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# Review on Automated Grass Cutter with Pesticide Sprayer

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**Abstract**— The aim of this project is to create an grass cutting and pesticide spraying robot that will decrease pesticide use and human health damage, allowing farmers to be protected and labour intensity can be reduced. The robot will have full route planning and navigation systems, as well as driving control, spraying mechanism and system construction and obstacle avoidance with multi-sensor module integration. The spray robot will be designed, including spraying and grass cutting simulations and analyses. It is used not only to track motion and monitor orientation, but also to compensate for path errors in order to achieve good stability and reliability. Meanwhile, the spraying system will be improved to eliminate leaks and prevent repeated spraying, with automatic sprays varying according to the target. This project proposes a pesticide spraying and grass cutting system which will help farmers in field of agriculture.

**Keywords**— DC Motor, Arduino UNO, GSM Module, Pesticide sprayer, Cutter, Android App.

## 1. INTRODUCTION

In India agriculture is the main source of income for Indian population which include almost 60 percent of Indian population. Agriculture where farmers work in their field to cultivate different kind of crops according to climate and resources. To deal with this kind of food demand for such huge population, farmers has to use large quantity of pesticides for increasing the food production. The productivity of crop is affected by other major biological parameter such as pest, disease and this parameter can be control by human being for improving production of crop. But it is very harmful procedure for farmers when they spray pesticide, they have to take too many precautions like wearing suitable outfit, gloves and masks etc. For getting best solutions in such cases use of robots is very imminent technological solution which improves productivity and efficiency. It becomes cost effective technological solution. This system is based on developing a robotic vehicle employed in agriculture for spraying dangerous pesticides. This project involves the usage of Arduino microcontroller to control the movement of the robot with the aid of a mobile application. This cost-effective robotic vehicle can improve productive capacity, safety in agricultural applications and meet the demand for labor.

### 1.1 Problem Statement

Manual pesticide spraying operations is full of direct exposure to the pesticide liquid work environment, great harm to human body and when this pesticide may come into contact with the farmer during spraying, which may trigger skin cancer and asthma illnesses.

Manual weed cutting poses several health risks and practical challenges for individuals involved in the task such as physical strain, exposure to certain plants can cause skin irritation and allergic reactions, and prolonged sun exposure and respiratory issues due to dust and pollen.

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## 2. LITERATURE REVIEW

In [1], the proposes an insecticide spraying system to help farmers in agriculture. This agriculture vehicle proves to be an effective and efficient machine which can be easily navigated and controlled. The robot can traverse a variety of terrains and seils. The android application is used to control the robot's movement as well as spray pesticides. As a result, the robot's contest is simple, and farmers can easily operate this intelige vehicle. The application was built by using MIT app Inventor. This robot focuses on farmers spraying pesticides from a distance without coming into direct contact with them.

In [2], the author proposes how robotics are often applied to different fields of agriculture. The foremost important occupations in a developing country like India is agriculture. It's important to boost the effectiveness and productivity of agriculture by swapping laborers with intelligent machines like robots using new technologies. The paper proposes a brand-new strategy to interchange humans in various agricultural operations like detection of presence of pests, spraying of pesticides, spraying of fertilizers, etc. there by providing safety to the farmers and precision agriculture. The developed system involves developing a prototype which uses simple cost-effective elements like microprocessors, wireless camera, different motors and terminal elements which helps the farmers in different crop field activities.

In [3], the author proposes a pesticide spraying system which will help farmers in field of agriculture. The robot will have full route planning and navigation systems, as well as driving control, spraying mechanism and system construction and obstacle avoidance with multi-sensor module integration. The spray robot will be designed, including obstacle avoidance, spraying, and sensor integration simulations and analyses. It is used not only to track motion and monitor orientation, but also to compensate for path errors in order to achieve good stability and reliability. Meanwhile, the spraying system will be improved to eliminate leaks and prevent repeated spraying, with automatic sprays varying according to the target.

In [4], the author proposes the application of advanced technology in the field of agriculture, but also to bring the technology close to the reach of farmers in financial aspect, in a very convenient way. This paper provides an engineering solution to diagnose diseased affected area of plants by automatic sprayer robot remotely. An automatic pesticide sprayer is involved to spray the pesticide to the localized area of the affected crops. This system is based on sprayer filled with pesticides. The Sprayer movement is controlled by DC motor at low velocity, up & down direction according to plant height. The proposed system can remotely operate through any electronic device like mobile, laptop etc.

In [5], the author proposes a device that use solar energy as their main supply and contribute to reducing the pollution that may be either sound pollution or noise pollution. The proposed device helps in overcoming all the problems and drawbacks of the conventional grasscutters to some extent. During cloudy weather, these devices are operated through batteries, which are charged using the solar panel when there is lots of sunlight.

In [6], the paper author proposes a multipurpose farming machine has considerable potential to greatly increase productivity of crops, so we are designing and fabricating a multipurpose farming machine which will do multiple operations simultaneously i.e. drilling, seed sowing, pesticide spraying and grass cutting. In agriculture, the opportunities for robot – enhanced productivity are immense and the robots are appearing on farms in various guises and in increasing numbers. The other problems associated with autonomous farm equipment can probably be overcome with technology. Robots can improve the quality of our lives but there are downsides. The present situation in our country all the agricultural machine is working on manual operation otherwise by petrol engine or tractor which is expensive, farmer cannot work for long time manually to have some kind of power source system to operate the digging mechanism. To implement a prototype model of drilling and seed sowing machine system within the limited available source and economy. The system can be subjected to further development using advanced technologies. Our team has successfully combined many ideas from various fields of mechanical engineering and agricultural knowledge to improve the yield and by reducing the labor effort and expenses. The whole idea of multipurpose equipment is a new concept patentable and can be successfully implement in real life situations.

In [7], the author proposes an engineering solution to the current human health hazards involved in spraying potentially toxic chemicals in the contained space of a hot and steamy glasshouse. ARM- Based Pesticide Spraying Robot. The main use of robots in agriculture is for harvesting, Fruit picking, driverless tractor or sprayer are design to supersede human labor. Main aim is to avoid manual spraying of pesticides at actual farm. It will achieve by

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replacing human by a robot, through transmission of video of crop to central station. Development and Automation of Robot with Spraying Mechanism for Agricultural Applications. This is achieved by the design and construction of an autonomous mobile robot for use in pest control and disease prevention applications in commercial Farm. The effectiveness of this platform is shown by the ability to successfully navigate itself down rows of a Farm, spray the pesticides effectively while the farmer controls it from a far distance. And this pesticide spraying system efficiently covers the plants evenly with spray in the set dosages.

In [8], the author proposes an engineering solution to the current human health hazards involved in spraying potentially toxic chemicals in the contained space of a hot and steamy glasshouse. ARM- Based Pesticide Spraying Robot. The main use of robots in agriculture is for harvesting, Fruit picking, driverless tractor or sprayer are design to supersede human labor. Main aim is to avoid manual spraying of pesticides at actual farm. It will achieve by replacing human by a robot, through transmission of video of crop to central station. Development and Automation of Robot with Spraying Mechanism for Agricultural Applications. This is achieved by the design and construction of an autonomous mobile robot for use in pest control and disease prevention applications in commercial Farm.

In [9], the author is focused to solve the problem in manual farming sector such as grass cutting, planting of seeds and pesticide sprinkling. The machine gets supply from solar powered battery. The dc motor is used to operate the wheels of the machine. The AT mega Microcontroller is used to control all the system process. The goal of robotics is to eliminate individual's paperwork and enable operational precision. This robot is capable for cutting the grass and to accomplish seed positioning and optimal seed compaction, the soil is scooped to a specific depth and the seeds from the crusher are shoved into the area at different time intervals.

In [10], the author proposes a project that has been made in order to reduce the work load of the farmers and increase the efficiency of the irrigation process. With the help of this system, the water tank will be automatically filled with water, when empty, from reservoir, without any manual work. The whole world, nowadays, is mainly aiming towards fully automated systems with less human labor. This project has also been aimed at that sector. The problem of water wastage during irrigation has also been solved. Dry areas where water supply is limited, those areas can also be perfectly irrigated by the use of this system. Moreover, components of the system are also reliable, low cost and easily affordable. This system has not only meant for farmers only. It can be used in greenhouse plants also. In this world of advancement, money and time saving are two important factors to be kept in mind. This project also saves time and money by quick hassle-free work and affordable cost.

2.1 Gap Analysis

[1] The development and implementation of such advanced technology can be expensive, which might be a barrier for small-scale farmers.

[2] Regular maintenance is crucial to ensure the robot's optimal performance. This includes cleaning, calibrating sensors, and checking for wear and tear on mechanical parts.

[3] The spraying robot experiences errors in obstacle detection.

[4] This robot cannot be controlled beyond a certain distance.

[5] Farmers and operators need to learn how to use and manage the robotic system. This learning curve can be steep, especially for those who are not familiar with advanced technology.

[6] Regular maintenance is needed to ensure optimal performance, which can be costly and time-consuming. Repairs may require specialized technicians, adding to the operational cost.

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[7] Adverse weather conditions, such as heavy rain, high winds, or extreme temperatures, can negatively impact the robot's performance. The system may struggle to function effectively in such conditions, potentially delaying critical pesticide application.

[8] For the solar-powered pesticide spraying robot, climate conditions will not always be consistent.

[9] For the solar-powered pesticide spraying robot, climate conditions will not always be consistent, and the Wi-Fi signal weakens beyond a certain distance

[10] Although Arduino is relatively low-cost, integrating sensors, GSM modules, and irrigation infrastructure can be expensive for small-scale farmers. Sensors, especially soil moisture and temperature sensors, may require regular calibration and replacement due to wear and environmental conditions. GSM modules may face issues like SIM card malfunctions or firmware glitches.

## 3. PROPOSED METHADOLOGY

This agriculture vehicle proves to be an effective and efficient machine which can be easily navigated and controlled. The robot can traverse a variety of terrains and soils. The android application is used to control the robot's movement as well as spray pesticides. As a result, the robot's control is simple, and farmers can easily operate this intelligent vehicle. The application was built by using MIT app Inventor. This robot focuses on farmers spraying pesticides with grass cutting from a distance without coming into direct contact with them. Because the task's complexity is reduced and the manned task is converted to an unmanned task, this feature would encourage more people to take up agriculture.

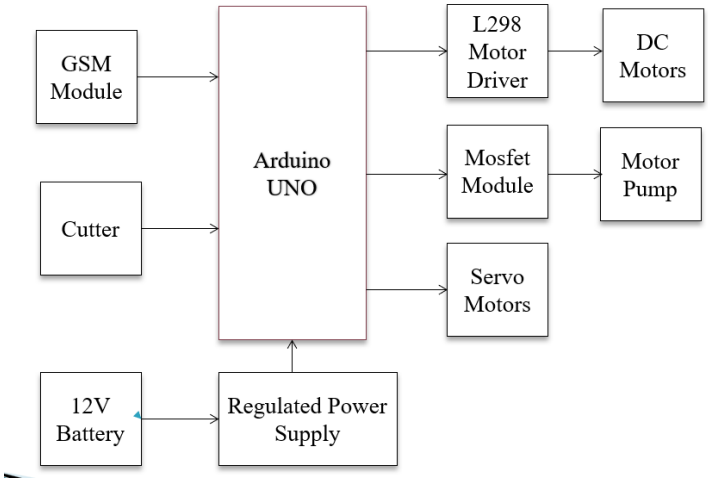


Fig 1: Block Representation

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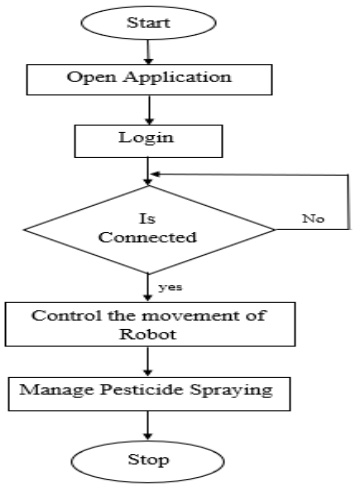


Fig 2: Flowchart

## 4. CONCLUSION

In this project, we are proposing a pesticide spraying robot with grass cutter. A robot for use in agriculture An Agrobot is a concept for improving the product's performance and cost, which, once optimized, would show to be useful in agricultural spraying and grass cutting operations. Integrated GSM module which could control the start/stop and run operation of the robot. Farmers' workloads are reduced, as are health issues. Successfully constructed a robot that can travel on rough surfaces as well as carry a sufficient load of compressor and other equipment. Successful in creating a robot with a strong enough structure to resist the field's challenges. Sure, once this idea is presented in a way that is appropriate for the Indian market, it will undoubtedly aid in lowering the 15% molality rate found in Indian formers associated with agricultural spraying operations. Projects like this inspire people to pursue agriculture as a full-time or part-time occupation. This is critical in developed countries, particularly India, where agriculture is the economic backbone.

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