

Smart Phone Operated Multipurpose Agricultural Robotic Vehicle – Agribot

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Abstract - The paper aims on the design, development and fabrication of the robot which can put the seeds, dig the soil, plough the land, cutting the waste plants these whole system of robot works with battery. Thus we made sowing machine along with weeder which is operated automatically by Bluetooth module , it reduces the efforts of farmers thus increasing the efficiency of planting also reduces the problem encountered in manual planting. This also increased the planting efficiency and accuracy. We made it from raw materials thus it was so cheap and very usable for small scale farmers.

KEYWORDS - Weeder, Bluetooth module, sowing, robot

I. GENERAL

The main aim of agricultural robotics is apply robotics technologies on the field of agriculture as well as the agricultural challenges to develop new techniques. Now days, no one can end up the day without using any kind of embedded system products. It makes our human life very robust and makes work comfortable. The 21st century is said to be century of creation, progress, globalization and so much else, but the second side too, that is nothing but 21st century is century of the population, global warming, drought and cloud burst also helpless health factors! Automation in agricultural robotics system has been developed to implement a number of agricultural productions in many countries. Such as picking, harvesting, monitoring, weeding, seeding,

fertilizer, irrigation. But in this project functions included are soil based applications of Seeding, Fertilizer, and Irrigation. The purpose of our project is sow, plow, water and cut the crops with minimum man power and labor making it an efficient vehicle using Bluetooth. . This robotic vehicle is an agricultural machine of a considerable power and great soil clearing capacity. The machine will cultivate the farm by considering particular rows and specific column at fixed distance depending on crop.

II. OBJECTIVE

- The objective of this project is to agricultural monitoring system using android phone.
- To manufacture vegetable seed sowing machine, this can be operated automatically.
- To level the ground in small extent and maintain the same distance between two seeds at the time of sowing process.

III. METHODOLOGY

WORKING PRINCIPLE OF AGRICULTURAL ROBOTIC VEHICLE

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

Let's start by looking at a simple 2-pole DC electric motor (here red represents a magnet or winding with a "North" polarizatio).

BLOCK DIAGRAM

DESCRIPTION:**PIC MICRO CONTROLLER****CONCEPTS OF MICROCONTROLLER :**

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. 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.

Microcontrollers are :

- Smaller in size
- Consumes less power
- Inexpensive

Micro controller is a stand alone unit ,which can perform functions on its own without any requirement for additional hardware like i/o ports and external memory.

The heart of the microcontroller is the CPU core. In the past, this has traditionally been based on a 8-bit microprocessor unit. For example Motorola uses a basic 6800 microprocessor core in their 6805/6808 microcontroller devices.

In the recent years, microcontrollers have been developed around specifically designed CPU cores, for example the microchip PIC range of microcontrollers.

LCD DISPLAY:



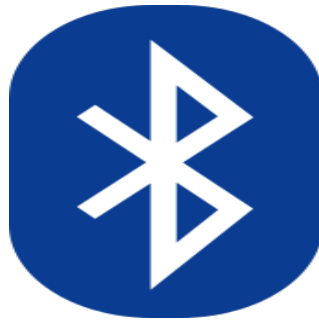
A **liquid crystal display (LCD)** is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly.

They are used in a wide range of applications including: 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.

BLUETOOTH:

Bluetooth is an open wireless technology standard for exchanging data over short distances (using short wavelength radio transmissions) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. Created by telecoms vendor Ericsson in 1994,^[1] it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Today Bluetooth is managed by the Bluetooth Special Interest Group.

IMPLEMENTATION



Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands in the range 2402-2480 MHz. This is in the globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency band.

In Classic Bluetooth, which is also referred to as basic rate (BR) mode, the modulation is Gaussian frequency-shift keying (GFSK). It can achieve a gross data rate of 1 Mbit/s. In extended data rate (EDR) $\pi/4$ -DQPSK and 8DPSK are used, giving 2, and 3 Mbit/s respectively.

Bluetooth is a packet-based protocol with a master-slave structure. One master may communicate with up to 7 slaves in a piconet; all devices share the master's clock. Packet exchange is based on the basic clock, defined by the master, which ticks at 312.5 μ s intervals. Two clock ticks make up a slot of 625 μ s; two slots make up a slot pair of 1250 μ s. In the simple case of single-slot packets the master transmits in even slots and receives in odd slots; the slave, conversely, receives in even slots and transmits in odd slots. Packets may be 1, 3 or 5 slots long but in all cases the master transmit will begin in even slots and the slave transmit in odd slots.

Bluetooth provides a secure way to connect and exchange information between devices such as faxes, mobile phones, telephones, laptops, personal computers, printers, Global Positioning System (GPS) receivers, digital cameras, and video game consoles.

The Bluetooth specifications are developed and licensed by the Bluetooth Special Interest Group (SIG). The Bluetooth SIG consists of more than 13,000 companies in the areas of telecommunication, computing, networking, and consumer electronics.

To be marketed as a Bluetooth device, it must be qualified to standards defined by the SIG.

BATTERY:



An electrical **battery** is one or more electrochemical cells that convert stored chemical energy into electrical energy.^[1] Since the invention of the first battery (or "voltaic pile") in 1800 by Alessandro Volta, batteries have become a common power source for many household and industrial applications. According to a 2005 estimate, the worldwide battery industry generates US\$48 billion in sales each year,^[2] with 6% annual growth.^[3]

DRIVER CIRCUIT:

In electronics, a **driver** is an electrical circuit or other electronic component used to control another circuit or other component, such as a high-power transistor. The term is used, for example, for a specialized computer chip that controls the high-power transistors in AC-to-DC voltage converters. An amplifier can also be considered the driver for loudspeakers, or a constant voltage circuit that keeps an attached component operating within a broad range of input voltages.

The following circuit will allow you to drive a 12V relay using logic voltage (an input of 4V or greater will trip the relay). The circuit has its own 12V power supply making it self contained but the power supply portion can be left out if an external supply will be used. The circuit shows an output from the power supply that can be used to power other devices but it should be noted that the supply is unregulated and not particularly powerful with the parts stated. The 12V DC output is suitable for powering a few LEDs or low voltage lights but should not be used to power other electronic boards or motors.

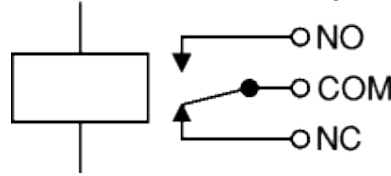
RELAY:

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are doublethrow (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.



Relays are usually SPDT or DPDT but they can have many more sets of switch contacts, for example relays with 4 sets of changeover contacts are readily available. Most relays are designed for PCB mounting but you can solder wires directly to the pins providing you take care to avoid melting the plastic case of the relay. The animated picture shows a working relay with its coil and switch contacts. You can see a lever on the left being attracted by magnetism when the coil is switched on. This lever moves the switch contacts. There is one set of contacts (SPDT) in the foreground and another behind them, making the relay DPDT.



The relay's switch connections are usually labeled COM, NC and NO:

- **COM** = Common, always connect to this, it is the moving part of the switch.
- **NC** = Normally Closed, COM is connected to this when the relay coil is **off**.
- **NO** = Normally Open, COM is connected to this when the relay coil is **on**.

DC MOTOR:



ADVANTAGES:

- This project is used to monitor the soil, water etc.

APPLICATION:

- This project is very useful to monitoring the agricultural.

III. RESULT AND CONCLUSION

In this effective way we are designed a multipurpose robot and its main objective is cultivate plants and weeds in less time to cultivate more agriculture products. The robot can be with open source system instead of normal robotic car. Automation is needed such as industry, bio-medical, survey line etc. Especially in agriculture field for increasing yield of crops. Flexibility of automation system is high than traditional system. Our main objective of this project is advance method to sow, plow, water and cut the crops with minimum man power and labor making it an efficient vehicle using Bluetooth. In this project control is based on smart phone it will work depends user input it will cultivate weeds and automatic irrigation provided for plants. Agriculture technology development is back born of a country to make people healthy. For that we put efforts to design multipurpose robot agriculture for former easy to harvest a plants weeds, and all agriculture foods.

REFERENCES

- [1] P.V.,Shivprakash,"Multipurpose Agricultural Robot", International Journal Of Engineering Research Vol.5, Issue, 06, PP:1129-1254, 20 May 2016.
- [2] Abhishek Gupta, ShaileshKumawat&ShubhamGarg ,"Automatic Plant Watering System", Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-4, 2016.
- [3] Manjuath Pai1, Sandesh Sharma, Chaitra Krishna, Chaithanya, Sandeep S., "A Study on Semi Automatic Vegetable Planting Machine"National Conference on Advances in Mechanical Engineering Science (NCAMES-2016).
- [4] AkhilaGollakota, "A Multipurpose Agricultural Robot ", Birla Institute of Technology and Science, Hyderabad Campus.
- [5] Andrew English, Patrick Ross , Devid Ball, "Learning Crop Models for Vision - Based Guidance of Agricultural Robot", 2015 IEEE / RSG International Conference on Intelligent Robots and System (IROS) , Sept 28-Oct 02 , 2015.
- [6] Swetha S. and Shreeharsha G.H., "Solar Operated Automatic Seed Sowing Machine", International Journal of Advanced Agricultural Sciences and Technology 2015, Volume 4, Issue 1, pp. 67-71.
- [7] Snehal M. Deshmukh, Dr.S.R.Gengaje,"ARM- Based Pesticide Spraying Robot", International Journal of Engineering Research and General Science Volume 3, Issue 3, Part-2, May-June, 2015.
- [8] RanaBiswas, RomitBeed, AnkitaBhaumik, ShamikChakrabarty&RaghavToshniwal,"Solar-Powered Automated Plant/Crop Watering System", International Journal of Advanced Engineering and Global Technology I Vol-03, Issue-01, January 2015.
- [9] Swati D.Sambare, S.S.Belsare," Seed Sowing Using Robotics Technology", International Journal of scientific research and management (IJSRM), Volume- 3, Issue-5, 2015.
- [10] Sriwongras P., Dostal P., "DEVELOPMENT OF SEEDER FOR PLUG TRAY", Department of Technology and Automobile Transport, Faculty of Agronomy, Mendel University in BZemedelska 1, 613 00 Brno, Czech Republic.