AGRII ROBOT FOR MULTIPURPOSE APPLICATIONS (PUMPING AND PLUGHING)

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ABSTRACT:

In India almost 70 percentages of people are depending on farming. Several operations are performed in the farming field like seed sowing, mud levelling, plugging etc. The present methods of seed sowing, pesticide spraying and mud levelling are problematic. The tools used for above movements are expensive and difficult to handle. So the farming system in India should be encouraged by developing a system which will decrease the man power and time. This paper aims to design, develop and design of the robot which can sow the seeds, levels the mud and spray the pesticides, which also detects the obstacles. This entire system is driven by solar energy. The designed robot gets energy from solar panel and it is operated using Bluetooth/Android App which sends the signals to the robot for required mechanisms and the movement of the robot. This increases the efficiency of seed sowing, pesticide spraying and mud levelling and also reduces the problem come across in manual planting. For labor-intensive control, the robot uses the remote controller as android app.

I. INTRODUCTION

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 play a major role in various fields such as industrial, medical, military applications etc., [1] 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. Recently computing and robotics technologies have seen major improvements in technologies commonly employed in agricultural robotics: perception, manipulation, and autonomous vehicles. Perception is achieved through a variety of sensors and that can be applied to a small focused workspace or to the monitoring of vast agriculctural field through sensors that are distributed. Main motive of Automation Technology is to reducing the effort of labour, a phenomenon common in the developed world. The reasons are the need for improved the process of farmer working. Robotics and artificial intelligence offers in agriculture field to processes related to seeding, harvesting, to improve productivity and efficiency. The uses of robotics are spreading every day to accomplished further various agricultural fields, as the opportunity of replacing human operators provides effective solutions with return on investment. agricultural robots have been developed and implemented a number of agricultural products in many countries. This Agricultural robot can performs basic functions like harvesting, planting and spray the pesticides. The applications of agricultural robot

widely used in the investment and research . autonomous farming is the operation, guidance, and control of autonomous machines to fullfill the agricultural tasks. It motivates agricultural robotics. The main goal of agricultural robotics is more than just the application of robotics technologies to agriculture. The multipurpose agricultural robots are designed to perform the basic functions of agricultural field. by using this robot agricultural operations perform autonomously such as ploughing, seed sowing, mud closing and water spraying. The main aim of the proposed system are to check the soil depending on moisture level in the soil, to ploughing the seeds with teeth's like structure at the end to turn the top layer of soil down, to close the seeds and level the ground automatically and to provide irrigation system by spraying water with a pump in the field.

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].

III.DESIGN OF HARDWARE

This chapter briefly explains about the Hardware. It discuss the circuit diagram of each module in detail.

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial

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converter. Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Arduino board has the following new features:

• 1.0 pin out: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin, that is reserved for future purposes.

• Stronger RESET circuit.

• Atmega 16U2 replace the 8U2.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

Fig: ARDUINO UNO

POWER SUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".
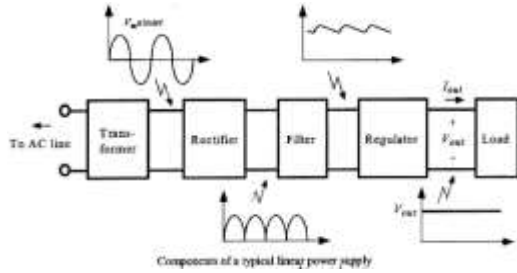
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Fig: Block Diagram of Power Supply

LCD DISPLAY

A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

Fig: LCD

BUZZER

Digital systems and microcontroller pins lack sufficient current to drive the circuits like relays, buzzer circuits etc. While these circuits require around 10milli amps to be operated, the microcontroller's pin can provide a maximum of 1-2milli amps current. For this reason, a driver such as a power transistor is placed in between the microcontroller and the buzzer circuit.


L293D:

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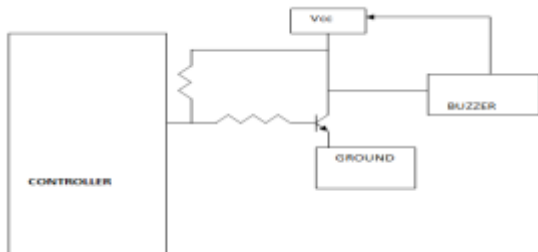
The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed 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.

DC MOTOR

A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homopolar motor (which is uncommon), and the ball bearin motor, which is (so far) a novelty. By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source -- so they are not purely DC machines in a strict sense.
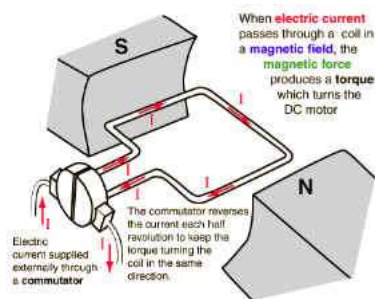
Mini Submersible Pump

Submersible pumps in general are designed to be fully submerged into the water. Submersible pumps are placed within the reservoir of water that requires pumping out, which is why they are normally used for drainage in floods, sewerage pumping, emptying ponds or even as pond filters. In this article, the mechanism of a smaller type of submersible water pump called the mini submersible pump will be specifically addressed. A mini submersible pump is a smaller version of the submersible water pumps which is lightweight, small size, low consumption, and makes little noise. A mini submersible water pump is used widely in household for cooking, cleaning, bathing, space heating, watering flowers, etc. A mini submersible water pump is a centrifugal water pump, which means that it uses a motor to power an impeller that is designed to rotate and push water outwards. The motor is located in a waterproof seal and closely connected to the body of the water pump which it powers. Filtration pumps found inside aquarium

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fish tanks utilize a type of mini submersible water pump. The mini submersible water pump is installed inside the actual fish tank to pump the water out where it is needed.

Advantage and Disadvantage of Mini Submersible Pump: Min submersible water pumps are very efficient as well because they do not require a lot of energy to vacuum in water within which they are submerged. However, known disadvantages of mini submersible water pump are that seals tend to corrode over time which allows water to potentially seep into the motor. When this happens, the motor could be rendered useless, and accessing and repairing becomes extremely difficult.


Bluetooth

Bluetoo**h** is a wireless protocol utilizing short-range communications technology facilitating data transmission over short distances from fixed and/or mobile devices, creating wireless personal area networks (PANs). The intent behind the development of Bluetooth was the creation of a single digital wireless protocol, capable of connecting multiple devices and overcoming issues arising from synchronization of these devices. Bluetooth uses a very robust radio technology called frequency hopping spread spectrum. It chops up the data being sent and transmits chunks of it on up to 75 different frequencies. In its basic mode, the modulation is Gaussian frequency shift keying (GFSK). It can achieve a gross data rate of 1 Mb/s. Bluetooth provides a way to connect and exchange information between devices such as mobile phones, telephones, laptops, personal computers, printers, GPS receivers, digital cameras, and video game consoles over a secure, globally unlicensed Industrial, Scientific, and Medical (ISM) 2.4 GHz short-range radio frequency bandwidth. The Bluetooth specifications are developed and licensed by the Bluetooth Special Interest Group (SIG). The Bluetooth SIG consists of companies in the areas of telecommunication, computing, networking, and consumer electronics.

Bluetooth is a standard and communications protocol primarily designed for low power consumption, with a short range (power-class-dependent: 1 meter, 10 meters, 100 meters) based on low-cost transceiver microchips in each device. Bluetooth enables these devices to communicate with each other when they are in range. The devices use a radio communications system, so they do not have to be in line of sight of

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each other, and can even be in other rooms, as long as the received transmission is powerful enough. Bluetooth device class indicates the type of device and the supported services of which the information is transmitted during the discovery process.

IV.BLOCK DIAGRAM:
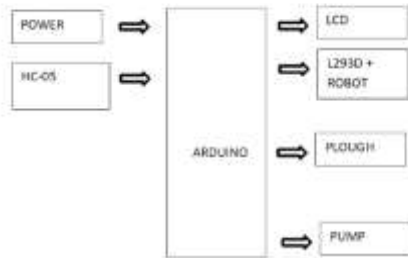
V.CONCLUSION

The multipurpose agricultural robot gives an advance method to sow, plow and cut the crops with minimum man power and labor making it an efficient vehicle. The machine will cultivate the farm by considering particular rows and specific column at fixed distance depending on crop. Robots can improve the quality of our lives and enhance opportunities for future mankind to create an upgraded model for the betterment of farmers. 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 machine requires less man power and less time compared to traditional methods, so if we manufacture it on a large scale its cost gets significantly reduce and we hope this will satisfy the partial thrust of Indian agriculture. So in this way we can overcome the labor problem that is the need of today's farming in India.

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