

Smart Phone Operated Advance Irrigation Vehicle

Haris Quazi¹, Akash Gupta², Kedar Prabhu³, Abhishek Mishra⁴, Vinay Kumar Singh⁵

^{1,2,3,4}Student, Department of Electronics, Shree L. R. Tiwari College of Engineering, Mumbai, India

⁵Assistant Professor, Department of Electronics, Shree L. R. Tiwari College of Engineering, Mumbai, India

Abstract: Agricultural Robot or agribot is a robot deployed for agricultural purposes. Irrigation robot, driverless tractor / sprayer, and agrorobots are designed to replace human labour. In most cases, a lot of factors have to be considered (e.g., the size and color of the crops to be picked) before the commencement of a task. Robots can be used for other horticultural tasks such as pruning, weeding, spraying and monitoring. Robots can also be used in livestock applications (livestock robotics) such as automatic milking, washing and castrating. Robots like these have many benefits for the agricultural industry, including a higher quality of fresh produce, lower production costs, and a smaller need for manual labour. Our robotic vehicle is an agricultural machine of a considerable power. This multipurpose system gives an advanced method to seed sowing, ploughing, watering the crops and harvesting with minimum man power and labour making it an efficient vehicle. The machine will cultivate the farm by considering particular rows and specific columns at fixed distance depending on crop. Moreover the vehicle can be controlled through Bluetooth medium using an Android smart phone. The whole process calculation, processing, monitoring are designed with motors and interfaced with Microcontroller

Keywords: Android controlled, driver motors, Bluetooth modem, Arduino, Agrobot.

1. Introduction

“The discovery of agriculture was the first big step toward a civilized life. “Is a famous quote by Arthur Keith. This emphasizes that the agriculture plays a vital role in the economy of every nation. Since the dawn of history agriculture has been one of the significant earnings of producing food for human utilization. Today more and more lands are being developed for the production of a large variety of crops. The field of agriculture involves various operations that require handling of heavy materials.

For example, in manual ploughing, farmers make use of heavy ploughing machines. Additionally, while watering the crops farmers still follow the traditional approach of carrying heavy water pipes. These operations are dull, repetitive, or require strength and skill for the workers. In the 1980’s many agricultural robots were started for research and development. Kawamura and co-workers developed the fruit harvesting robot. Grand and co-workers developed the apple harvesting robot. They have been followed by many other works. Over history, agriculture has evolved from a manual occupation to a

highly industrialized business, utilizing a wide variety of tools and machines.

Researchers are now looking towards the realization of autonomous agricultural vehicles. The first stage of development, automatic vehicle guidance, has been studied for many years, with a number of innovations explored as early as the 1920s. The concept of fully autonomous agricultural vehicles is far from new; examples of early driverless tractor prototypes using leader cable guidance systems date back to the 1950s and 1960s.

2. Motivation and background

The discovery of agriculture was the first big step toward a civilized life. Agriculture has always been the backbone of India. This emphasizes that the agriculture plays a vital role in the economy of every nation. Since the dawn of history agriculture has been one of the significant earnings of producing food for human utilization.

Small bots are perfectly suited for crawling or rolling along between, under and around plants, where they can monitor soil conditions, photograph and transmit images of plants for monitoring and analysis, do some spot tillage here and there, detect insect infestations and diseases before they become widespread and even dispense precise and controlled amounts of pesticides and fertilizers as needed.

Swarms of such robots will someday act as intelligent agents to provide a level of care, monitoring and data collection that is far beyond what is now economically feasible for any farmer. The cost of such small agribots should be fairly low—once commercial production is in full swing, such machines could be available for around \$500 each, or eventually even much less.

3. Objective

Agriculture is quickly becoming an exciting high-tech industry, drawing new professionals, new companies and new investors. The technology is developing rapidly, not only advancing the production capabilities of farmers but also advancing robotics and automation technology.

This project focuses on advancement in agricultural methods. In this dissertation we investigate that farmers spend a lot of man power on field. India is a country where Agriculture is

considered the most important occupation. So our objective mainly focuses on reducing their exertion and striving by recreating an advanced irrigation vehicle which can save all of the time and effort.

Agricultural robots automate slow, repetitive and dull tasks for farmers, allowing them to focus more on improving overall production yields.

4. Problem statement

A. Man power

In spite of the large scale mechanisation of agriculture in some parts of the country, most of the agricultural operations in larger parts are carried on by human hand using simple and conventional tools and implements like wooden plough, sickle, etc. Little or no use of machines is made in ploughing, sowing, irrigating, thinning and pruning, weeding, harvesting threshing and transporting the crops. This is specially the case with small and marginal farmers. It results in huge wastage of human labour and in low yields per capita labour force.

There is urgent need to mechanise the agricultural operations so that wastage of labour force is avoided and farming is made convenient and efficient. Agricultural implements and machinery are a crucial input for efficient and timely agricultural operations, facilitating multiple cropping and thereby increasing production.

B. Heavy Mechanization

In spite of the large scale mechanization of agriculture in some parts of the country, most of the agricultural operations in larger parts are carried on by human hand using simple and conventional tools and implements like wooden plough, sickle, etc.

Little or no use of machines is made in ploughing, sowing, irrigating, thinning and pruning, weeding, harvesting threshing and transporting the crops. This is specially the case with small and marginal farmers. It results in huge wastage of human labour and in low yields per capita labour force.

There is urgent need to mechanise the agricultural operations so that wastage of labour force is avoided and farming is made convenient and efficient. Agricultural implements and machinery are a crucial input for efficient and timely agricultural operations, facilitating multiple cropping and thereby increasing production.

Some progress has been made for mechanising agriculture in India after Independence. Need for mechanisation was specially felt with the advent of Green Revolution in 1960s. Strategies and programmes have been directed towards replacement of traditional and inefficient implements by improved ones, enabling the farmer to own tractors, power tillers, harvesters and other machines.

A large industrial base for manufacturing of the agricultural

machines has also been developed. Power availability for carrying out various agricultural operations has been increased to reach a level of 14 kW per hectare in 2003-04 from only 0.3 kW per hectare in 1971-72.

This increase was the result of increasing use of tractor, power tiller and combine harvesters, irrigation pumps and other power operated machines.

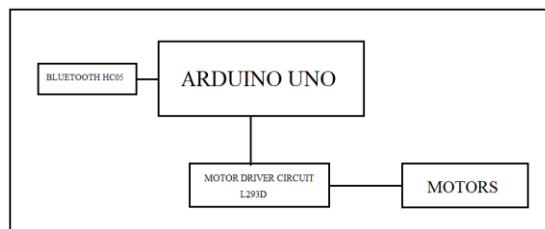


Fig. 1. Block diagram (For movement)

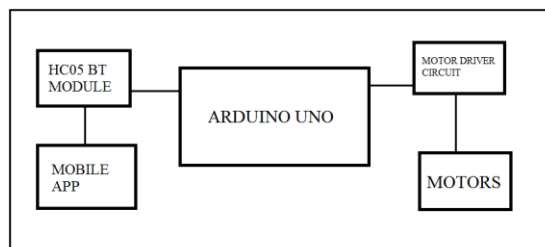


Fig. 2. Block diagram (For application)

5. Conclusion

This study therefore concludes that if we use Smart phone operated advanced irrigation vehicle, it will solve many issue related to excessive man power and heavy ploughing machines. The new blend of all the trending technologies may reduce human exertion up to an extent. This will help them save time and benefit the yield. This device is like a friend to human. Its easy operation allows every individual to use it efficiently. Also, it is cost efficient to be affordable by most of the people in need of it. So if this project is implemented it will be a gift for the farmers in our country.

References

- [1] H. Pota, R. Eaton, J. Katupitiya, and S. D. Pathirana, "Agricultural Robotics: A Streamlined Approach to Realization of Autonomous Farming School of Information Tech and Electronic Engineering, Australian Defense Force Academy, Canberra , Australia
- [2] Ajit G. Deshmukh and V. A. Kulkarni, "Advanced Robotic Weeding System," Jawaharlal Nehru Engineering College, Aurangabad, Maharashtra, India.
- [3] S. Chandika, "Automation and Emerging Technology Development of 2d Seed Sowing Robo," Department of Mechatronics EnggKongu Engineering College Perundurai, India
- [4] Shrinivas R. Zanwar, and R. D. Kokate, "Advanced Agriculture System," Dept. of Instrumentation Engineering, Jawaharlal Nehru Engineering College, Aurangabad, India.