IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 3, June 2023

Agricultural Pesticide Spraying Robot using Bluetooth Module

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Abstract: *The agriculture industry is one that is highly resource- and labour-intensive. As such, farmers are increasingly turning to technology and automation to address this issue. However, agricultural robots are far too complicated, slow, and costly to be made publicly available. As a result, the agriculture sector still lags behind in integrating modern technologies. This research paper details the development of a low-cost agricultural robot for spraying fertilizers and pesticides in agriculture fields as well as for general crop monitoring. The prototype system is a two-wheeled robot that consists of a mobile base, a spraying mechanism, a wireless controller for controlling the robot movement, and a camera for crop health and growth monitoring as well as detecting the presence of pests in the agriculture field. Tests conducted on the prototype system show that while the productivity of the robot in terms of crop coverage is slightly lower than a human worker, the labour cost savings afforded by the agricultural robot prototype is much greater as it functions completely in an autonomous mode and only requires the operator to control the robot when placing it at the start of the crop path. Furthermore, the prototype system also provides greater resource savings and reduction in the contamination of underground water sources due to leeching process, thus achieving precision agriculture goals. Lastly, the excellent battery life of the prototype system ensures that there will be no increase in the operation times and reduction in the efficiency of the fertilizer and pesticide spraying process due to the recharging times when replacing human workers. Future recommendations include making the agricultural robot fully autonomous, using either a rail- or line-following system, to further reduce the labour requirements and costs*

Keywords: Pesticides, Adjustable robotics, Bluetooth

I. INTRODUCTION

Electrostatic spraying application is adopted in crop protection to forestall pest infestation, to boost product quality and to maximise yield. It involves a superposition of charges to pesticide spray droplets to draw in substrate ions at obscured surfaces. The droplets wraparound effect decreases off-course deposition, enhances on-course spray and invariably improves spray efficiency. Electrostatic spraying system functions productively at ideal parameters together with charging voltages, application pressures, spraying height regimes, flow rate, travel speed, electrode material, and nozzle orientation. Many groups of system parameter settings are systematically utilized by scientists for electrostatic application, yet there are unsure specific optimum parameters groups for pesticide spraying. The “Pesticide Robot “is designed to work in green house which is capable of spring pesticide maximum 1 km huge range, also use is able to control the pesticide spraying pump using one single button. Though pesticide spraying is important to increase the production yield, unregulated usage of pesticides will damage the soil and the crops. A micro flow monitoring system with REFERENCES differential pressure flow meter and electrical control injector can be used for variable spray rate control.

II. LITERATURE SURVEY

In this section, various method of image processing for plant disease detection is discussed. The vegetation indices from hyper spectral data have been shown for indirect monitoring of plant diseases. But they cannot distinguish different diseases on crop. Wenjiang Huang et al developed the new spectral indices for identifying the winter wheat disease. In

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this paper three different pests are considered (Powdery mildew, Yellow rust and Aphids) for their study. To find the disease wavelengths were extracted using RELIEF-F algorithm (K. Thangadurai and K. Padmavathi, 2014). Enhanced images have got more quality and clarity than original image using RELIEF-F algorithm. Since primary images will be in RGB form it's difficult to process the RGB image because of its range 0 to 255, hence this primary RGB is converted to grey images. To enhance the image intensities are distributed using histogram equalization.

III. METHODOLOGY

Aim: "AGRICULTURAL PESTISIDE SPRAYING ROBOT".

Objectives:

- Agricultural robot automate slow repetitive and dull tasks for farmers,allowing them to focus more on improving overall production yields.
- Some of the most common robots in agriculture are used for harvesting and pinking weed control.
- The objective of spraying is to deliver an effective, uniform dose of product to a target area in a safe and timely manner.
- It is used for controlling pests. Pesticides are mixed with water and then sprayed to areas infested. It is also used for spraying livestock to kill ticks and other dangerous pests that lower production. It is used for applying liquid substances such as fertilizers and pesticides to plants during the crop growth cycle.

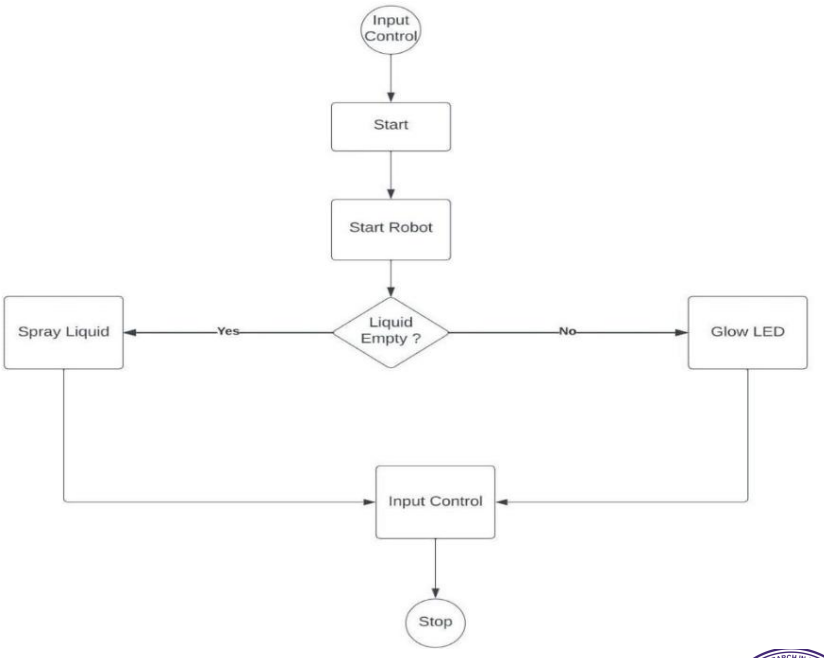
IV. SOFTWARE DESIGN

4.1 Description of Software used

A. Arduino IDE:

Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

B. MIT App Inventor:



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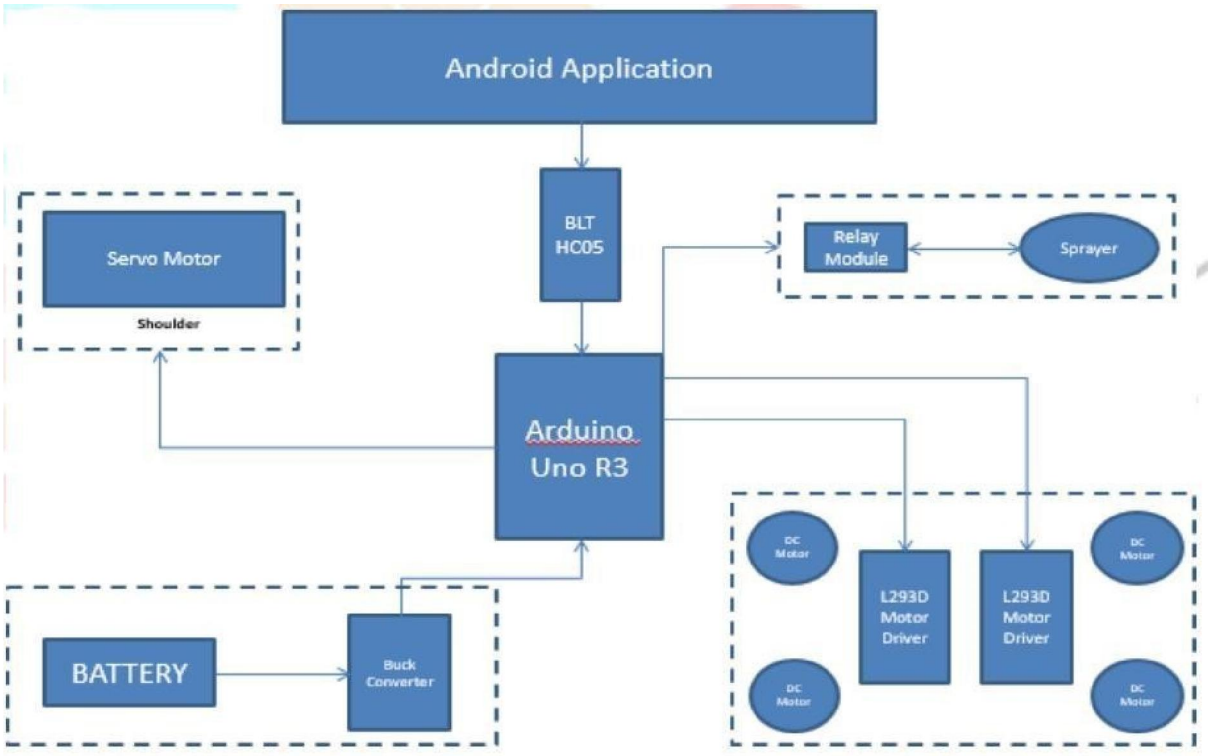
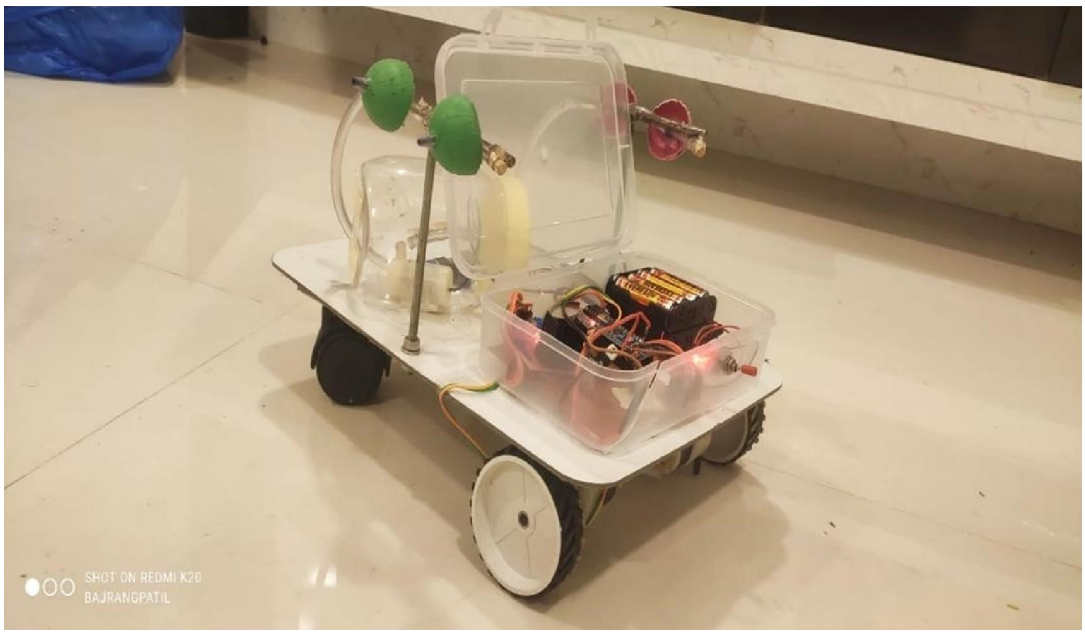
MIT App Inventor includes tutorial lessons as well as suggestions for student explorations and project work. Each unit also includes supplementary teaching materials: lesson plans, slides, unit outlines, assessments and alignment to the Computer Science Teachers of America (CSTA) K12 Computing Standard

V. BLOCK DIAGRAM & DESCRIPTION



VI. TESTING AND RESULT



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VII. ADVANTAGES

With higher speeds and closer tolerances, they can operate with fewer errors. They make fewer errors and operate at higher velocities and higher quality. The robots can reduce the use of pesticides by up to 80% of the farm. In different fields, robots are more efficient and can work around trees, rocks, ponds. For technicians, the robots can create jobs that can fix the robots. The robots can deliver products of high quality and lower the cost of production. Robots gantry can function as both fertilizer or liquid sprays and, most importantly, as an automatic self-control system that meets weather conditions. They can be small in size, allowing to accumulate near-crop data and perform mechanical weeding, mowing, spraying, and fertilizing. Robotic cameras and sensors are capable of detecting weeds, identifying pests, parasites or diseases, and other stress. Usually, the sensors are selective and are only used to spray on the affected area.

VIII. LIMITATIONS

It costs a lot of money to make or buy robots. They need maintenance to keep them running. The farmers can lose their jobs. The robots can change the culture / the emotional appeal of agriculture. Energy cost and maintenance. The high cost of research and development. Lack of access to poor farmers.

IX. APPLICATIONSAND FUTURE SCOPE

1) Application is adopted in crop defence to stop pest infestation, to increase product quality and to expand yield Agricultural pesticide spraying robot is also used to spray sanitization Application are used in automatic fuel system It also used in fire extinguisher Application are used in automatic garden water system supply

2) Electric farm factory robot with interchangeable tools including low tillage solutions, soft robotics , grasping technologies and sensors , will support the sustainable intensification of agriculture , drive manufacturing productivity and future food security In future , we will add artificial intelligence and the mechanical learning technology to automatically control the robot . This will make the robot fully autonomous. This type of robot has a bright future because it is very useful in agriculture and reduces workload . It saves time and money by reducing the amount of pesticide the liquid that needs to be sprayed . It will assist farmers in working in any season and under any conditions.

X. CONCLUSION

The prescribed contraption and spraying method enable to play out the spraying undertaking profitably and financially. The central duty of this endeavour is in structure up a novel spraying contraption that ensures full incorporation of the recognized article with least shower. Pesticide application is decreased by spraying every goal independently. This is cultivated by planning the spraying device toward the point of convergence of the goal and setting the thing detachment of the spraying as demonstrated by the shape and size of the goal. A sharp mechanical structures for spraying pesticides in cultivation field for controlling the robot by the use of a remote choice rather than manual completion of yields shower tests, reduces the prompt prologue to pesticides and the human body, moreover decrease pesticide harm to people, and improve age adequacy.

There can be diverse landscape and statures of yields for the spraying activity tests that demonstrates that a viable, portable robot, and gives the better splash impact at the workplace, for example, its low costs, simplicity of dealing with and simple support and different qualities of people with an expansive market in rural creation.

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