

Agri Bot – Gsm Based Smart Automated Control For Seed Sowing and Grass Cutting System

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Abstract- Agricultural Robot for easy farming and helpful to farmers .Nowadays there are no one to do farming so we chose this to make it easy and we added the seed sowing concept and grass cutting .In agricultural field numerous operations are being performed by the farmers and some of these tasks are so tiring. So to reduce the hard work of these laborers we are designing a method that makes the process easy and quite understandable to the users. There also exist methods of seeding and grass cutting but it does not come handy and often deals with lot of difficulties which in turn causes lot of trouble to the users. Sometimes the user find trouble in handling these machines and often leads to failure. Therefore we are designing this process of seed sowing in such a way that it does not faces the trouble as of the existing system. it functions with a mechanism in which seed are sowed uniformly in the field with the motor of 100 rpm which is being controlled by the users through GSM technology. We are also adding grass cutter which helps to weed out the crops and plants while seeding and can even perform the task individually in the field.both these process can perform simultaneously. It is focused to reduce the problems of the existing system and to provide an efficient way of farming.

Keywords- ARDUINO,GSM ,SEED SOWING,GRASS CUTTER.

I. INTRODUCTION

In olden days technology was not developed that much. So they were seeding plowing and plant cutting are done by hand. But nowadays technology is developed. So now it's not necessary to do seeding in sunlight. By the use of robot technology one can sit in a cool place and can do seeding by monitoring the robot motion. Today's agricultural field need to find unique ways to process the agriculture in a effective way.In the field of agriculture various problems are faced by the farmers in the operations like seed sowing, plowing, and waste planet cutting, weeding.The equipments used to perform the agricultural operations are very heavy. Due to migration of human's in the cities the labour problem occurs. Nowadays

robotics technology plays a prominent role in various fields and organization In many countries uses robots to perform different operations in the agricultural field. We can make the use of available technologies and the robotics technology in the farming system to reduce the efforts of farmers and also to reduce time, energy and required cost.

II. RELATED WORKS

In PIC microcontroller ,we have already programmed the robots working.when the robots starts moving in forward motion after few distance it stops and then it starts drilling with a help of drilling machine mechanism[5]. The user communicates through SMS with the centralized unit. This centralized unit communicates with the system through SMS which will be received by the GSM with the help of the SIM (Subscriber Identity Module) card [2] . Liquid crystals that does not emit light directly and are thin and flat and consume very small amount of power compared to LED displays and cathode Ray Tubes. LCD is having totally 16 pins. LCD is connected to P0.22, P0.28 and P1.16 to P1.25[2]. Prashant G. Salunkhe[1] In present day, the agricultural field requires the advance technologies in the process of sowing, cropping, cutting.The advancement in technology will increase the efficiency of getting new crops.

Rotating motion of wheels are applied to the sowing shaft through sprocket or belt drive. Because of this shaft will rotates and drop the seed from hopeer or seed meter box to the digger through the hose for digging purpose. For one revolution of shaft only one seed is required to deposit this function can be fulfill by using bush[4]. The Robotics system is an electromechanical and artificial agent which is sterred by DC motor which has four wheels.The machine can be controlled remotely .Assembly language is used in programming the microcontrollers[5]. Deekshitha K P[3] examined the present Agricultural Robot to perform plowing, seeding and grass cutting in fields. The architectural hardware reduces the labor work. The input applications are provided to

the robot and by using GSM, the communication with the robot is made easier.

III. PROPOSED SYSTEM

The main objective of the proposed system is to reduce the efforts of a farmer. The seeds are sowed in the field according to the instructions given by the user the robot move in forward, reverse, left and right direction to drop the seeds at a particular position. A ground wheel is attached at the base of the seed sowing machine. The power transmission system is used to transmit the motion of the rotation to the metering mechanism. The metering mechanism contains number of scoops to drop out the seeds from the hopper. The seeds are then transmitted in the seed distributor pipes. Flexible and compatible pipes can be used to distribute seeds. Four wheels are connected at the base for the flexible movement of robot. DC motors are used to drive the wheels connected to the robot. GSM are used for send information to robot machine. LCD are used display for displaying the process. This system has three main sections like seeding, plowing and waste plant cutting, which are inter-communicated using communication technologies. The grass cutting is used to weed out the unwanted crops or plants with the help of rotator blade which spins at the rate of 1000rpm DC motor. A relay control switch is used to control both the seed sowing and grass cutting process.

Advantages of proposed system:

The proposed approach avoids wastage of seeds when compared to manual operation and it also uses grass cutter to weed out the unwanted. In this an android application will be given to communicate with the robot. This communication is done through GSM. Some of the system features is to provide information to the farmers about seeding and grass cutting and updation him about these information.

IV. SYSTEM COMPONENTS

HARDWARE DESCRIPTION

There are 5 main hardware components used in our project namely,

- 3.1.1 ARDUINO
- 3.1.2 GSM
- 3.1.3 LCD
- 3.1.4 DC MOTOR
- 3.1.5 Battery

3.1.1 ARDUINO

- Microcontroller development board originally aimed towards students
- Contains open-source hardware and software.
- Various boards and revisions for project needs
- Requires no prior programming experience and is cross platform
- Heavily influencing IoT and DIY solutions

The arduino microcontroller is single board computer that has clinch considerable attraction in professional market. we can write programs and create interface circuits and also to control motors and lights in arduino board. The Arduino programming language is a reduced the complexity of C/C++, only a few commands of C are needed to perform useful functions. The significant feature of the Arduino is that you can create a control program on the host PC and download it to the Arduino then it will run automatically. Remove the USB cable connection to the PC, and when you push the reset button the program will still run from the top everytime. First remove the battery of Arduino board and hold on in a closet for about six months. The last program you stored will run when your reconnecting the battery. The last program you stored will run when your reconnecting the battery. It insist that you connect the board to the host PC inorder to develop and debug your program, but once that is done, you no longer need the PC to run the program.



Figure ARDUINO board

GSM FRAMEWORK

A GSM network include the following components:
 A Mobile Station: It is the mobile phone which contains the transceiver, the display and the processor and is controlled through a SIM card processing over the network.
 Base Station Subsystem: It will work as an interface between the mobile station and the network subsystem. It composed of Base Transceiver Station which incorporate the radio transceivers and it handles the protocols for communication with mobiles. It also composed of the Base Station Controller which controls the Base Transceiver station and work as a interface between the mobile station and mobile switching centre. Network

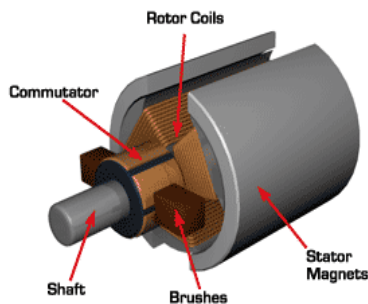
Subsystem: It supplies the basic network connection to the mobile stations. The basic chunk of the Network Subsystem is the Mobile Service Switching Centre; it will supply approach to different networks like ISDN, PSTN etc. It also comprises of the Home Location Register and the Visitor Location Register which supply the call routing and roaming capabilities of GSM. It also comprises the Equipment Identity Register which will take care of an account of all the mobile equipments wherein each mobile is pinpointed by its own IMEI number.

LCD

The Liquid crystals that does not emit light directly and are thin and flat and consume very small amount of power compared to LED displays and cathode Ray Tubes.

DC MOTOR

It is utilized to turn direct current electrical energy into mechanical energy.



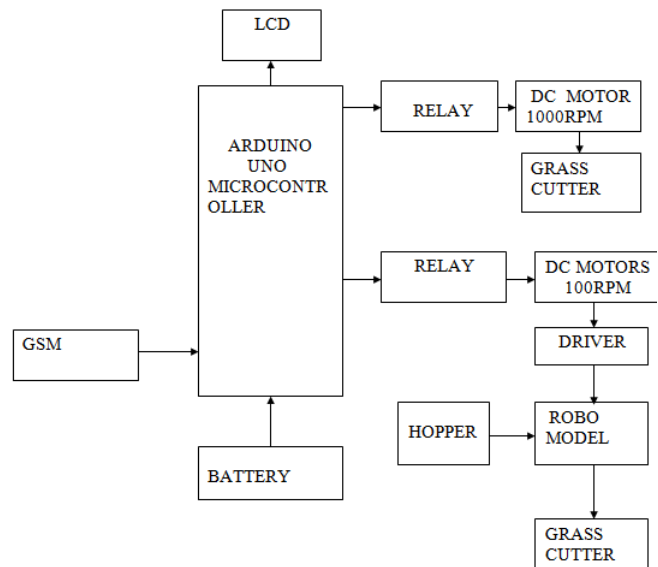
BATTERY

It is a device of one or more electrochemical cells and it will power the electrical devices like electric cars, flash light through external connections supplier. When a battery is distributing electric power, its positive terminal is the cathode and its negative terminal is the anode.

GRASS CUTTER

The grass cutting is used to weed out the unwanted crops or plants with the help of rotator blade which spins at the rate of 1000rpm DC motor. A relay control switch is used to control both the seed sowing and grass cutting process.

BLOCK DIAGRAM



IMPLEMENTATION

1. Initially input the pitch at which it is expected to sow the seed using numerical key pad provided on the machine and initiates the seed sowing sequence.
2. The data input is provided to the ARUDINO, which is mounted in the machine to processes the input data.
3. Depending on the pitch, the machine then moves through the distance specified in the pitch(moves forward,backward and sideways)
4. The distance is calculated using rotary encoders.
5. When the machine covers the respective distance the machine stops to sow the seed. When the machine stops the ARUDINO signals the seed sowing mechanism to sow the seed at specified pitch.
6. Seed sowing mechanism is responsible for sowing the seeds at a particular pitch. It consists of hopper in which seeds are added and a small plough which digs the field .
7. The machine can run using battery.
8. The grass cutter is used to weed out the unwanted crops and to make the seed sowing process more efficient.

Stepwise implementation of the hardware circuit

The algorithm for the system is given as follows,

The ARDUINO board has been programmed with a robots working

- Step 1:** Initialize the ports of the microcontroller.
- Step 2:** Assigning the pins of inputs and outputs.
- Step 3:** Enabling the LEAD ACID battery by connecting wires.
- Step 4:** Start execution.
- Step 5:** Send the messages to SIM to control the movement of agri rob to move the wheels.

Step 6: Drivers to control the movement of agri robo

Step 7: Rotary wheels are connected to move the robot

Step 8: Send message to the sim connected with a kit via GSM to start the kit

- Send *f to move the kit forward.
- Send *b to move the kit backward
- Send *l to move the kit left side
- Send *r to move the kit to in right side and also to rotate
- Send *s to stop the kit

Step 9: LCD 16*2 which is 16 characters and 2 lengths will display the message received by the sim that is locked with a kit

Step 11: seeds are sowed with the help of hopper in the intervals of 180 degree.

Step 12: Switch on the relay which enable a DC motor of 1000rpm which operates grass cutter to weed out the grasses

Step 13: weed out process is performed with a help of grass cutter which rotates in a speed of 1000rpm

VI. RESULTS AND OUTCOMES

Figure 1.1 shows the entire kit of the proposed system. The system is integrated with components such as Arduino uno, GSM that displays the operations performed, DC motors for seed sowing and grass cutter, driver which controls the movement of the robot, battery, sim holder.



Figure LCD

Step 10: Switch on the relay which will enable a DC motor of 100rpm to sow the seeds from nozzle

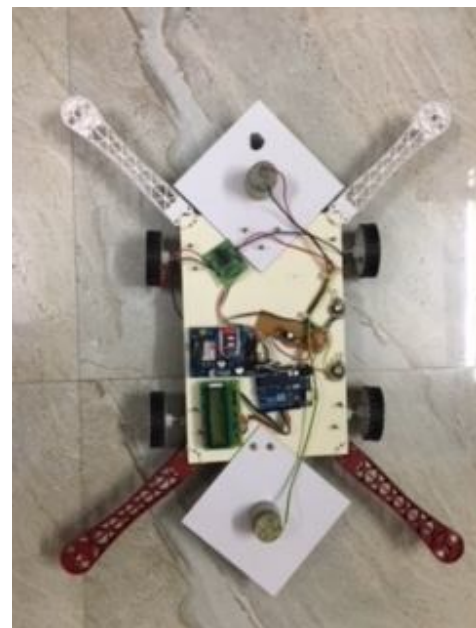


Fig 1.1

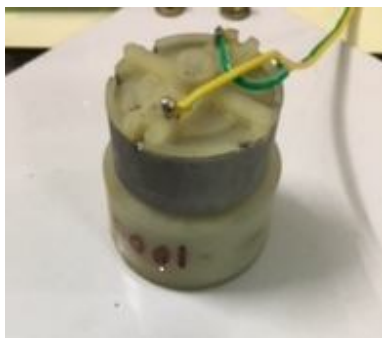


Figure DC motor of 100rpm

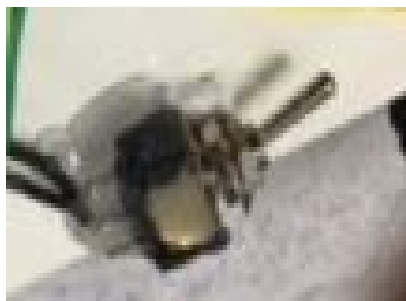


Figure relay control switch

Agri bot is used to sow seeds and to weed out the crops and plants in the field thus by reducing the labour. figure 1.2 shows the process of seed sowing which is operated with the of DC motor that makes it to rotate at the speed of 100 RPM. figure 1.3 shows the LCD display that reads the message sent by the user and perform the actions according to the message it reads. figure 1.4 shows the rotator blade called grass cutter that weeds out the crops. This is performed with the help of DC motor of 1000 RPM .



Fig 1.2



Fig 1.3



Fig 1.4

VII. COMPARATIVE STUDY

S.NO	PARAMETER	MANUAL	TRACTOR	AGRICULTURAL SYSTEM
1	MAN POWER	more	Moderate	Less
2	TIME REQUIRED	more	Less	Less
3	SOWING TECHNIQUE	manually	manually	Automatically
4	WASTAGE OF SEEDS	not fixed	not fixed	Fixed
5	ENERGY REQUIRED	moderate	Less	Less
6	POLLUTION	high	very high	Less
7	GRASS CUTTING	manual	manual	switch control

VIII. CONCLUSION AND FUTURE WORKS

Seed sowing in agricultural areas is extremely important. Increase in the demand for man power in the working field has always been a great concern , nowadays Usage of resources is optimal which has been provided with greater extent by automation technology. Since earlier days farmer is supposed to visit their agricultural land and check the land to sow seeds and to weed out the crops. To avoid

more human efforts this technology used. It allows the user to monitor and also maintain the moisture remotely regardless of time. It is really effective and economic way to reduce human effort in agriculture land. Current problems in agriculture are less man power and availability of human resource . So, as explained the GSM can help farmer in many ways. The system has a huge demand and future scope too. It allows a lot of development within it and leads to the standard and useful system which can be used vary widely in agricultural field. Thus, project is proposed out using ARUDINO core with the help of GSM. After considering different advantages and disadvantages of the existing machine, it is concluded that the automated robotic vehicle for farmers can 1. Maintain row spacing 2. Proper utilization of seeds can be done with less loss. 3. Perform the various simultaneous operations and hence saves labor requirement, labor cost, labor time, total cost of saving and can be affordable for the farmers. 4. Achieves automation in agricultural field. The future work can be the following,

- Bring the entire setup to a compact size which makes the integration easy.
- Seed sowing can adopt different algorithms to reduce the wastage of seeds.
- Any data analytics algorithm can be applied on the data collected using IoT to develop a prescriptive analytics system.
- Introduction of Cutter in place of drill can be used as grass cutter equipment.
- Addition of multi-hopper can be attached side by side forsowing of large farm.

REFERENCES

[1] Low-Cost Wireless Monitoring and Decision Support for Water Saving in Agriculture F. Viani, Member, IEEE, M. Bertolli, M. Salucci, Member, IEEE, and A. Polo Student Member, IEEE

[2] GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile Pavithra D. S1, M. S .Srinath2 1PG Student, Department of ME, MCE, Hassan, India.2Associate Professor, Department of ME, MCE, Hassan, India.

[3] MULTIPURPOSE SEED SOWING MACHINE Raut Madhuri1, Prof. P.S.Gorane2, Pawar Ganesh 3, Patil Shubham4, Patil Nikhil5 2professors: Department of Mechanical Engineering, Gsmcoe Balewadi Pune, (India) 1,3,4,5 Department of Mechanical Engineering, Gsmcoe Balewadi Pune, (India)

- [4] Abdulrahman ,Mangesh Koli, Ahmadakbar Department of Computer Science and Engineering District Palghar Maharashtra – IndiaIndiaIndia
- [5] <http://syslog.co.in/embedded-projects/electrical-projects/seed%20sowing%20plowing%20and%20waste%20grass%20cutting%20robot%20with%20android%20application.pdf>
- [6] <http://www.ijerm.in/v3-i5/26%20ijerm.pdf>
- [7] http://www.kscst.iisc.ernet.in/spp/39_series/SPP39S/02_Exhibition_Projects/217_39S_BE_0598.pdf
- [8] <http://www.iosrjournals.org/iosr-jmce/papers/vol11-issue4/Version-1/I011414955.pdf>
- [9] <http://www.ijecs.in/index.php/ijecs/article/download/3980/3748>
- [10] http://www.iraj.in/journal/journal_file/journal_pdf/1-120-142815460354-56.pdf
- [11] http://www.ijritcc.org/download/browse/Volume_5_Issue_s/February_17_Volume_5_Issue_2/1489565958_15-03-2017.pdf
- [12] http://www.me.umn.edu/courses/me2011/arduino/arduino_Guide.pdf
- [13] http://www.ijates.com/images/short_pdf/1482815378_P521-529.pdf
- [14] <http://www.rroj.com/open-access/robotic-agriculture-machine.pdf>
- [15] http://www.kscst.iisc.ernet.in/spp/38_series/spp38s/synopsis_exhibition/150_38S1386.pdf