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# AGRO ROBOT

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**ABSTRACT**: Smart farming and precision agriculture involve the integration of advanced technologies into existing farming practices in order to increase production efficiency and the quality of agricultural products. As an added benefit, they also improve the quality of life for farm workers by reducing heavy labor and tedious tasks. Replacing human labor with automation is a growing trend across multiple industries, and agriculture is no exception. Most aspects of farming are exceptionally labor-intensive, with much of that labor comprised of repetitive and standardized tasks an ideal niche for robotics and automation. Our proposed robot performing tasks ranging from planting and watering, to harvesting and collecting. Eventually, this new wave of smart equipment will make it possible to produce more and higher quality food with less man power. The core concept of incorporating autonomous robotics into agriculture remains the goal of reducing reliance on manual labor, while increasing efficiency, product yield and quality.

## INTRODUCTION:

Engineering research in the field of agriculture holds a key for sustainable future of mankind. Agricultural robotics is a promising solution for handling the problems of workforce shortage and declining profitability .Agriculture can be a field as favorable industry for the application of automation. An agricultural robot is a robot deployed for agricultural purposes. Applying automation for agriculture has helped create several advancement to the industry while helping farmers save money and time. process like ploughing, seeding, weeding, watering, fertilizing, harvesting, spraying etc require large amount of man power

In order to reduce this need, the robot to perform agricultural operations autonomously. A robot is a mechanical, artificial agent and is usually an electro mechanical system. It is a device that, software programming, makes complicated tasks easy to perform. Agro robot is taking farming practices to a new phase by become a smarter, detecting source of variability in the field. Consuming less energy and adopting their performances for more flexible task. They have become an integral part of the future production of fruits, vegetables and crops.

It is a fast and reliable method of real-time observation at the plant level. Agro robot has been regarded as a solution to reduce labor intensity it also be deliver products at high quality and lower the cost of production. Agriculture robotics is the use of automation in bio systems such as agriculture. It is replacing the conventional techniques to perform the same task with efficiency .Applying automation to agriculture has helped create several advancements to the industry. There was a continuous labor outflow from agriculture, mainly from standardized tasks within production process.

In order to differentiate the conventional and proposed system, the development agricultural robots that can effectively perform tedious field task have grown significantly in the past decade. Replacing human labor with automation is a growing trend across multiple industries, and agriculture is no exception. Robot performing tasks ranging from planting and watering, to harvesting and collecting. This new wave of smart equipment will make it possible to produce more and higher quality food with less manpower. The robot are not getting sick or tired and time off is not needed with higher speeds and closer tolerances they can operate with fewer errors, when they make fewer errors and operate at higher velocities and higher quality. It can reduce the use pesticide by up to 80% of the farm.

When it comes to task like spraying fungicide and insecticide in the field, it play an essential role in safeguarding human employees from that would have otherwise being picking up farm chemicals by hand. This robot are designed to perform spraying task by specially fabricated fertilizer sprayer. Unlike human resources, agro robots would never get tired. No matter how steadily they work, they would always operate in full dimensions all around. Their accuracy and precision are higher than humans, and this elevates the quality of the outcomes. These features quite naturally heighten up consistency in the agricultural sector and finally led to a up in the process of food production. The main objective of this project is to reduce the time and and effort by marginal farmers. Day by day the wages for labors are also increasing so we can save money too.

They can be small in size, allowing to accumulate near-crop data and perform ploughing, spraying, and fertilizing. Robot provide an opportunity to replace human oprerators with a good return on investment by providing effective solutions.

## PROPOSED SYSTEM:

Agro robot improve the quality of life for farm workers by reducing heavy labour and tedious tasks. Replacing human labor with automation is a growing trend across multiple industries, and agriculture is no exception. Robot performing tasks ranging from planting and watering, to harvesting and collecting. This new wave of smart equipment will make it possible to produce more and higher quality food with less manpower.

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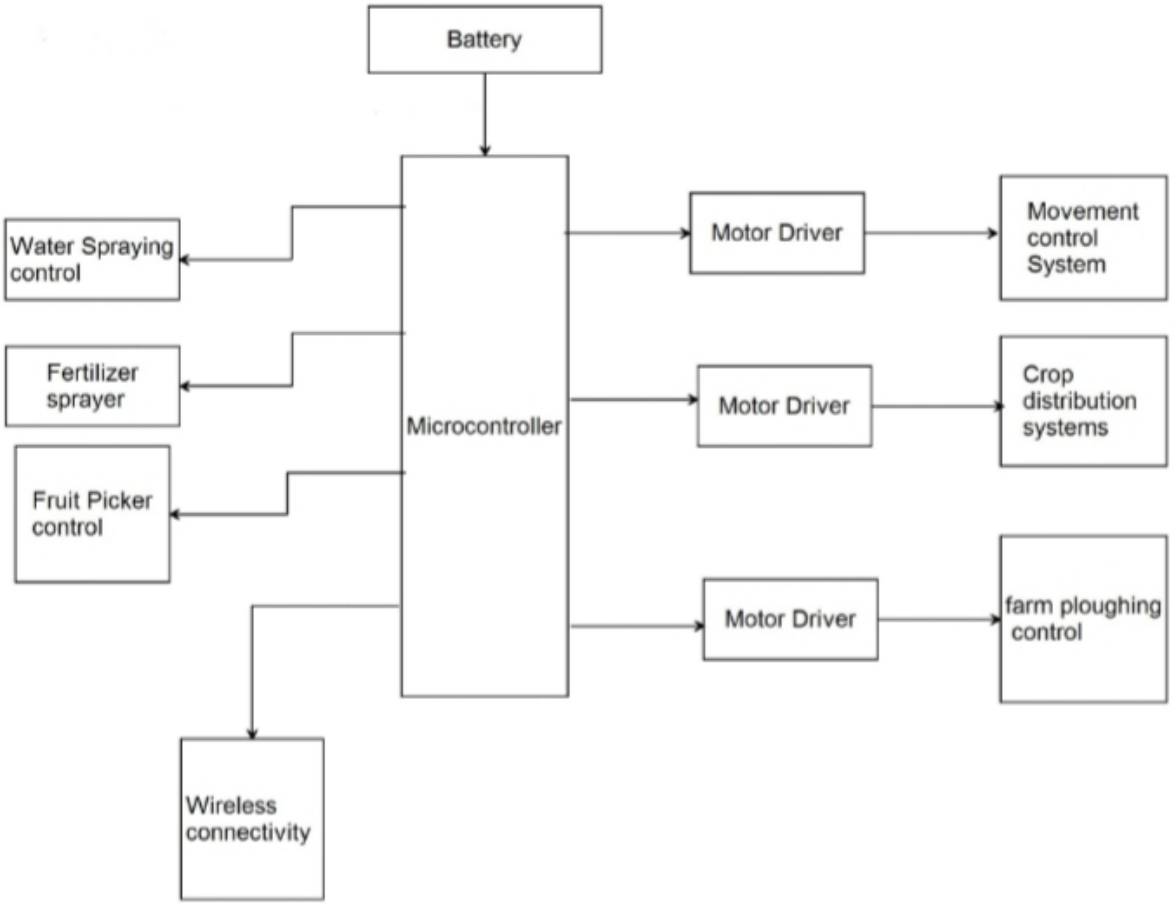
BLOCKDIAGRAM



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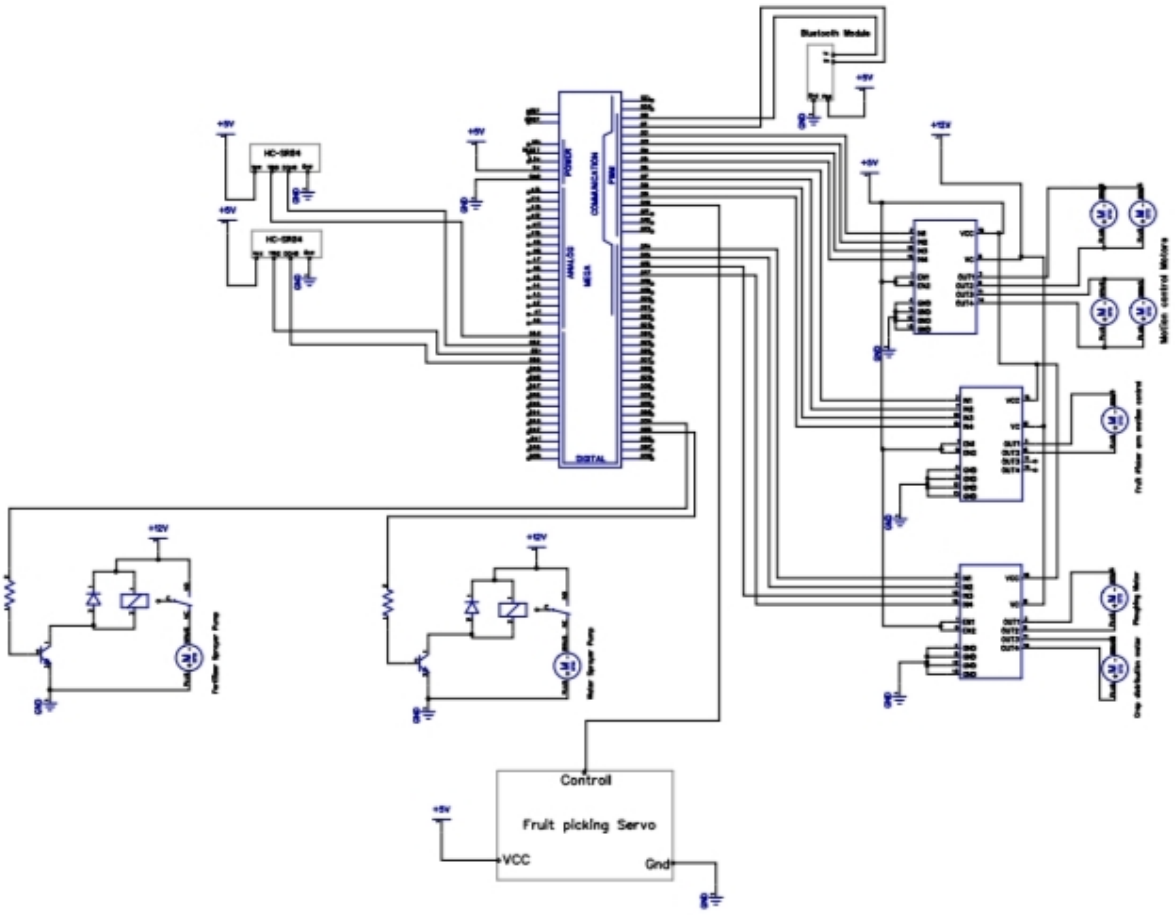
CIRCUIT DIAGRAM




The integral part of the circuit diagram is microcontroller, the microcontroller board like “Arduino Mega” depends on the ATmega2560 microcontroller. It includes digital input/output pins-54, where 16 pins are analog inputs, 14 are used like PWM outputs hardware serial ports (UARTs) – 4, a crystal oscillator-16 MHz, an ICSP header, a power jack, a USB connection, as well as an RST button. This board mainly includes everything which is essential for supporting the microcontroller. So, the power supply of this board can be done by connecting it to a PC using a USB cable, or battery or an AC-DC adapter. This board can be protected from the unexpected electrical discharge by placing a base plate..The SCL & SDA pins of Mega 2560 R3 board connects to beside the AREF pin. Additionally, there are two latest pins located near the RST pin. One pin is the IOREF that permit the shields to adjust the voltage offered from the Arduino board. Another pin is not associated & it is kept for upcoming purposes. These boards work with every existing shield although can adjust to latest shields which utilize these extra pins.

The next part is HCSRO4 ultrasonic sensor Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work:
(1) Using IO trigger for at least 10us high level signal,
(2) The Module automatically sends eight 40 kHz and detect whether there is pulse signal back.
(3) IF the signal back, through high level , time of high output IO duration is
the time from sending ultrasonic to returning.
Test distance = (high level time velocity of sound (340M/S) / 2,

Next here we are using a Bluetooth module HC05 HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip

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Bluetooth system with CMOS technology and with AFH(Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall development cycle. Before you get over it keep these things on check.

A relay is an electrically operated switch that can be turned on or off, letting the current go through or not, and can be controlled with low voltages, like the 5V provided by the Arduino pins. The set at the right consists of VCC and GND to power up the module, and input 1 (IN1) and input 2 (IN2) to control the bottom and top relays, respectively. The second set of pins consists of GND, VCC, and JD-VCC pins. The JD-VCC pin powers the electromagnet of the relay.

The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications.All inputs are TTL compatible. Each output is a complete totem-pole drive circuit,with a Darlington transistor sink and a pseudo-Darlington source. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN.When an enable input is high, the associated drivers are enabled and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications. On the L293, external high-speed output clamp diodes should be used for inductive transient suppression. A VCC1 terminal, separate from VCC2, is provided for the logic inputs to minimize device power dissipation. The L293and L293D is characterized for operation from 0°C to 70°C. When voltage is applied to the motor, current begins to flow through the field coil from the negative terminal to the positive terminal. This sets up a strong magnetic field in the field winding. Current also begins to flow through the brushes into a commutator segment and then through an armature coil. The current continues to flow through the coil back to the brush that is attached to other end of the coil and returns to the DC power source. The current flowing in the armature coil sets up a strong magnetic field in the armature. The magnetic field in the armature and field coil causes the armature to begin to rotate. This occurs by the unlike magnetic poles attracting each other and the like magnetic poles repelling each other. As the armature begins to rotate, the commutator segments will also begin to move under the brushes. As an individual commutator segment moves under the brush connected to positive voltage, it will become positive, and when it moves under a brush connected to negative voltage it will become negative. In this way, the commutator segments continually change polarity from positive to negative. Since the commutator segments are connected to the ends of the wires that make up the field winding in the armature, it causes the magnetic field in the armature to change polarity continually from North Pole to South Pole. The commutator segments and brushes are aligned in such a way that the switch in polarity of the armature coincides with the location of the armature's magnetic field and the field winding's magnetic field.

The switching action is timed so that the armature will not lock up magnetically with the field. Instead the magnetic fields tend to build on each other and provide additional torque to keep the motor shaft rotating. When the voltage is de-energized to the motor, the magnetic fields in the armature and the field winding will quickly diminish and the armature shaft's speed will begin to drop to zero. If voltage is applied to the motor again, the magnetic fields will strengthen and the armature will begin to rotate again.

## PROS AND CONS:

The major advantage of the system includes reducing human labour,increasing efficiency of the product and yield. Consumers time and money , Easy to perform Cost of the system will be somewhat a great bother and lack of acess to farmers will also be a concern.

## CONCLUSION:

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 (colour, firmness, weight, density, ripeness, size, shape) accurately. Robots can improve the quality of our lives but there are downsides.

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## REFERENCES

[1]. Xue Jinlin, XU Liming, "Agriculture robot for automatic ploughing and seeding", IEEE, International Conference on Measuring Technology, 2015,published.

[2]. Aljanobi.A,"Gesture controlled wireless agricultural wheeding robot", IEEE International workshop,2019, references.

[3]. Minh Anh Tuan Tran, Trong Nhan Le, Tan Phuong and Viet Nam,"Development of spraying robot for precision agriculture:an edge following approach in International Conference on Advanced Computing and Appliations(ACOMP), IEEE, January, 2020

[4]. Ajay Mittal, Sanat Sarangi, Saranya Ramanath, Prakruti V. Bhatt, Rahul Sharma and Srinivasu P. ,"Design and development of agri_bot for automatic seeding and watering application" IEEE Transl, May,2020.
[5]. Amritanshu Srivastava, Shubham Vijay, Alka Negi and Akash Singh,"A proposal of FPGA based low-cost and power efficient autonomous fruit harvester" in International Conference on Embedded Systems (ICES), IEEE, 2020.

[6].Shivaprasad, B.S. and Ravishankara, M.N., (2014.) "Design and implementation of seeding and fertilizing agriculture robot", International Journal of Application or Innovation in Engineering & Management (IJAIEM), 3(6), pp.251-255.
[7] Umarkar, S. and Karwankar, A., (2016) , April. "Automated seed sowing agribot using Arduino", In Communication and Signal Processing (ICCSP), 2016 International Conference on (pp. 1379-1383). IEEE.
[8] Y. N. Kumar et al., "Automated Seed Sowing Agribot," 2019 IEEE 1st International Conference on Energy, Systems and Information Processing (ICESIP), Chennai, India, 2019, pp. 1-5.
[9] N. S. Naik, V. V. Shete and S. R. Danve, "Precision agriculture robot for seeding function," 2016 International Conference on Inventive Computation Technologies (ICICT), Coimbatore, 2016, pp. 1-3.
[10] G. Amer, S. M. M. Mudassir and M. A. Malik, "Design and operation of Wi-Fi agribot integrated system," 2015 International Conference on Industrial Instrumentation and Control (ICIC), Pune, 2015, pp. 207-212.
[11] . R. Eaton, J. Katupitiya, K. W. Siew and B. Howarth, "Autonomous Farming: Modeling and Control of Agricultural Machinery in a Unified Framework," 2008 15th International Conference on Mechatronics and Machine Vision in Practice, Auckland, 2008, pp. 499-504.
[12] R. Eaton, J. Katupitiya, K. W. Siew and K. S. Dang, "Precision Guidance of Agricultural Tractors for Autonomous Farming," 2008 2nd Annual IEEE Systems Conference, Montreal, Que., 2008, pp. 1-8.