e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

AGRICULTURAL SOWING MACHINE AND MONITORING SYSTEM

Prathamesh Penshanwar[*1], Devendra Bawanthade[*2], Gaurav Mali[*3], Pragati Kokate[*4], P.R. Bhakare[*5]

[*1,2,3,4]Student, ENTC Dept., MGICOET, Shegaon, Maharashtra, India.

[*5]Ass. Prof., ENTC Dept., MGICOET, Shegaon, Maharashtra, India.

DOI : https://www.doi.org/10.56726/IRJMETS52128

ABSTRACT

The use of machine learning techniques to improve agricultural research by analyzing intricate connections in cropping systems is covered in the abstract for the Agricultural Sowing Machine and Monitoring System. Significant yield disparities based on parameters such as sowing date can be revealed by the system through analysis of site-specific crop responses and management interactions. By using large databases and artificial intelligence algorithms, this strategy seeks to address future food demands, discover sustainable practices, and expedite agricultural research. There is significant potential for raising agricultural yields due to the system's capacity to examine interactions between infinite cropping systems, which are difficult to assess using conventional techniques. All things considered, the Agricultural Sowing Machine and Monitoring System offers a viable way to increase agricultural output and satisfy the needs of an expanding world population while addressing the effects of climate change.

Keywords: ESP32H, Seed Sowing, Temperature Sensor, Soil Moisture Sensor, 12V Servo Motors.

I. INTRODUCTION

Agricultural Sowing Machines are essential equipment that have revolutionized the process of seed planting in the field of modern agriculture. With the help of these automated tools, which range from precision planters to conventional seed drills, farmers can now plant seeds with unmatched efficiency and accuracy. These devices guarantee ideal conditions for crop growth and seed germination by precisely adjusting depth, spacing, and placement of seeds. Agricultural Sowing Machines are not only more efficient throughout the planting process but also result in higher crop yields and lower costs due to their ability to integrate nutrients and modify seed rates. The days of manually planting seeds are long gone, as these devices are an essential part of modern farming methods that increase productivity and efficiency in the fields. Agricultural Sowing Machines and Monitoring Systems have become essential instruments in contemporary farming. These systems monitor several elements of crop development and field conditions in real-time by utilizing cutting-edge technology, such as GPS, sensors, and data analytics. Agricultural monitoring systems (AMS) gather information on temperature, nutrient levels, crop health, and soil moisture to give farmers important insights into the condition of their farms. Informed decision-making is made possible by real-time data processing and analytics, which help farmers enhance crop management techniques including fertilization, irrigation, and pest control. The capacity of Agricultural Monitoring Systems to create intricate yield maps that track crop performance throughout the field is one of its primary characteristics. Farmers can use these maps to identify high- and low-productivity areas and then target their interventions to increase yield and optimize resource use. Furthermore, these systems are excellent at spotting issues early on. They do this by employing crop health monitoring to spot symptoms of pests, illnesses, or dietary shortages. Farmers who identify problems early on can minimize crop losses and ensure healthier, more resilient crops by taking quick corrective action. A major development in contemporary agriculture is the combination of monitoring systems with agricultural sowing machines. When combined, these technologies support sustainable farming methods while also increasing production and efficiency. Farmers may increase yields while lowering input costs and their impact on the environment by using early problem detection capabilities, strategic seed distribution, and optimal resource utilization.

II. PROBLEM STATEMENT

In contemporary agriculture, obtaining maximum crop yields and guaranteeing food security for an expanding population depend heavily on the accurate and effective spreading of seeds. On the other hand, conventional manual sowing techniques are time-consuming, labor-intensive, and prone to inconsistent seed spacing and placement. Farmers may experience inconsistent crop emergence, lower yields, and higher input expenditures as a result of this inefficiency. farmers face difficulties in properly managing their fields due to the absence of data-driven decision-making and real-time monitoring in agricultural activities. Farmers may find it difficult to maximize the use of irrigation, fertilization, and pest control techniques in the absence of precise information on soil moisture levels, nutrient status, and crop health. This may lead to excessive use of resources, such fertilizers and water, which could harm the environment and cause financial losses.

III. METHODOLOGY

When combined with a monitoring system, an agricultural sowing machine creates a comprehensive system for effective crop planting. In order to generate the best possible seedbed, the land must first be prepared for planting by Plow, harrowed, and levelling. Next, taking into account variables like seed kind, suggested spacing, and field size, the machine's seed hopper is loaded with the right seeds. Based on the needs of the crop, the operator modifies the machine's settings, such as planting depth, seed spacing, and other elements. Real-time tracking and management are made possible by connecting the sowing machine to the monitoring system

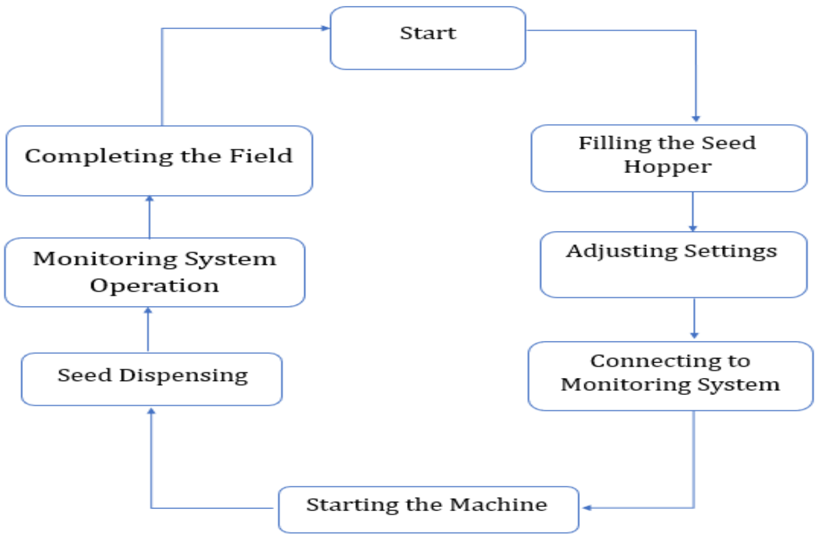

Figure 3.1: Flow Chart For Agricultural Sowing Machine And Monitoring System

The use of this data, the operator may ensure consistency throughout the field by making quick modifications during planting, such as controlling the depth and seed rate. The monitoring system offers post-planting analysis once the field is completely planted, producing reports and maps to evaluate effectiveness and schedule upcoming activities. For the sowing machine and the monitoring system to operate at their best, regular maintenance including cleaning, calibration, and software updates is necessary. Precision planting, less seed waste, data-driven decision-making, and remote monitoring capabilities are just a few advantages of integrating these technologies, which eventually result in increased yields and resource-efficient agricultural methods.

a. Hardware Design

The Agricultural Sowing Machine's hardware design includes all the parts needed for accurate and effective seed planting. It has a seed tube system for exact placement into the soil, a seed metering mechanism for precise seed distribution, and a seed hopper for storing seeds. The equipment has furrow openers and adjustable seed depth wheels to guarantee uniform seed spacing and depth control. Moreover, simultaneous sowing and fertilization are made possible by an integrated fertilizer connection, which maximizes resource utilization. The machine's mechanical parts are propelled by a powerful engine. Farmers may easily modify factors like as depth settings, seed rates, and other aspects while on the go with an intuitive control panel. Reliable operation in a variety of agricultural conditions is ensured by the integration of these hardware components into a sturdy and weather-resistant system. Farmers receive actionable insights for well-informed crop management decision-making from the wirelessly transferred data, which is processed and analyzed at a central center. In addition to promoting sustainable agricultural methods and equipping farmers with the tools

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

necessary for precision agriculture, the comprehensive hardware design of the Agricultural Sowing Machine and Monitoring System seeks to maximize seed planting efficiency.

b. Block Design

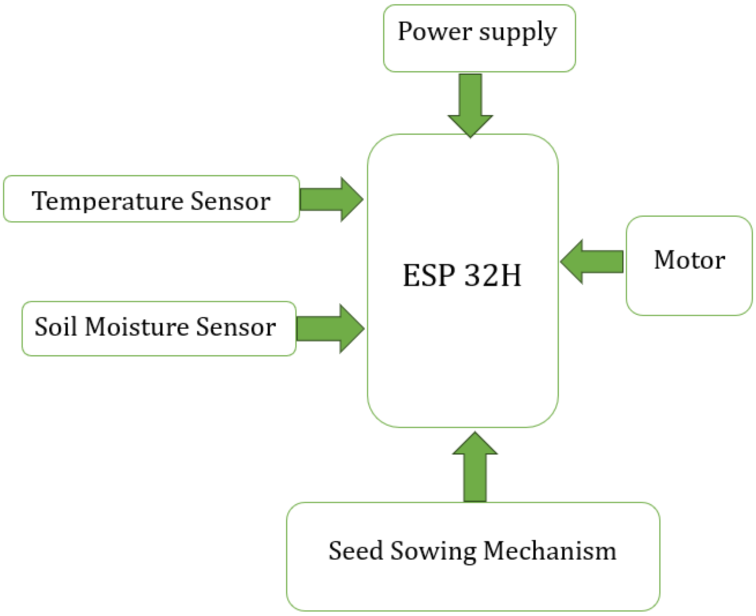

Figure 3.2: Block Diagram Agricultural Sowing Machine And Monitoring System.

IV. MODELING

Figure 4.1: Actual Module

V. RESULTS AND WEB INTERFACE WINDOWS

The result is Farmers and agricultural practices have benefited greatly from the deployment of the Agricultural Sowing Machine and Monitoring System. The approach has led to increased crop yields, better crop management, more efficient seed planting, better resource utilization, easier problem diagnosis, and the promotion of sustainable farming practices. Increased customer satisfaction, better economic viability, and cost reductions have all been observed by farmers. All things considered, the system has shown to be a useful instrument for precision agriculture, advancing and bolstering the sustainability of contemporary farming methods.

a. Web interface of controlling robot and watching Sensor Data:

1. Web interface Window

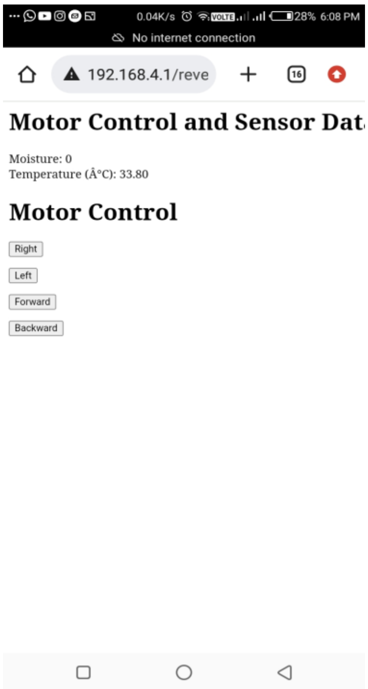

Fig 5.1.1: Web Interface Window

VI. CONCLUSION

In conclusion, there are a lot of advantages to adopting an IoT-based fingerprint-based attendance system. It offers a dependable and effective way to monitor attendance, doing away with the necessity for manual record keeping and lowering the possibility of fraud or mistakes. IoT-enabled real-time management and smooth transmission of attendance data improves administrative effectiveness and provides deeper insights into attendance trends. All things considered, this method provides a practical and safe option for managing attendance in a variety of contexts, including events, businesses, schools, and institutions.

VII. REFERENCES

[1] Andrys, J., Kala, J., & Lyons, T. J. (2017). Regional climate projections of mean and extreme climate for the southwest of Western Australia (1970–1999 compared to 2030–2059). Climate Dynamics, 48, 1723 1747. https://doi.org/10.1007/s00382-016-3169-5.

[2] Choi, H.J. et al., 2016. Origin of the enhanced electrical characteristics of BaTiO3-based thermistors by sputtered Al and Ni-Cu buffer electrode films. Current Applied Physics, 16(4), pp.435–439.

[3] B Yogesh Ramdas," Green Growth Management by Using Arm Controller et al Int. Journal of Engineering Research and Applications ISSN: 2248- 9622, Vol. 4, Issue 3(Version 1), March 2014, pp.360-363.

[4] Fao/Who, 2013. State of the art of the intitiatives and activities relevant to risk assessment and risk management of nanotechnologies in the food and agriculture sectors., (November), p.56.

[5] D. S. Suresh, Jyothi Prakash K V, Rajendra C J," Automated Soil Testing Device", ITSI Transactions on Electrical and Electronics Engineering (ITSI-TEEE) ISSN (PRINT): 2320 – 8945, Volume - 1, Issue -5, 2013.

[6] Agee, J. K., & Skinner, C. N. (2005). Basic principles of forest fuel reduction treatments. Forest Ecology and Management, 211, 83–96. https:// doi.org/10.1016/j.foreco.2005.01034.

[7] Sneha J. Bansod, Shubhadha Thakre, "Near Infrared Spectroscopy based Soil Nitrogen measurement", International Journal of Current Engineering and Technology E-ISSN 2277 – 4106, P-ISSN 2347 – 5161.