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# Smart Phone Operated Multipurpose Agricultural Robot

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**ABSTRACT:** 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. This equipment may be in our future, but there are important reasons for thinking that it may not be just replacing the human driver with a computer. It may mean a rethinking of how crop production is done. Crop production may be done better and cheaper with a swarm of small machines than with a few large ones. One of the advantages of the smaller machines is that they may be more acceptable to the non farm community. The jobs in agriculture are a drag, dangerous, require intelligence and quick, though highly repetitive decisions hence robots can be rightly substituted with human operator. The higher quality products can be sensed by machines (color, firmness, weight, density, ripeness, size, shape) accurately. 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 is expensive, farmer can't work for long time manually to avoid this problem, we need to have some kind of power source system to operate the digging machine.

## I. INTRODUCTION

Advanced mechanics is an interdisciplinary exploration zone at the interface of software engineering and designing. Advanced mechanics includes plan, development, activity, and utilization of robots. The objective of advanced mechanics is to plan smart machines that can help and help people in their everyday ACTIVITIES and protect everybody. Mechanical technology creates machines that can for people and duplicate human activities. Robots can be utilized much of the time and for some reasons, yet today many are utilized in perilous conditions (counting examination of radioactive materials, bomb recognition and deactivation), producing measures, or where people can't endure (for example in space, submerged, in high warmth, and tidy up and regulation of dangerous materials and radiation). Robots can take on any structure however some are shown up. This is said to help in the acknowledgment of a robot in certain replicative practices as a rule performed by individuals. Such robots endeavor to duplicate strolling, lifting, discourse, cognizance, or some other human action. A considerable lot of the present robots are motivated commonly, adding to the field of Robotics.

Advanced mechanics is a part of designing and science that incorporates gadgets designing, mechanical designing and software engineering, etc. This branch manages the plan, development, and use to control robots, tangible input and data preparing. These are a few advances which will supplant people and human exercises in coming years. These robots are intended to be utilized for any reason however these are utilizing in touchy conditions like bomb recognition, deactivation of different bombs and so on Robots can take any frame however large numbers of them have given the human appearance. The robots which have appeared as human appearance may prone to have the walk like people, discourse, and insight and in particular every one of the things a human can do.

This venture work depicted here is very helpful in the agrarian fields. The task points on the plan Agricultural Robot for Spraying water, cultivating, Mulching and cutting activity". Over 42% of the absolute populace on the planet has picked farming as their essential occupation. As of late, the improvement of independent vehicles in agribusiness has encountered expanded interest. This advancement has driven numerous analysts to begin growing more reasonable and versatile vehicles. In the field of farming self-ruling vehicles, an idea is being created to research if different little independent machines would be more productive than customary enormous farm haulers and human power. These vehicles ought to be equipped for working 24 hours per day throughout the entire year, in most climate conditions and have the insight inserted inside them to act reasonably in a semi-common habitat throughout extensive stretches of time, unattended, while doing a helpful undertaking. There are various field activities that can be executed via self-sufficient vehicles, giving a larger number of advantages than traditional machines.

## II. LITERATURE SURVEY

In agriculture the use of robots enhances the productivity and reduces the human effort and cost. The automation of various agricultural activities by robots are envisioned. It has been described that the present robot can perform better and can automate more than one work simultaneously. This robot can be effectively used by the farmers. In future this robot can be enhanced with some more cognitive capabilities and also to take appropriate actions even in the absence of the farmers. It can be induced with human interaction and also learning from experience, given by Blackmore, S.(2007).

“A systems view of agricultural robotics”.[4]. Central to this idea was the proposal of the implementation of the PFDS and PADS, and their strong interaction. The PFDS is primarily used for relaying spatial accuracy information for machinery navigation, while the PADS are used to communicate the agronomy information about, and requirements of, the crop, given by R. Eaton, R. Eaton, J. Katupitiya, S D Pathirana (2008), “Autonomous farming: Modeling and control of agricultural machinery in a unified framework”.[5].

Agriculture is the primary source of livelihood in many countries in the world, including India. Agriculture accounts for 18 % of India’s gross domestic product. The increase in population requires the increase in agricultural activities to meet the food demand whereas the per capita land availability is reducing. The conventional methods of farming, higher input costs, labor shortage, lack of water resources and problems in crop monitoring make agriculture uneconomical and inefficient, leading to decline in crop production. Automation in agriculture has emerged as a promising methodology for increasing the crop productivity without sacrificing the product quality by saving time and labor using specified tools and technologies (Bonadies and Gadsden, 2019).

Its efficiency, usability and accuracy will help to improve the productivity of agricultural machinery by reducing the human activities. The present advancements in programming and technology have made robotics easy and easily accessible. In addition to the easiness of this, the cost factor should also be considered such that it is affordable to the everyday farmer. Hence a robotic platform, capable of providing all the advantages of Agro-bots at reduced cost could boost the pace of advancement of Indian agriculture.

As the quantity of work accessibility is decreasing step by step and their wages are expanding so there is prerequisite of higher profitability. Subsequently the gadget is to be planned which causes ranchers to beat the expressed issue. Pointed toward expanding the efficiency and lessening the work in question, the robot is intended to execute the fundamental capacities needed to be done in the ranches. In the current age the greater part of the nations don't have adequate talented labor explicitly in agrarian area and it influences the development of non-industrial nations. So it's an opportunity to computerize the area to beat this issue. In India there are 70% individuals reliant on farming. So we need to contemplate agribusiness. Imaginative thought of our undertaking is to mechanize the way toward furrowing and planting cultivating like sunflower, corn, groundnut and vegetables like beans, woman's finger, pumpkin and seed of wheat and so forth To decrease the human exertion and increment the yield. The furrowing of firm and manor of seeds is consequently done by utilizing dc engine. The distance between the two seeds are controlled and shifted by utilizing microcontroller. At the point when the robot arrives at the finish of the field we can alter the course with the assistance of far off switches. The entire interaction is constrained by microcontroller. Furrowing of firm and seed Plantation is our everyday life is finished by work vehicle in ranches. Yet, it requires additional time and the labor lack is confronted consistently. The fundamental prerequisite of mechanization is to diminish labor through our venture.

## III. METHODS

Computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have displaced cathode ray tube(CRT) displays in most applications. They are usually more compact, lightweight, portable, less expensive, more reliable, and easier on the eyes. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn-in.LCDs are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically-modulated optical device made up of any number of pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome. The earliest discovery leading to the development of LCD technology, the discovery of liquid crystals, dates from 1888. By 2008, worldwide sales of televisions with LCD screens had surpassed the sale of CRT units

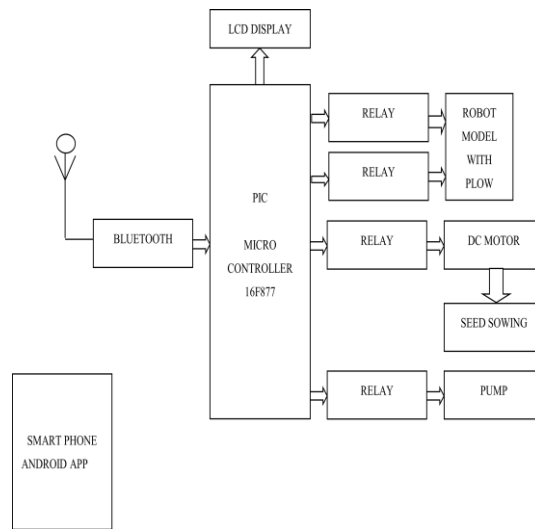


Fig 1: Proposed Block Diagram

Microcontroller is a general purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU, memory and peripherals to make it as a mini computer. A microcontroller combines on to the same microchip: The CPU core Memory (both ROM and RAM) Some parallel digital i/o Microcontrollers will combine other devices such as: A timer module to allow the microcontroller to perform tasks for certain time periods. A serial i/o port to allow data to flow between the controller and other devices such as a PIC or another microcontroller. An ADC to allow the microcontroller to accept analogue input data for processing.

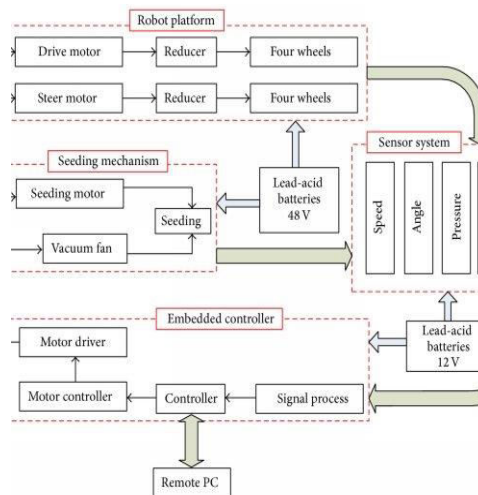


Fig 2: Block Diagram

Agriculture is the backbone of India. The history of Agriculture in India dates back to Indus Valley Civilization Era and even before that in some parts of Southern India. Today, India ranks second worldwide in farm output. The special vehicles plays a major role in various fields such as industrial, medical, military applications etc., The special vehicle field are gradually increasing its productivity in agriculture field. Some of the major problems in the Indian agricultural are rising of input costs, availability of skilled labors, lack of water resources and crop monitoring. To overcome these problems, the automation technologies were used in agriculture. The automation in the agriculture could help farmers to reduce their efforts. The vehicles are being developed for the processes for ploughing, leveling, water spraying. All of these functions have not yet performed using a single vehicle. In this the robots are developed to concentrate in an efficient manner and also it is expected to perform the operations autonomously. The proposed idea implements the vehicle to perform the functions such as ploughing, seed sowing, mud leveling, water spraying. These functions can be

integrated into a single vehicle and then performed. The idea of applying robotics technology in agriculture is very new. In agriculture, the opportunities for robot-enhanced productivity are immense - and the robots are appearing on farms in various guises and in increasing numbers. We can expect the robots performing agricultural operations autonomously such as ploughing, seed sowing, mud closing and water spraying. Watching the farms day & night for an effective report, allowing farmers to reduce the environmental impact, increase precision and efficiency, and manage individual plants in novel ways.

#### IV. RESULT ANALYSIS

The Ploughing tool is interfaced with the Arduino. The ploughing tool can be operated in three modes namely on, off and mid. The microcontroller will receive the command to work on any of these three modes and it directs the ploughing tool to plough the field accordingly. The seeds are stored in a small container and it is closed with a small flip. This flip is controlled by the servomotor to open and close the container. The servomotor is capable of rotating to 180 degrees. Meanwhile, when the servomotor is at 180 degree, it automatically opens the container and hence the seeds are sown in the field.

The temperature sensor interfaced with the Arduino helps to send the information about the temperature to the user via WiFi module. After knowing the temperature, water can be poured on the field. This can be done with the help of relay and solenoid valve. The relay makes the solenoid valve to allow and stop the flow of water to the field. Agribot (4-wheeled robot) is initiated with the power "ON". The agribot starts moving in forward direction along with the two sensors - IR sensor and Moisture sensors are also turned "ON". These are used to monitor the environment in real time. IR sensors are used to turn on rotor in order to cut the unwanted weeds (or) grasses. Likewise, moisture sensors are used to sense moistness in the soil and turn ON or OFF the water pump for watering the plants. Robotic arm is constructed by switch for ploughing the land.

Robot is operated in manual mode only for control purpose. It is used to start the Robot and make it move in forward direction. The three important mechanisms are - (i) Rotor is turned ON/OFF through IR sensors detecting unwanted grasses, (ii) Water pump is turned ON/OFF using moisture sensor based on detecting the moistness in soil. (iii) Robotic is turned ON/OFF through a switch for ploughing the land.

Application scans for the Bluetooth interface (HC-05) Robot. (2) once, the robot connected to the phone successfully. (3) There are three communication mode - (i) Byte stream mode, (ii) Keyboard mode, (iii) Command line mode. (4) Select Byte stream mode - Successfully connected. (5) In Byte stream mode, operational status of agribot - (i) Pumping motor ON (or) (ii) Rotor is on for leveling or removing grass. (iii) Robot is going to digging, Reduces the number of labors require for agricultural activity. ii. Due its quick action time will be saved. iii. Agribot can able to work in any environmental condition. iv. The robots can work without sleep so they can work 24/7/365. v. Protection against harmful effects of chemicals.

#### V. CONCLUSION

Robotics is playing a significant role in agricultural production and management. There is a need for autonomous and time saving technology in agriculture to have efficient farm management. The researchers are now focusing towards different farming operational parameters to design autonomous agricultural vehicles as the conventional farm machineries are crop and topological dependent. Till date the agricultural robots have been researched and developed principally for harvesting, chemical spraying, picking fruits and monitoring of crops. Robots like these are perfect substitute for manpower to a great extent as they deploy unmanned sensing and machinery systems. The prime benefits of development of autonomous and intelligent agricultural robots are to improve repeatable precision, efficacy, reliability and minimization of soil compaction and drudgery. The robots have potential for multitasking, sensory acuity, operational consistency as well as suitability to odd operating conditions. The study on agricultural robotic system had been done using model structure design mingled with different precision farming machineries. Few prototypes were designed by European Union named CROPS, USA-ISAAC2 & Michigan Hortibot, Australia-AgBot, Finland-Demeter, India-Agribot and many other countries. The agricultural robots are designed using different localization techniques which are vision, GPS, laser and sensor based navigation control system. In this paper, comparative study including an overview of Robotics approach for precision Agriculture in India and worldwide development is explored.

## REFERENCES

- [1] S.Ponlatha, P.Umashankar, P.Balashanmuga Vadivu, D.Chitra, " AN IoT based efficient energy management in smart grid using SMACA technique", Wiley- International Transaction on Electrical Energy System, Vol.31, No.125, pp.1-22, Dec 2021.
- [2] Shibusawa, S. 1996. PhytoTechnology - An introduction to the concept and topic of a new Project. <http://phytech.ishikawac.ac.jp/WhatIs.html>.
- [3] Dyson, G. (1997). Darwin among the machines, The Penguin Press.
- [4] Tillett, N.D., Hague, T. and Marchant, J.A.(1998) A robotic system for plant scale husbandry. Journal of Agricultural Engineering Research, 69, 169-178.
- [5] Tang, L., Tian, L., and Steward, B. L. 2000, Color image segmentation with genetic algorithm for in- field weed sensing, Transactions of the ASAE - American Society of Agricultural Engineers 43:41019-1028.
- [6] Pedersen, B. B. 2001, Weed density estimation from digital images in spring barley, Unpublished MSc thesis KVL, Denmark.
- [7] Søggaard, H. T. and Heisel, T. 2002, Weed classification by active shape models. AgEng 2002, International Conference on Agricultural Engineering, Budapest, Hungary, June-July 2002.
- [8] Leropoulos, I., Greenman, J., and Melhuish, C. (2003). Imitating metabolism: Energy autonomy in biologically inspired robots. AISB '03 Second international symposium on imitation in animals and artifacts. Aberystwyth, Wales, pp.191-194.
- [9] Graglia, E. 2004, Importance of herbicide concentration, number of droplets and droplet size on growth of Solanum nigrum L, using droplet application of Glyphosphate, XIIeme Colloque International sur la Biologie des Mauvaises Herbes.
- [10] Nørremark, M. and Griepentrog, H. W. 2004, Physical methods to control weeds within crop rows, AgEng04, Leuven, Belgium.
- [11] Lund, I. and Søggaard, H. T. 2005, Robotic Weeding - Plant recognition and micro spray on single weeds, 5ECPA (This conference), ed. J. V. Stafford.
- [12] Blackmore, S. (2007). A systems view of agricultural robotics. Precision Agriculture conference, Wageningen Academic Publishers, the Netherlands. pp. 23-31.



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