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IOT CONTROL SMART IRRIGATION VECHILE

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ABSTRACT
More than 60 percent of the population in the India, agriculture as the primary sector occupation. In recent years, due increase in labor shortage interest has grown for the development of the autonomous vehicles like robots in the agriculture. Here we are fabricating the agriculture machine is a new innovative model which is mainly used to water spraying. Our main aim of this concept is to reduce the man power and also avoid time consumption and to utilize solar energy. The entire assembly is controlled by app which is made on IOT app maker and the brain of this project is the NODE MCU which controls all the motors and pump by receiving signals from the app with help of a wifi module (ESP8266), MCU stores the code which is encoded into it by Arduino encoder. Entire assembly is moved by motors

Keywords— Smart Irrigation, Iot, Automatied Vehical, Remote Sensing

1.Introduction

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 labour, 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 weeding, seed sowing, levelling and 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 water spraying. These functions can be integrated into a single vehicle and then performance

2 DESCRIPTION AND EQUIPMENT

2.1PRINCIPLES OF OPERATION

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" polarization, while green represents a magnet or winding with a "South" polarization). Every DC motor has six basic parts -- axle, rotor (armature), stator, commutator, field magnet(s), and brushes. In most common DC motors, the external magnetic field is produced by high-strength permanent magnets. The stator is the stationary part of the motor -- this includes the motor casing, as well as two or more permanent magnet

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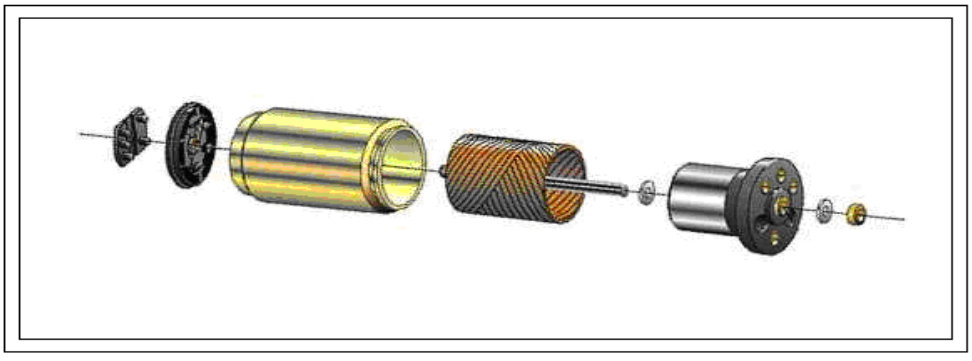
pole pieces. The rotor (together with the axle and attached commutator) rotate with respect to the stator. The rotor consists of windings (generally on a core), the windings being electrically connected to the commutator. The above diagram shows a common motor layout -- with the rotor inside the stator (field) magnets.The geometry of the brushes, commutator contacts, and rotor windings are such that when power is applied, the polarities of the energized winding and the stator magnet(s) are misaligned, and the rotor will rotate until it is almost aligned with the stator's field magnets. As the rotor reaches alignment, the brushes move to the next commutator contacts, and energize the next winding. Given our example two-pole motor, the rotation reverses the direction of current through the rotor winding, leading to a "flip" of the rotor's magnetic field, driving it to continue rotating.
In real life, though, DC motors will always have more than two poles (three is a very common number). In particular, this avoids "dead spots" in the commutator. You can imagine how with our example two-pole motor, if the rotor is exactly at the middle of its rotation (perfectly aligned with the field magnets), it will get "stuck" there. Meanwhile, with a two-pole motor, there is a moment where the commutator shorts out the power supply. This would be bad for the power supply, waste energy, and damage motor components as well. Yet another disadvantage of such a simple motor is that it would exhibit a high amount of torque "ripple" (the amount of torque it could produce is cyclic with the position of the rotor).So since most small DC motors are of a three-pole design, let's tinker with the workings of one via an interactive animation (JavaScript required):A few things from this -- namely, one pole is fully energized at a time (but two others are "partially" energized). As each brush transitions from one commutator contact to the next, one coil's field will rapidly collapse, as the next coil's field will rapidly charge up (this occurs within a few microsecond). We'll see more about the effects of this later, but in the meantime you can see that this is a direct result of the coil windings' series wiring:There's probably no better way to see how an average DC motor is put together, than by just opening one up. Unfortunately this is tedious work, as well as requiring the destruction of a perfectly good motor.The guts of a disassembled Mabuchi FF-030-PN motor (the same model that Solarbotics sells) are available for (on 10 lines / cm graph paper). This is a basic 3-pole DC motor, with 2 brushes and three commutator contacts.The use of an iron core armature (as in the Mabuchi, above) is quite common, and has a number of advantages. First off, the iron core provides a strong, rigid support for the windings -- a particularly important consideration for high-torque motors. The core also conducts heat away from the rotor windings, allowing the motor to be driven harder than might otherwise be the case. Iron core construction is also relatively inexpensive compared with other construction types.But iron core construction also has several disadvantages. The iron armature has a relatively high inertia which limits motor acceleration. This construction also results in high winding inductances which limit brush and commutator life.In small motors, an alternative design is often used which features a 'coreless' armature winding. This design depends upon the coil wire itself for structural integrity. As a result, the armature is hollow, and the permanent magnet can be mounted **inside** the rotor coil. Coreless DC motors have much lower armature inductance than iron-core motors of comparable size, extending brush and commutator life.



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The coreless design also allows manufacturers to build smaller motors; meanwhile, due to the lack of iron in their rotors, coreless motors are somewhat prone to overheating. As a result, this design is generally used just in small, low-power motors. Beamers will most often see coreless DC motors in the form of pager motors.

Again, disassembling a coreless motor can be instructive -- in this case, my hapless victim was a cheap pager vibrator motor. The guts of this disassembled motor are available (on 10 lines / cm graph paper). This is (or more accurately, was) a 3-pole coreless DC motor.

2.2 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 double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. 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.

2.3 PUMP:

A pump is a device used to move gases, liquids or slurries. A pump moves liquids or gases from lower pressure to higher pressure, and overcomes this difference in pressure by adding energy to the system such as a water system. A gas pump is generally called a compressor, except in very low pressure-rise applications, such as in heating, ventilating, and air-conditioning, where the operative equipment consists of fans or blowers.Pumps work by using mechanical forces to push the material, either by physically lifting, or by the force of compression.Hand-operated, reciprocating, positive displacement, water pump. A positive displacement pump causes a liquid or gas to move by trapping a fixed amount of fluid or gas and then forcing displacing that trapped volume into the discharge pipe. They are relatively inexpensive, and are used extensively for pumping water out of bunds, or pumping low volumes of reactants out of storage drums. Conversion of added energy to increase in kinetic energy increase in velocity.Conversion of increased velocity to increase in pressure. Conversion of Kinetic head to Pressure Head. Meet all heads like Kinetic, Potential, and Pressure.Periodic energy addition.Added energy forces displacement of fluid in an enclosed volume.Fluid displacement results in direct increase in pressure. One sort of pump once common worldwide was a hand-powered water pump over a water well where people could work it to extract water, before most houses had individual water supplies.

Hand operated pumps are considered the most sustainable low cost option for safe water supply in resource settings, A hand pump opens access to deeper groundwater that is often not polluted and also improves the safety of a well by protecting the water source from contaminated buckets. This means that communities are often stuck without spares and cannot use their hand pump anymore and have to go back to traditional and sometimes distant, polluted resources. This is unfortunate, as water projects often have put in a lot of resources to provide that community with a hand pump.

2.4 WHEEL

A wheel is a circular device that is capable of rotating on its axis, facilitating movement or transportation or performing labor in machines. A wheel together with an axle overcomes friction by

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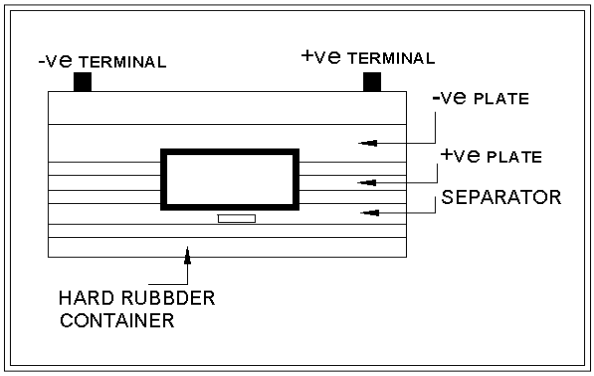
facilitating motion by rolling. In order for wheels to rotate a moment needs to be applied to the wheel about its axis, either by way of gravity or by application of another external force. Common examples are found in transport applications. More generally the term is also used for other circular objects that rotate or turn, such as a Ship's wheel and flywheel. The wheel most likely originated in ancient.The wheel is a device that enables efficient movement of an object across a surface where there is a force pressing the object to the surface. Common examples are a cart drawn by a horse, and the rollers on an aircraft flap mechanism.The wheel is not a machine, and should not be confused with the wheel and axle, one of the simple machines. A driven wheel is a special case that is a wheel and axle. Wheels are used in conjunction with axles, either the wheel turns on the axle or the axle turns in the object body

2.5 BATTERY

In our project we are using secondary type battery. It is rechargeable type. A battery is one or more electrochemical cells, which store chemical energy and make it available as electric current. There are two types of batteries, primary (disposable) and secondary (rechargeable), both of which convert chemical energy to electrical energy. Primary batteries can only be used once because they use up their chemicals in an irreversible reaction. Secondary batteries can be recharged because the chemical reactions they use are reversible; they are recharged by running a charging current through the battery, but in the opposite direction of the discharge current. Secondary, also called rechargeable batteries can be charged and discharged many times before wearing out. After wearing out some batteries can be recycled.Batteries have gained popularity as they became portable and useful for many purposes. The use of batteries has created many environmental concerns, such as toxic metal pollution. A battery is a device that converts chemical energy directly to electrical energy it consists of one or more voltaic cells. Each voltaic cell consists of two half cells connected in series by a conductive electrolyte. One half-cell is the positive electrode, and the other is the negative electrode. The electrodes do not touch each other but are electrically connected by the electrolyte, which can be either solid or liquid. A battery can be simply modeled as a perfect voltage source which has its own resistance, the resulting voltage across the load depends on the ratio of the battery's internal resistance to the resistance of the load.



3 CONTROL UNIT:

Microcontrollers are destined to play an increasingly important role in revolutionizing various industries and influencing our day to day life more strongly than one can imagine. Since its emergence in the early 1980's the microcontroller has been recognized as a general purpose building block for intelligent digital systems. It is finding using diverse area, starting from simple children's toys to highly complex spacecraft. Because of its versatility and many advantages, the application domain has spread in all conceivable directions, making it ubiquitous.

3.1 ESP8266 WIFI MODULE

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an

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application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

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4 BLYNK APPLICATION

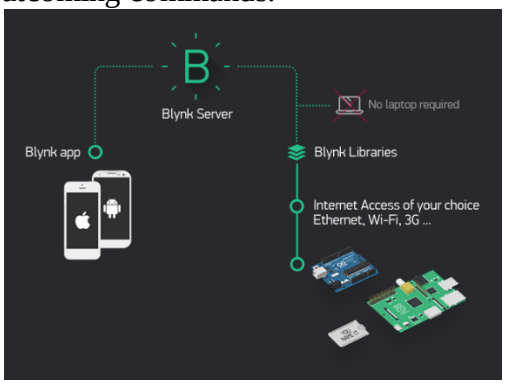
Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things.

There are three major components in the platform:

Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide.

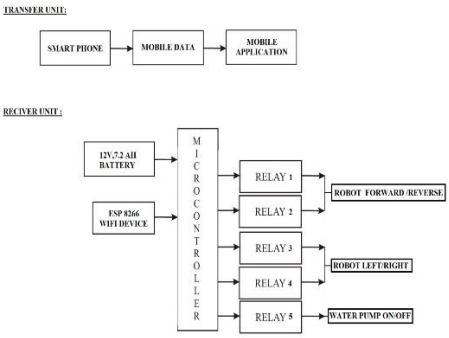
Blynk Server - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.

Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.



5 DESIGN AND DRAWING

5.1 BLOCK DRAWING



6 WORKING PRINCIPLE

In our project all the components are placed on the base frame. There are four wheels to move this machine. The spraying nozzle is coupled with the motor to spray for moving the nozzle. Then the water is pumped from the water tank to the sprayer nozzle. All motors are taken the energy from the storage battery. The battery is charged by the sun light by using the solar panel which is attached in this vehicle. After all the motors are switched ON, then the vehicle can be moved by remote control over the agricultural field.

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CONCLUSION

The project carried out by us made an impressing task in the field of agricultural sector. The multi utility agricultural machine is very usefully for the workers to carry out a number of operations in a single machine. All the parts are arranged in such a way that in every stage of agriculture, the equipment can be rearranged to perform the specified action. Our team has successfully combined many ideas from various fields of mechanical engineering and agricultural knowledge to improve the yield and by reducing the labour effort and expenses. The whole idea about multipurpose equipment is a new concept, patentable and can be successfully implemented in real life situations. More operations can be included to the vehicle like soil leveler, grass cutter and many other machines for various operations. Also engine can be used to drive the equipment which will reduce the work load. The tyre can be changed according to the type of the land. The plough tool tip arrangement is made separately, so in case of breakage the tip of the tool is alone changed. A steering mechanism can also be done for the ease

REFERENCES

1. M.V. Achutha, Sharath Chandra.N.,Natraj .G.K "Design and analysis of multipurpose farm equipment" IJIRAE ISSN:2349-2763 Issue 02,Vol.3 (Feb.2016)
2. Nitin Kumar Mishra , Shaswat Khare , Sumit Singh "Multi-purpose Agricultural Machine" ISSN:2321-9009 Vol.5,ISS-1,Spl. Issue -2 Feb-2017
3. P. Vijay , K.V.N.Rakesh, B. Varun, "Design of a Multi purpose seed sower cum plougher" IJETAE , ISSN 2250- 2459 Vol.3,Issue-4, Apr-2013
4. D.A. Mada, Sunday Mahai, "The Role of Agricultural Mechanization in the Economic Development for Small Scale Farms In Adamawa State",The International Journal Of Engineering And Science (IJES) Volume 2, Issue 11, Pages 91-96 , 2013 , ISSN (e): 2319 – 1813 ISSN(P): 2319-1805 – Nov-2013
5. V.K. Tewari, A. Ashok Kumar, Satya Prakash Kumar, Brajesh Nare, "Farm mechanization status of West Bengal in India", Basic Research Journal of Agricultural Science and Review ISSN 2315 6880 Vol. 1(6) pp. 139-146 Dec-
2012
6. David D. Wilson and John H. Lumkes "Design of a multipurpose agricultural vehicle and attachments for developing countrie", Agric Eng Int: CIGR Journal Open access at http://www.cigrjournal.org Special issue 2015.
7. Dr. C.N. Saklhale, Prof. S.N. Waghmare "Multipurpose farm machine", IRJET,ISSN:2395-0056 Vol.3 Issue-09 , Sep-2016
8. Mohammad Muneer Uz Zaman "Design of Rotary Tiller With Grass Cutter" International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 3 Issue: 2 079– 083, Feb-2015
9. M.G.Jadhav , Prof. J.K. Sawale , "Design and fabrication of manually operated weeder with pesticides sprayer" , IRJET ISSN : 2395-0056 Vol. 3 Issue12 , Dec-2016 International Journal of Scientific & Engineering Research Volume 9, Issue 5, May-2018 ISSN 2229-5518
10. Dhiraj N. Kumbhare , Vishal Singh,"Fabrication of automatic pesticides spraying machine", IRJET,ISSN:2395- 0056,Vol.3 Issue-04 Apr-2016
11. Siddharth Kshirsagar , Vaibhav Dadmal , Prashnt Umak, "Design and development of agriculture sprayer vehicle" EISSN 2277-4106,P-ISSN 2347-5161 spl Issue-4 March-2016
12. Sanjay S , Sridhar R , "Design and fabrication of mechanical pest sprayer", IJIRSET, ISSN:2319-8753, Vol. 4 Spl Issue 10, Aug-2015