# AGRIBOT FOR SEED SOWING USING IOT

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**Abstract —** Farming is the backbone of the Indian economy, and finding a technological solution has been challenging. Current breakthroughs in AI technology, along with robotics, have paved the path for a smart agricultural solution. Because robots are used to automate processes in industry, there is a high need for robots that can accomplish new jobs without requiring costly modifications. The robot can then successfully sort the things on its own. To demonstrate the superiority of our technique over alternative active learning systems, we give findings from its use on a real robot.

**Keywords:** Agriculture, Smart Farming, Seed Sorting, IoT Sensors.

## I. INTRODUCTION

Agriculture is increasingly adopting artificial intelligence (AI), both in terms of agricultural products and field farming techniques. Subjective processing is poised to emerge as the most useful technology in agricultural services because it can perceive, learn, and adapt to a variety of contexts to boost efficiency. Some of the popular technologies utilised in wise information combining include moisture sensors, proximity sensors, and image sensors. Soil testing is one type of high-resolution data. Sensors for proximity sensing must be in close proximity to the soil or in direct touch with it. This facilitates soil categorization based on the subsurface soil in a specific location [1]. The wireless network enables communication between the field robot and the access point as well as the creation of a distinct multi-hop network. There is no requirement to rely on a predetermined infrastructure since mobile robots operate in decentralised, self-computing, and self-organizing networks. The mobile robots approach the target by navigating around the site of entrance, making observations, and then returning with the learned knowledge.

In agriculture, seed is the most important input. Good-quality seed alone has the ability to increase on-farm production by 15-20% while also achieving food security. The goal of seed improvement technology is to increase seed performance under certain conditions and with appropriate planting equipment. When robotic process automation in industry and manufacturing, the efficacy of training a robot is critical [1], as adapting robots to diverse applications is time-consuming and hence costly [2]. As a result, the training technique must be optimised. One example is a robot that can sort various types of garbage or detect errors in a quality inspection procedure. Visual analytics methodologies may be used by these robots, and classifiers may be trained using representatives from each of the object categories to be detected.

The robot would be outfitted with numerous sensors, and AI would be used to teach important characteristics of interest. Based on the intelligence included in the robot, judgements on soil and seed quality, crop growth and quality may be made. Spectral image processing and remote sensing methods are essential for creating agricultural metrics that cover thousands of acres. That may lead to a gradual change in how farmers spend their time and effort monitoring agriculture. Machines that understand artificial intelligence in agriculture will be very successful at managing extreme weather conditions, improving earnings, precise cultivation, and yield executives. For robotic and AI-enhanced farming solutions, yield monitoring and plant growth evaluation continue to be two of the most important farming-related concerns.

## 2. RELATED WORK

Liu et al. (2015) suggested a unique neural network-based soybean seed sorting method. To characterise the soybean seed, eight form characteristics, three colour features, and three texture features are obtained. The BP neural network is utilised as the classification model to distinguish between the various defects. The results of testing on the acquired picture set, which contains 857 pictures of soybean seeds with mildew, insect damage, and other flaws, indicate an average recognition accuracy of 97.25%.

Huang (2012) suggested using neural networks to assess and classify the quality of areca nuts. A back-propagation neural network classifier is used to evaluate the quality of the areca nuts, and the secondary axis length, axis length, perimeter, compactness, axis number, area, and average grey level are utilised to grade the quality of the areca nuts.

Machine vision technology was used by Aznan et al. (2016) to detect rice seeds from the M263 variety. They gathered a variety of morphological data before using a stepwise discriminant function analysis (DFA) to categorise various rice kinds. The classification accuracy is 96% for the training set and 95.8% for the testing set, respectively.

For Indian pulse seeds, HemaChitra and Suguna (2018) presented a novel image-based sorting method. They employed SVM for categorization in this method after retrieving the colours, shapes, and textural properties. Their method has a 98.9% accuracy rate.

Li et al. (2019) created a method for identifying several varieties of damaged maize. A database of photos of normal corn and six unique wounded corns is being developed. To distinguish between these corns, colour and form are extracted and employed with the greatest likelihood classifier. The trials' findings show that all classes have a classification accuracy of higher than 74%. These methods, however, have low accuracy and restricted versatility since they rely on handmade features created for specific crops and the traditional classifier for sorting.

## 3. SYSTEM METHODOLOGY

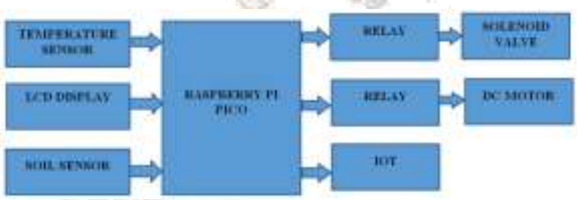


Figure 1 Block Diagram

### Raspberry Pi Pico

A Raspberry Pi Pico is a low-cost microcontroller. Microcontrollers are tiny computers with limited storage and no external peripherals. A Raspberry Pi Pico, like a Raspberry Pi computer, has GPIO Pins for controlling and receiving input from a range of electrical devices.

### Temperature Sensor

Temperature detectors are typically used to detect heat or cold in the environment. These temperature detectors are useful for calculating the amount of heat energy or coldness produced by or emitted by the system. It can sense and perceive any physical change in temperature, digital or analogue output. Two types of temperature sensors can analyze temperature changes. Heat sensors are classified into two types: touch and non-contact. The contact temperature probe must come into physical contact with anything that may detect fluctuations. The non-contact temperature sensor is excellent for sensing temperature changes in any range without requiring physical touch. The non-contact temperature sensor is excellent for sensing temperature changes in any range without requiring physical touch. The temperature range is determined by the type of sensor utilized. This is also a low-cost option. Temperature Sensor is shown in Figure 2.

Figure 2 Temperature Sensor

### LCD Display

LCD module at a temperature and relative humidity of 40% and 40%, respectively. Lower temperatures can slow the display's blinking pace, while higher temperatures can cause the display's overall colour to change. The display will return to normal when the temperature falls within the established range. Heat and humidity can cause polarisation degradation, bubble production, or polarizer peel-off.

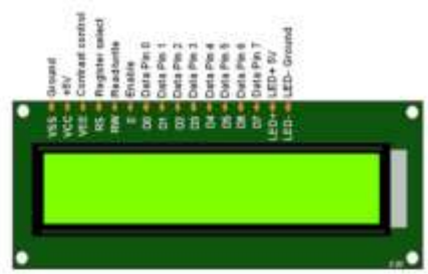

Figure 3 LCD Display

### Soil Sensor

In plant gardens as well as irrigation fields, the soil's moisture content is crucial. Plants are fed by the nutrients in the soil, which enables them to flourish. To change the temperature of the plants, watering the date plants is also important. Via a procedure analogous to transpiration, water may be utilised to alter the plant's temperature. The date plant's root systems grow more quickly in moist soil. Overly damp soil can provide anaerobic conditions that favour plant growth and the expansion of soil pathogens. In order to calculate how much irrigation is required to reach a specific level of saturation, soil moisture sensors measure the amount of water in the soil. This information may be used to calculate how much water is stored in a profile. These sensors can be installed and used for long-term monitoring or they can be portable and utilised for fast readings.

Figure 4 Soil Sensor

### Relay

It is a switch that is turned on by electricity. A lever is pulled and the switch contacts are altered by the magnetic field created by the current flowing through the relay's coil. As the coil current can be on or off, relays have two switch positions and are double throw (changeover) switches.

Figure 5 Relay

### Internet of Things (IoT)

By 2050, nine billion people will be fed thanks to the IoT's contribution to precision agriculture. Farmers now collect real-time data from sensors and keep an eye on their crops in order to reap bigger harvests and increase revenues. The sensors in IoT can predict climate changes, overcome irrigation problems, and support farmers to increase the crop yield gradually. Nowadays, there is a need to implement novel ideas in agriculture due to the growing population and food demands.

### Solenoid valves

A solenoid valve is an electromechanical valve used to regulate the flow of liquid or gas. A wrapped copper wire surrounds a core with a moveable closing plunger in the solenoid. The coil's job is to generate a magnetic field by delivering an electric current through it, which then moves the piston and either opens or shuts the valve. Solenoid valves transform electric current into linear motion. Solenoid valves provide a variety of functions.

Figure 6 Solenoid valves

### DC Motor

A DC motor is an electrical device that uses a magnetic field created by direct current to transform electrical energy into mechanical energy. A magnetic field is created in the stator when a direct current motor is turned on. The rotor spins because magnets on it are drawn to and repelled by the magnetic field. The motor's wire windings get electricity from the commutator, which is connected to brushes that are connected to the power supply, to keep the rotor moving constantly.

Figure 7 DC Motor

## 4. RESULT


Figure 8 Implementations and results of Ubidots

In the above mentioned image it shows how the sensors data's get stored in the IoT server Ubidots and result is shown on the server.

## 5. CONCLUSION

Farming is the backbone of the Indian economy, and finding a technology answer has been difficult. Recent advancements in AI technology paired with Robotics have opened the way for a smart farming solution. Because robots are used to automate processes in industry, there is a high need for robots that can accomplish new jobs without requiring costly modifications. The robot can then successfully sort the things on its own. To demonstrate the superiority of our technique over alternative active learning systems, we give findings from its use on a real robot.

## 5. FUTURE SCOPE

In the future,we plan to use the advanced type of controller like the raspberry pi.And we have planned to use the AI&ML for better working.we planned to use the AI&ML to detect the plant disease and remove the weed along with seed sowing.For better live streaming we will use the raspberry cam module

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