structure serves as the IoT backbone and aids farmers in increasing agricultural output.

Additional noteworthy IoT-greenhouse farming characteristics, top technology business trends, and success tales performance metrics have been discovered. This thorough investigation demonstrates unequivocally that the government and a number of significant businesses have started to invest in the development of Internet of Things-based smart greenhouse farming techniques.

VII. ACKNOWLEDGEMENT

We are appreciative to have reached this point in our mission because it required a lot of help and work from many people to finish and had such a big impact on our enterprise. We are immensely appreciative and humbled by everyone who has helped us transform these concepts into something more profound.

We would especially like to express our gratitude to Dr. Achyutha Prasad N (Professor and Head of the Department, Computer Science and Engineering, East West Institute of Technology), who gave us the wonderful opportunity to work on this wonderful project that also allowed us to conduct a great deal of research. We also wish to express our gratitude to the computer science and engineering professors whose suggestions enabled us to move past a lot of seemingly insurmountable obstacles.

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