International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.05, March 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

FABRICATION AND IMPROVEMENT IN AGRICULTURE MACHINE

Abhijit Phaltane[1], Gopal Kayasth[2], Anil Dapekar[3]

[1,2,3](Dept. of Mechanical Engg. V.P.S.C.O.E.Lonawala/ SPPU-Pune, Maharashtra, India)

ABSTRACT

This project strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing, pesticide spraying and levelling by using solar panel electric automatic system. The main component here is the microcontroller that supervises the entire process. Initially the robot tills the entire field and proceeds to ploughing, simultaneously dispensing seeds side by side and levelling with water and pesticide spraying. The main aim of this is to avoid waste in various process and fatigue of human life with eco-friendly.

Keywords - levelling, ploughing, pesticide spraying, seed dispensing, solar panel, solar tracker

I.INTRODUCTION

Indian modern agriculture development does not have sufficient skilled labor to trade off new technology. The problem focused here is direct seeding, working with huge hours or manpower. So, it is mandatory to automate this sector and a progressive innovation becomes necessity for raising the demand on agro product quality. To give an solution of these problems, a sensor guided rover for digging, precise seed positioning and levelling and spraying liquids has been proposed to reduce the human effort and also to increase the yield. The rover's navigation is performed by remote guiding devices fortified with the positioning system by solar called automated.

Indian economics base on agriculture field development in agriculture lead to raise to economic status of country. In India farmer are facing problem due to unavailability of labor. Also traditional way of farming equipment which takes lots of time and it also increases labor cost.

The idea of applying robotic technology in agriculture is very new. In agriculture the opportunities for robot enhanced productivity are immense and the robot is appearing on the farm in increasing number. We can expect the robot performing agriculture operation autonomously such as mechanical digging, seed sowing, and spraying, and levelling.

The automation in agriculture filed could be more effective and efficient. It works on daily working hours, free stress and fatigue from human life ,to reduce electricity consumption environmental all impact and safety issues and most important is to reduce framer effort.

II.LITERATURE REVIEW

In the current scenario most of us have come across the atomization in various fields as the advancement of technology has to a lead tremendous development in the industrial products that have made our lives a lot easier and helpful than what our ancestors faced. The advancements especially in the field of agriculture have helped evolve a new era of development and growth of different developing countries. The atomization in this field has been a trademark for the people who are completely dependent on agriculture for their survival and other needs. Accordingly a report made says that most of the agriculture equipment's that are been projected in various fields, that is either by researchers or by the engineers are practically very difficult to implement. These equipment's made are mostly very complex in terms of field operation or are either less efficient as they are implemented based upon on the basic concept from the design point of view. Many of the other devices developed based upon the concept of seed sowing and fertilizing are either a single application devices or they are very less efficient. As these devices are developed taking in point the present scenario in the field of agriculture these devices are hence forth based upon the basic concept model and are practically inefficient to implement as these are designed to work in single rows which can be done more efficiently using manpower.

Thus in order to overcome these issues we are making an effort to develop a model which could be more efficient when being implanted on the practical basis.

2.1 Automated robot for seed sowing and fertilizer spraying along with weed remover based on msp430 controller

R. D. Kumare and S. Deshapande:

In the current scenario most of the countries do not have sufficient skilled manpower specifically in agricultural sector and it affects the growth of developing countries. So it's a time to automate the sector to overcome this problem. An innovative idea of our project is to automate the process of sowing crops such as sunflower, baby corn, groundnut, cotton and vegetables like beans, lady's finger, pumpkin and pulses like black gram, green gram etc to reduce the human effort and increase the yield.

The plantations of seeds are automatically done by using DC motor. The distance between the two seeds are controlled and varied by using Microcontroller. It is also possible to cultivate different kinds of seeds with different distance. Also the project consists of sprinkler, which would be used for reducing the wastage of fertilizers that is done by spraying appropriate amount of fertilizers required for the particular crop. The sprinkler would sprinkle on the senses from wheel movement and the on and off of the sprinkler would be controlled by Microcontroller. When the Robot reaches the end of the field we can change the direction with the help of remote switches. The whole process is controlled by Microcontroller.

2.2 Agriculture Based Robot (AGRIBOT)

S. Chavan1, A. Dongare:

Many countries in Asia including India are agrarian economies and most of their rural populations depend on agriculture to earn their livelihood. Aimed at increasing the productivity and reducing the labor involved, this robot is designed to execute the basic functions required to be carried out in farms. We aim to create a multitasking agriculture robot which will focus on basic work of plantation. To sow the seeds a robotic arm will dig to a precise depth with equal distance between the seeds. At bottom of robot water pump will be placed and as per the requirement water will be sprinkled. The right amount of fertilizer will be spread over the seed.

INTRODUCTION

Now a day's most of the countries do not have sufficient human factor in agricultural sector and it affects the growth of developing countries. So it's time to automate the sector to overcome this problem. In India, 70% people depends on agriculture. So we need to study the agriculture. Innovative idea of our Project is to automate the process of sowing crops such as groundnut, baby corn, sunflower and so on .The farming system like plugging, cultivating, weeding, harvesting, etc. is the different process. All the processes are advance to modifying the mechanism in farming which works automatically without the man power requirement. Manually seed plantation method suffers from various problems. The tendency of manual work is going on reducing. The man power shortage is one of the biggest problems faced continuously to all farmers. Due to labor shortage the plantation cost should be increased. So it is not economically beneficial for all farmers. Now a day's instrumentation and control system plays an important role. So we develop a system for "seed plantation robot" using microcontroller which is very economical and beneficial. Due to automation the work become easiest, errorless and it saves money also. Our system is nothing but the four tyre vehicle which is driven by geared DC motor. According to microcontroller program, after some distance or some time instant the seed should be dropped through the nozzle, which is operated by relay. Nozzle size is depends on the diameter of the seed. Same operation is repeated after some time delay. So there is no more labour work. It gives information about weather conditions for seed plantation. Hence all the problems of conventional method are overcome by using this system

2.3 Automated Agribusiness Furrowing Seeding and Grass Cutting Utilizing Android Smartphone

K. P. Deekshitha, P. Prasanna:

Aims on the design, development & the fabrication of the robot which can put the seeds, dig
the soil, plough the land, cutting the waste plant these whole systems of robot works with battery. In India near about 70% people dependent on agriculture. So the agriculture system in India should be advanced to reduce the efforts of farmers. Various operations are performed in the agriculture field like seeding, weeding, waste plant cutting, plowing etc. Very basic operation is seeding, plowing & plant cutting. But the present method of seeding, plowing & plant cutting are problematic. The equipment's used for seed sowing are very difficult and inconvenient to handle. So there is a need to develop equipment which will reduce the man power. The machine can be advanced for sowing seeds in farm with particular distance between seed is adjusted. In this paper robot

direction is provided by using Software programming. By using that proper direction is given to the robot. The farm is not the straight line and smooth. If any obstacle is occurred like stone, electric light pole, trees etc. the automatically robot get stop. Agriculture is the main occupation. So this system in India should be advanced to reduce the efforts of farmers.

Agriculture is the cultivation and breeding of animals, plants and fungi for food, fiber, bio fuel, medicinal plants and other products used to sustain and enhance human life. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that nurtured the development of civilization. The study of agriculture is known as agricultural science. The history of agriculture dates back thousands of years, and its development has been driven and defined by greatly different climates, cultures, and technologies. Industrial agriculture based on large-scale monoculture farming has become the dominant agricultural methodology. The machine can be advanced for sowing seeds in farm with particular distance between seed is adjusted. It cans automatically sowing seed in land. It can be also used fertilizer sowing instead of seed. The basic requirements of this machine for small scale cropping, they should be suitable for small farms, simple in design and technology and versatile for use in different farm operations. An automatically operated template row planting will designed and developed to improve planting efficiency and reduce drudgery involved in manual planting method. Seed planting is also possible for different size of seed at variable depth and space between two seeds. In the present era the vast majority of the nations don't have adequate talented labor particularly in agrarian area and it influences the development of creating nations. So it's an opportunity to computerize the area to defeat this issue. Remote control applications, all things considered, seem to an ever increasing extent, particularly in farming. Industry assumes an essential part. Presently a day's Robotics is a piece of today's correspondence and correspondence is a piece of progression of innovation, so chosen to take a shot at Robotic field, and plan something which will make human life today's perspective. There are distinctive sorts of portable robots which can be separated into a few classifications comprises of wheeled robot, creeping robot and legged robot. This venture manages a wheeled self-sufficient Robot. It is the piece of Automation; Robot has adequate knowledge to cover the most extreme territory. This venture work depicted here is very helpful in the rural fields. The venture points on the plan, advancement and manufacture of the exhibition unit of the venture "Automated Agribusiness furrowing seeding and grass cutting utilizing Android
Smartphone".

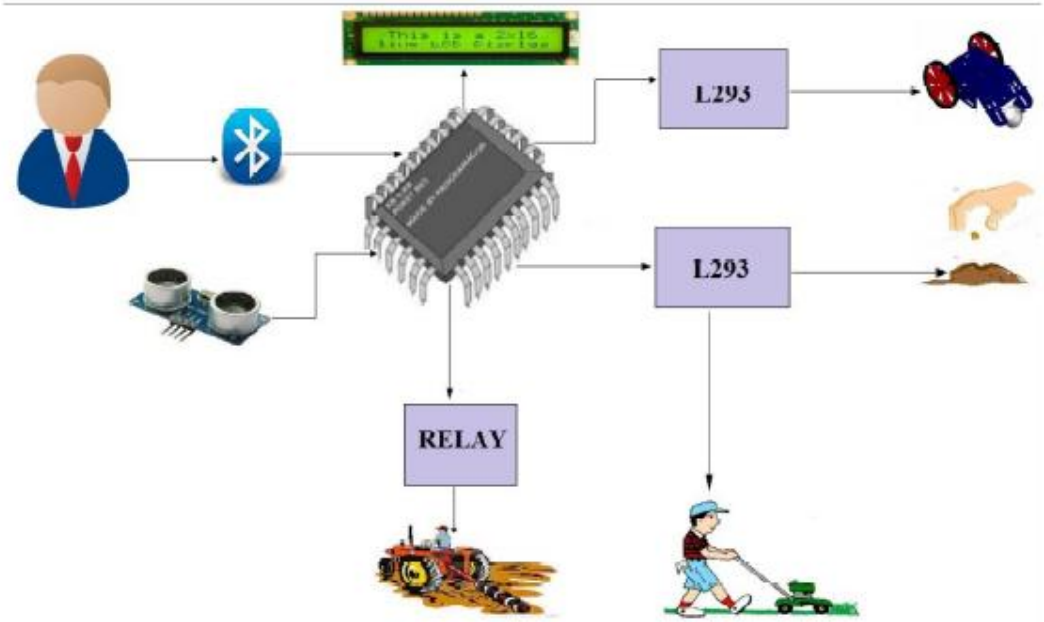


Fig.2.3.1 Operation Block Graph

Fig. 2.3.1 Operation Block graph shows for the most part contains (ultrasonic sensor) Bluetooth module, microcontroller, L293, hand-off, LCD and Power supply. These modules are incorporated to do a solitary assignment. The proposed framework is controlled with Renesas 64 stick microcontroller. Here, Bluetooth will send the contribution to the microcontroller. Microcontroller takes just advanced info. Robot machine can't read computerized input so L293 is a Motor driver circuit that believers advanced flag to simple or mechanical info. Engines are appended to robot machine that is controlled by driver circuit. To do development, engines are required. Driver circuit is utilized to control speed. In Seeding valve there is opening and shutting development. At right position it will open and close, will settle some deferral. Ultrasonic sensors will distinguish the plants. Plant cutting is finished by engines. Transfer is an exchanging operation and furrowing is performed.

Flowchart of the overall System

Figure 2.3.2 shows the flow of events in overall system. The user activates Bluetooth Once connection is established user selects any of the operation like seeding, plowing and waste grass cutting is performed until the stop signal is received Fig

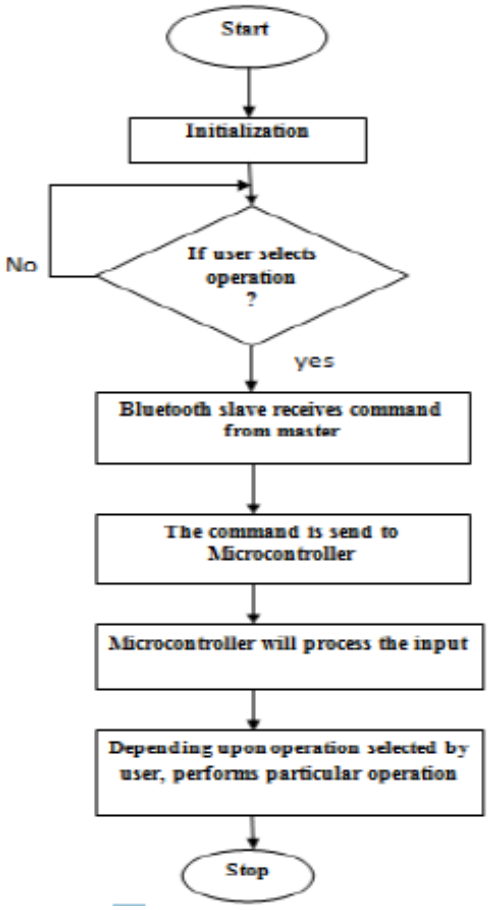


Fig2.3.2: Overall Flowchart of the System

Bluetooth module

Fig.2.3.1 shows HC-05 Bluetooth module is a serial port convention module. It is a simple to utilize "Bluetooth" and intended for straight forward remote serial association setup.HC05 Bluetooth module was associated with the same microcontroller to set up a duplex correspondence channel amongst itself and the android advanced Mobile Phones.

Fig 2.3.1 : Bluetooth Module

2.4 Design and Manufacturing of Robot for Digging and Seeding in Agriculture

S. Thawali :

The main area of application of robots in agriculture is at the harvesting stage, digging, ploughing and seeding. This robot is designed to replace human labor. The jobs involved in agriculture are not straightforward and many repetitive tasks are not required to do, so the agricultural industry is behind other industries in using robots. This paper represents a robot capable of performing operations like automatic ploughing, seed dispensing and pesticide spraying. It also provides manual control when required. The main component here is the microcontroller that supervises the entire process. Initially the robot digs the entire field simultaneously dispensing seeds side by side. On the field the robot operates on automated mode. For manual control the robot uses the Remote controller as control device and helps in the navigation of the robot on the field**.**

Autonomous agricultural robots are an alternative to the tractors found on fields today. Cultivation tasks like seeding, spraying, fertilizing and harvesting may be performed by autonomous agricultural robots in the future. To reach a full utilization the agricultural robot needs to be a vehicle with some basic capabilities and the possibility to support multiple applications. In the current generation, man power shortage is a major problem specifically in agricultural sector and it affects the growth of developing countries. In India at most 70% of people are dependent on agriculture. The revolutionary invention in agriculture system is becoming an important task because of rising demand on quality of agriculture products and lack of labor availability in rural farming areas.

Today agricultural robots can be classified into several groups: harvesting or picking, planting, pest control, or maintenance. It is unlike the robots that used in factories for building cars. Robots on farms have to operate according to nature. Robots that are used in factories don't have to deal with uneven environmental conditions or changing in environmental conditions. Commonly digging operation on the field is done by using bull or by tractor and the method of sowing the seeds are by hand. Later, the seeds are sowed through holes in bamboo attached to a plough. For example, sowing seeds in small areas they employ dibbling method i.e., making holes or slits by a stick or tool and dropping seeds by hand is practiced. Later, the multi row traditional seeding devices with manual metering of seeds are quite popular with experienced farmers. It is a large time consuming approach. Besides being wasteful, planting was very imprecise and lead to a poor distribution of seeds. Agricultural robots are an alternative to the tractors found on fields today.

Agriculture is humankind's oldest and still important economic activity, providing the food, feeder, fiber and fuel necessary for our survival. The current trend in agricultural robot development is to build more smart efficient machines that reduce the expense of the farmer while still providing one more services and higher quality which is precisely what we have done in this paper. Development of a robot that can perform automated ploughing and seeding operation can be manually navigated by the farmer and stabilizes the humidity in the environment. Robotics and automation can play a significant role in enhancing agricultural production needs.

We can also implement with the advancement in sensors and control systems that allow for optimal resource and integrated disease and pest management. The robot is developed which is used to automate the process of digging and sowing crops such as sunflower, baby corn, groundnut and vegetables like beans, lady's finger, pumpkin and pulses like black gram, green gram etc. and to reduce the human effort.

2.5 Automatic Seed Plantation Robot

P. G. Salunkhe:

Automatic Seed Plantation Robot which is based on electronic and mechanical platform that performs advance agriculture process. We have developed an electromechanical vehicle which is steered by DC motors to drive wheels. The farm is cultivated by the automated system, depending on the crop considering particular rows & specific columns. The spacing between two seeds in a column has to be entered manually. Proximity sensor is used to measure the rotation of wheels. To detect the obstacle in the path of the vehicle IR LED with TSOP receiver is used and turning position is also depend on this sensor. To check whether seed container is empty or not LDR sensor is used. All the operations are monitored and control by PIC microcontroller using sensors. The programming of this microcontroller is done in assembly language. LCD display is used to show seed count.

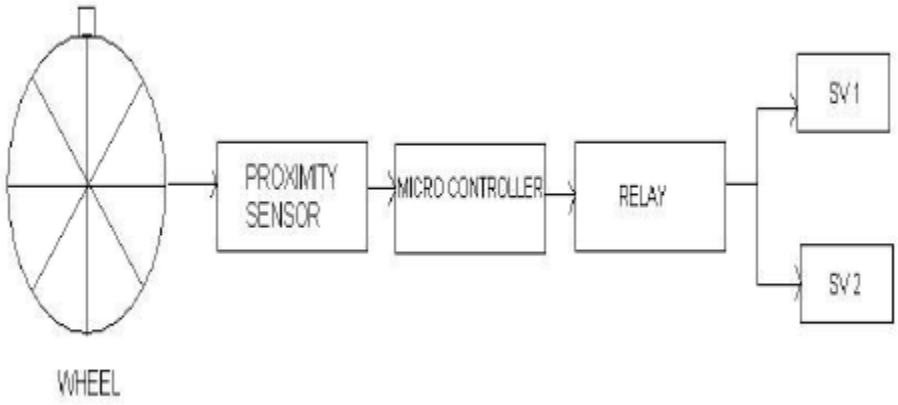
As we know economy dependency of our country is on agriculture. As India is agricultural country about 65 percent of peoples are farmers. In recent scenario number of changes are occurring in agriculture methodology like seed sowing, pesticides and irrigation. For developing our economical condition it must necessary to increase our agricultural productivity and quality also. Out of them Seed plantation is one of the most important and day-to-day job of the farmers. The conventional method for seeding is manual one but it requires more time and more efforts.

Manually seed plantation method suffers from various problems. The tendency of manual work is going on reducing. The man power shortage is one of the biggest problems faced continuously to all farmers. Due to labour shortage the plantation cost should be increased. So it is not economically beneficial for all farmers.

Now a day's instrumentation and control system plays an important role. So we develop a system for "seed plantation robot" using microcontroller which is very economical and beneficial. Due to automation the work become easiest, errorless and it saves money also.

From structure dig 1.1 our system is nothing but the four tire vehicle which is driven by geared DC motor. According to microcontroller program, after some distance or some time instant the seed should be dropped through the nozzle, which is operated by relay. Nozzle size is depends on the diameter of the seed. Same operation is repeated after some time delay. So there is no more labor work. It gives information about weather conditions for seed plantation. Hence all the problems of conventional method are overcome by using this system.

BASIC PRINCIPLE OF SEED PLANTATION :



Structure 1.1

As motor rotates vehicle moves forward, sv1 will be on and the sv2 will be off, the seed will be dropped below. The operation will be repeated. It is distance based function. The number of seeds planted will be shown on LCD display.

A rotating wheel is made up of iron or plastic and used to measure the distance between two seeds planted. A rotating wheel has a notch at specific point. After crossing that notch the proximity sensor sense and pulse is generated. That pulse is digitized by digitizer circuit. This pulse is applied to microcontroller unit. Microcontroller operates on the pulses which then drives the relay driver. Relay should be ON or OFF the valve. One valve is for capturing the seed and another is for pushing the seed. The distance base operation is used for capturing and pushing the seed. The basic principle of seed plantation is given below

One rotation of wheel = Distance covered by vehicle.

= Circumference of wheel.

= One pulse generated.

• Distance based operation is used.

2.6 COMMAND BASED SELF GUIDED DIGGING AND SEED SOWING ROVER

M. Priyadarshini-PG Scholar:

Today agricultural robots can be classified into several groups: harvesting or picking, planting, weeding, pest control, or maintenance. Scientists have the goal of creating “robot farms” where all of the work will be done by machines. The main obstacle to this kind of robot farm is that farms are a part of nature and nature is not

uniform. It is not like the robots that work in factories building cars. Factories are built around the job at hand, whereas, farms are not. Robots on farms have to operate in harmony with nature. Robots in factories don't have to deal with uneven terrain or changing conditions. Scientists are working on overcoming these problems.

Traditional methods include broadcasting manually. The common practice for digging the fields are by using bull or by tractor and the method of sowing the seeds are by hand. Later, the seeds are sowed in the furrow through a bamboo funnel attached to a country plough. For example sowing seeds in small areas they employ dibbling method i.e., making holes or slits by a stick or tool and dropping seeds by hand is practiced. Later, the multi row traditional seeding devices with manual metering of seeds are quite popular with experienced farmers. It is a large time consuming approach. Besides being wasteful, planting was very imprecise and lead to a poor distribution of seeds.

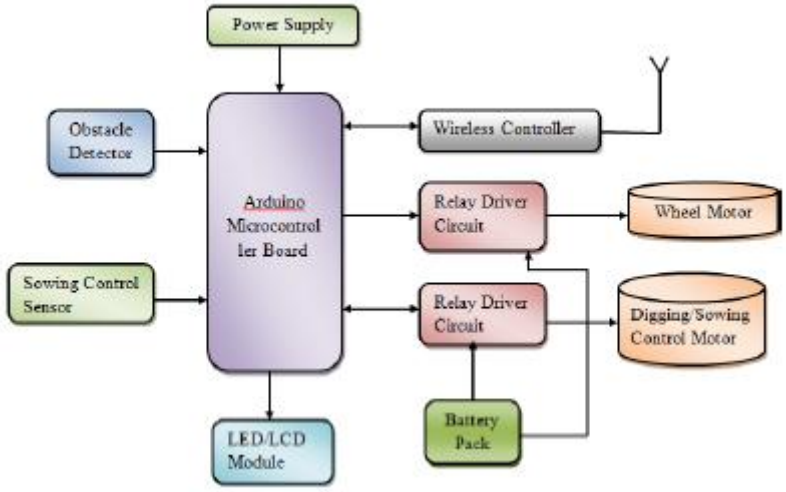


Fig. 2.6.1 Self-guided vehicle

From Fig. 2.6.1, When DC motor is started, the vehicle moves along the particular columns of ploughed land for digging and sowing the seeds and its movement is controlled by remote guiding device. If any obstacle in the pathway of the rover is discovered, the rover's alternate route is guided by the Ultrasonic radar, whereby the ultrasonic signals gets transmitted and received for obstacle detection. The sowing control sensor is used to sense whether the seed box is full or empty and sends instructions to the trained person through a wireless controller (Bluetooth) and an acknowledgement message is received. LCD module is used to display the condition of the battery level. The remote control transmitter and receiver.

2.7 Solar Operated Automatic Seed Sowing Machine

S. 1. Swetha and G.H. Shreeharsha

The real power required for machine equipment depends on the resistance to the movement of it. Even now, in our country 98% of the contemporary machines use the power by burning of fossil fuels to run IC engines or external combustion engines. This evident has led to widespread air, water and noise pollution and most importantly has led to a realistic energy crisis in the near future. Now the approach of this project is to develop the machine to minimize the working cost and also to reduce the time for digging and seed sowing operation by utilizing solar energy to run the robotic machine. In this machine solar panel is used to capture solar energy and then it is converted into electrical energy which in turn is used to charge 12V battery, which then gives the necessary power to a shunt wound DC motor. This power is then transmitted to the DC motor to drive the wheels. And to further reduction of labor dependency, IR sensors are used to maneuver robot in the field. Here 4 post sensors are used to define the territory and robot senses the track length and pitch for movement from line to line. Seed sowing and digging robot will move on different ground contours and performs digging, sow the seed and water the ground after closing.

Fig.2.7.1 In which this machine have a solar panel is used to capture solar energy and then it is converted into electrical energy which in turn is used to charge 12V battery, which then gives the necessary power to a shunt wound DC motor. This power is then transmitted to the rear wheel through chain drives. Consequently, in this project an attempt is made to make the electric and mechanical systems share their powers in an efficient way.

The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement can vary from crop to crop and for different agro-climatic conditions to achieve optimum yields. Typical application of seed sowing of Cereal's including ground nut, all types of dal’s, oil seed crop’s etc.

A solar panel is a device that collects and converts solar energy into electricity or heat or mechanical work. Solar energy is first used to charge a storage battery. An electric battery is a device consisting of one or more electrochemical cells that convert stored chemical energy into electrical energy. The solar energy stored in the battery is utilized to operate DC motor. A DC motor is a device that converts direct current (electrical energy) into mechanical energy. By using the bevel gear and Chain drive with sprockets power is transferred to the wheels for their movement. AT89S52 Microcontroller is used to automatically control the machine. IR Sensors are fitted to the machine for automatic turning operation and to sense the obstacle in the moving path. An infrared sensor is an electronic instrument.

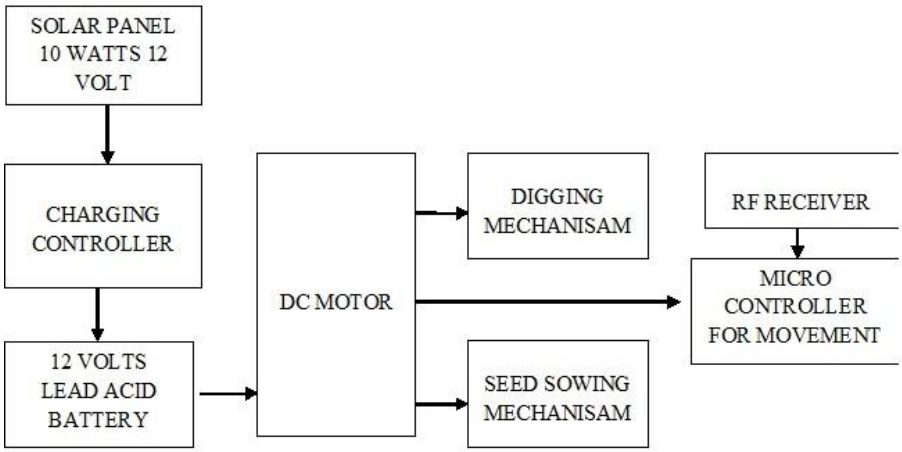


Fig.2.7.1 Experimental Setup

Performance Characteristics:

Prototype of the solar operated automatic seed sowing machine developed has the following Performance characteristics.

- Working speed of the machine depends upon the DC motor and energy stored in the battery.
- Prototype Machine can dig the soil in three rows up to 5 inch by rotating the digging tool by the help of DC motor.
- Digging speed depends on the moisture content in the soil and tool tip.
- At the same instant from the seed dropper seed is placed in all the three rows at a distance of 4 inch.
- No. of seed placing at an instant can be varied by altering the size of holes in the dropper.
- By the help of 4 post sensors, machine will sense the track length of the field and takes an automatic turning at the end of the boundary.
- In the future work this machine can also be further designed to detect obstacle present in the path by using IR sensor.

2.8 DESIGN AND IMPLEMENTATION OF SEEDING AND FERTILIZING AGRICULTURE ROBOT

B. Shivaprasad, M. N. Ravishankara, B. N. Shoba

In modern globalization, many technologists are trying to update a new development based on automation which works very rigidly, high effectively and within short time period. The progressive invention in agriculture system is becoming an important task especially because of rising demand on quality of agriculture products and declining labor availability in rural farming areas. The designed system is seeding and fertilizing agriculture robot using microcontroller. The aim of the designed system is to seeding, fertilizing and soil ph, temperature,

moisture, humidity checking. The robot is controlled by remote. The designed system involves navigation of robot to the destination successfully and does the above functions. The direction of the robot is controlled via remote. The robot and the remote system are connected through internet system. 6 DC motors are used for navigation of the robot. The speed of the DC motors is controlled using controller. The solenoid is used to control seeding and fertilizing.

The measurement of the moisture of soil, temperature of soil and ph value of soil, performing of the seeding and fertilizing in agriculture field is designed in the agriculture Robot. Instead of using line follower, obstacle detecting sensor in the proposed system camera is used for live streaming. Agriculture robot can be control by the internet using raspberry pi. Live steaming can see by computer by typing in address of raspberry pi and password then it can be control the robot by pressing controlling key in the system. Rhex rover robot is replaced by the wheeled robot.

Rhex rover having 6 legs, in which 3 legs can move instantly at a time and other 3 legs at next time. It can move like a cockroach using 3leg moves at time. Synchronous between legs are maintain by using IR sensor and feedback sensor therefore its can operate in agricultural field easily. Seed and fertilizer can be drop to field by using solenoid switch in seed dispenser and fertilizer dispenser. LDR is used for indicating seeds and fertilizer in the dispenser by glowing the LED. If seeds and fertilizer is empty then led stop glowing.

The measurement of the moisture of soil, temperature of soil and ph value of soil, performing of the seeding and fertilizing in agriculture field is designed in the agriculture Robot. Instead of using line follower, obstacle detecting sensor in the proposed system camera is used for live streaming. Agriculture robot can be control by the internet using raspberry pi. Live steaming can see by computer by typing in address of raspberry pi and password then it can be control the robot by pressing controlling key in the system. Rhex rover robot is replaced by the wheeled robot. Rhex rover having 6 legs, in which 3 legs can move instantly at a time and other 3 legs at next time. It can move like a cockroach using 3leg moves at time. Synchronous between legs are maintain by using IR sensor and feedback sensor therefore its can operate in agricultural field easily. Seed and fertilizer can be drop to field by using solenoid switch, which is in the seed dispenser and fertilizer dispenser. LDR is used for indicating seeds and fertilizer in the dispenser by glowing the LED, if seeds and fertilizer is empty then led stop glowing.

2.9 Agricultural Robot for Automatic Ploughing and Seeding

A. A .Sneha, E .Abirami, A. Ankita, R. Praveena, R.Srimeena

2015 IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2015)

This paper strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing, fruit picking and pesticide spraying. It also provides manual control when required and keeps tabs on the humidity with the help of humidity sensors .The main component here is the AVR At mega microcontroller that supervises the entire process. Initially the robot tills the entire field and proceeds to ploughing, simultaneously dispensing seeds side by side. The device used for navigation is an ultrasonic sensor which continuously sends data to the microcontroller. On the field the robot operates on automated mode, but outside the field is strictly operated in manual mode. For manual control the robot uses the Bluetooth pairing app as control device and helps in the navigation of the robot outside the field.

The field is fitted with humidity sensors placed at various spots that continuously monitor the environment for humidity levels. It checks these levels with the set point for humidity and alerts the farmer. The alerting mechanism is GSM module that sends a text message to the farmer informing him about the breach in set point. The farmer then responds via SMS to either switch on the water sprinklers or ignore the alert. The water sprinklers, if on, bring down the humidity level thus providing an ideal growing environment to crop. The concept of fruit picking and pesticide spraying is described under the process domain. Farmers today spend a lot of money on machines that help them decrease labor and increase yield of crops but the profit and efficiency are very less. Hence automation is the ideal solution to overcome all the shortcomings by creating machines that perform one operations and automating it to increase yield on a large scale.

The farming using this kind of device is called precision farming. The main parts of the robot are the tiller, plougher and the wheels section. Three cameras are present for praying pesticides and for fruit picking. The tiller is a horizontal bar with a number of jagged teeth's fixed on it to aerate or loosen the soil bed. Cong Ming, in Ligang and Fag Bo [4] published a paper titled "Intelligent robot Mowers: A review", Robot, Vol. 29, no 4.From this we can say that the plougher is similar to a tiller but has sharper and longer blades to turn over the soil. Both the tiller and plougher are crafted of sheet metal for the prototype model. The robot section consists of 7 motors out of which 5 are dc motors and 2 are servo motors. Four dc motors are attached to wheels strung on either side such that each side is driven by two motors each. The plougher is attached with another dc motor which aids polar movement in the plougher. However the tiller is fitted with more sophisticated servo motor for precise angular movement of the tiller. The servo motor serves its optimum purpose in the speed dispensing box where it is placed to slide the opening exactly for few inches in order to let the seeds fall in the soil. The AVR microcontroller and the other interfacing hardware are all mounted on the robot for convenience.

An initial outcome of this study indicates that most of these systems that which work autonomously are more flexible than traditional systems. The benefits of reduction in labor costs and restrictions on the number of daily working hours significantly improved. Thus it has made possible to automate the most significant working routines. However some have failed due to the requirement of accuracy of specific tasks. In addition, at this stage of development, the initial investment and annual costs of expensive GPS system are still relatively high

but it seems possible to design economic viable robotic systems for grass cutting, crop scouting and autonomous weeding. Findings show that there is a significant potential for applying these systems if it's possible to impose adequate control and safety regulations systems at reasonable costs. Moreover, a comparison between different European countries indicates that labor costs, cost rotation and farm structure may have a tremendous impact on the potential use of these systems.

2.10 Seed Sowing Using Robotics Technology

S.D. Sambare, S.S.Belsare

In India, near about 70% people are dependent upon agriculture. So the agricultural system in India should be advanced to reduce the efforts of farmers. Various number of operations are performed in the agriculture field like seed sowing, weeding, cutting, pesticide spraying etc. Very basic and significant operation is seed sowing. But the present methods of seed sowing are problematic. The equipment's used for seed sowing are very difficult and inconvenient to handle. So there is a need to develop equipment which will reduce the efforts of farmers. This system introduces a control mechanism which aims to drop seeds at particular position with specified distance between two seeds and lines while sowing. The drawbacks of the existing sowing machine will be removed successfully in this automatic machine.

The system is beneficial to the farmers for the basic seed sowing operation. The mode of operation of this machine is very simple even to the lay man. Low germination percentage leading to wastage of seeds can be reduced by the use of this system. Creation of gap due to non-germination of seeds can be avoided. Total yield percentage can be increased effectively. Labor problem can be reduced. As compared to the manual and tractor based sowing time, energy required for this robot machine is less. Also wastage of seed is less. So this system will be a better option for the farmers who want to perform the seed sowing operation in a well-organized manner.

2. 11 Mechatronics Based Remote Controlled Agricultural Robot

V. N Chalwa1, S. S Gundagi

In this project work an engineering solution to the current human health hazards involved in spraying potentially toxic chemicals in the confined space of a hot and steamy glasshouse or agricultural field is achieved by the design and construction of an autonomous mobile robot for use in pest control and disease prevention applications in commercial greenhouses. For this a mechanical robot is designed. The effectiveness of this platform is shown by the platforms ability to successfully navigate itself down rows of a greenhouse, while the pesticide spraying system efficiently covers the plants evenly with spray in the set dosages.

A robot which could spray chemicals under grapevine trellis was developed and experimented. From the experimental results, it was observed that the robot system made precise spraying operation and its precise

operation record possible. Based on the precise operations and records, an optimum management of chemicals could be expected, that is, necessary amount of chemicals would be sprayed only at necessary considered that this robot would be able to contribute the minimum input maximum output production system by establishment of trace ability system in grape production. In this regard here is a demo model of such equipment, which performs the operation very effectively. Such types of robots, which are used in the agricultural fields, are called as Agro-bots. Here in this module we have designed a robot, which can be controlled by using a remote for spraying the pesticides in the field or greenhouse. By the development of these agro-bots lot of manual labor will also be decreased. Here in this project a remote is designed with the help of RF transmitter, which encodes the data to the robot for controlling the movement as well as spraying the pesticide. The robot is equipped with RF receiver, which decodes and controls it. The transmitting and receiving modules are constructed using micro-controllers.

The robot for agricultural purpose an Agri-robot is a concept for the near the performance and cost of the product once optimized, will prove to be work through in the agricultural spraying operations. They have been successful in developing a robot whose construction is enough to withstand the challenges of the field. They are sure that once this concept is presented in a manner suitable to Indian market, it will definitely help in bringing down the 15% molality rate found in the Indian formers associated with the agricultural spraying operation.

III. OBJECTIVES

- Design and development of an agricultural robot which can be able to plough, dispense seeds with levelling and water or pesticide spraying in agricultural field.
- Control of this agro-bot will be wireless.
- Design and analyse a real time system for this robot to give a solution and propose a model which can be used.
- Analyse the design of plough tool and develop it for better tool life and cost saving according to condition of soil structure in future.
- To propose a low cost but effective real time agro-bot system.
- To arrange the model in such a way that all operations like digging, seeding, levelling, water spraying, pesticide spraying, seeding with specific distance, seeds optimization according to type of seed, LDR sensor fitting for seed control, design the water spray or pesticide spray for location wise handling.
- Analyse the system in such a way that it runs our vehicle in safe mode. There are adding some

Poka-yoke sensors and done the mistake proofing operation with the help of camera LCD display.

- Whole system operate by one hand and from very long distance, according to our area of field.

IV. WORKING STRUCTURE

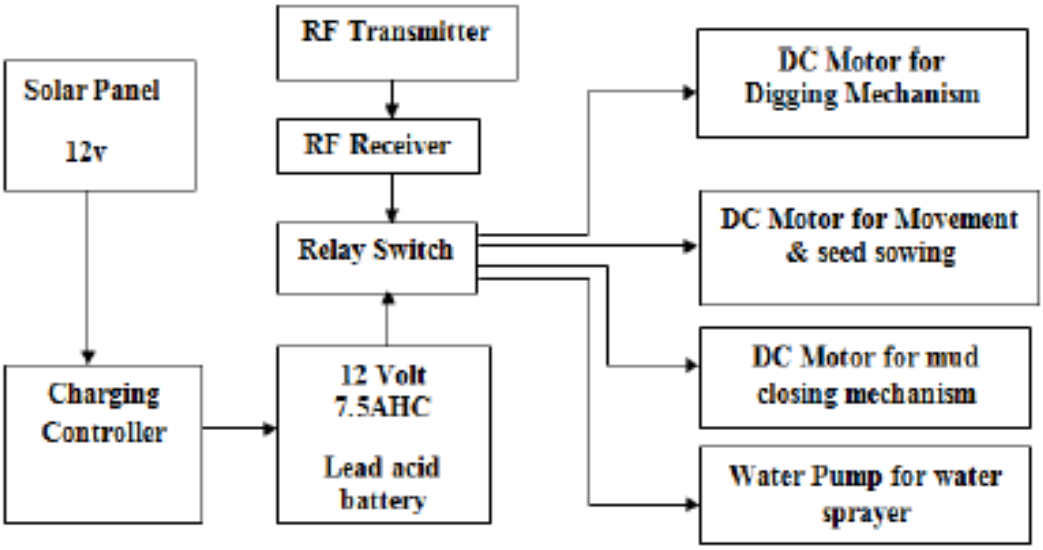


Fig. 2.13.1 working block diagram

In Fig.2.13.1 Working structure of block diagram schematic equipment's shows the arrangements of electric circuits wiring. In these all the electrical equipment's works by power given from battery which is connected to solar panel having 12 vols. Solar panel which receives the heat energy from sun and the photovoltaic cell which convert the same in to electricity by through charge controller.

When we give the signal from transmitter to the receiver relay switch operates and through microcontroller it gives the command to the respective operation equipment's. Ploughing, seeding, water or pesticide spraying and for rotation of robot wheels there are some motors which is operated by battery as per our flow process operation in agricultural area.

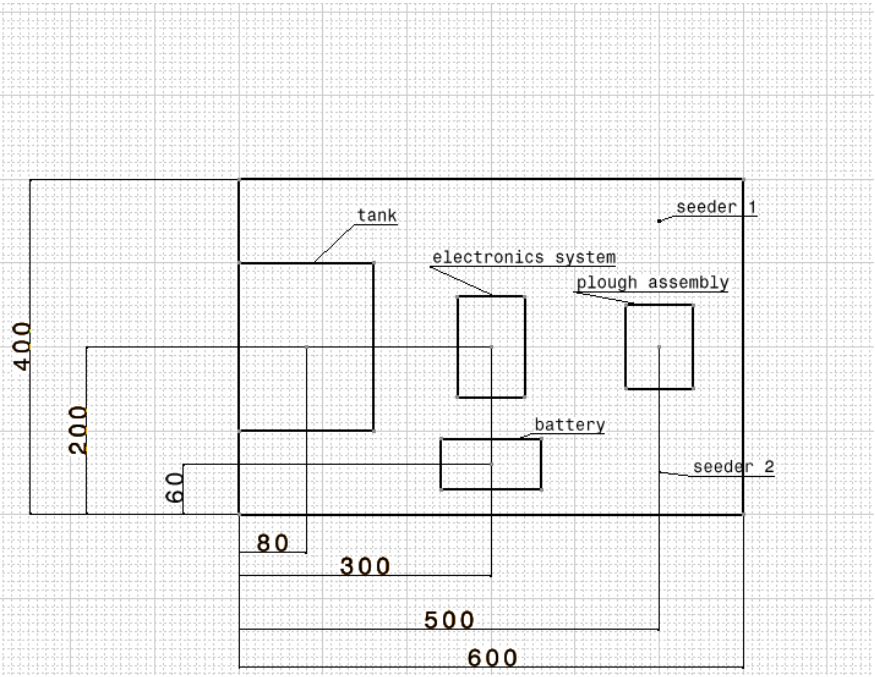


Fig. 2.13.2 block dig. structure

In Fig.2.13.2 block diagram it shows that the schematic arrangements of all the mechanical and electrical parts arranged on chassis of robot. Here at one end there is water tank at left side, microcontroller and battery at the moddle, and plough and seeded and leveller with right side

V. PATH CONTROL MECHANISM

From Fig.2.14.1 if obstacle (like hard stone) is present in the path of the vehicle, then infrared sensor (ultrasonic) along with TSOP receiver is get triggered. So the microcontroller understand that it's time to turn the vehicle in 60^{o} in the forward direction and again come back in the same column to process it further. Figure shows the trajectory of robot if the obstacle is present.

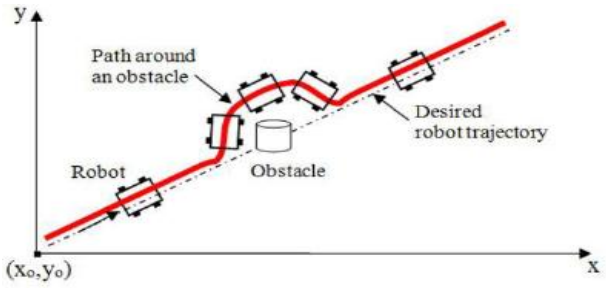


Fig. 2.14.1 Trajectory of vehicle

VI.WORKING

The basic aim of this project is to develop a multipurpose machine, which is used for digging the soil, seed sowing, and leveller to close the mud and water sprayer and pesticide spray to spray water with least changes in accessories with minimum cost. This whole system of the robot works with the battery and the solar power.

- The base frame is made for the robot with 4 wheels connected and driven the rear wheel is dc motor.
- One end of the frame, cultivator is fitted which is also driven by dc motor and design is made to dig the soil.
- Cylindrical piping arrangement is made by the sheet metal, to store the seeds and the seeds flow through the drilled path holes on the digged soil.
- At the end leveller is fitted to close the seeds to the soil, and water pump sprayer to spray the water.
- Solar is placed on top of the robot and is connected to the battery for charging the battery.
- Thus the max efficiency is utilized from the sun by the solar panel and to the battery. The solar panel system is operated by solar tracker.
- IR transmitter and IR receiver is used to controlthe operation of the vehicle
- Obstaclesensor helps to response for moving of safe path for robot

The assembly of the robotic system is built using high torque DC motor, RF module (transmitter receiver) for wireless communication , relay driver circuit, Battery package by using solar panel and microcontroller module which is shown in block diagram above.

When DC motor is started, the vehicle moves along the particular columns of ploughed land for digging and sowing the seeds and its movement is controlled by remote guiding device. The remote control transmitter and receiver is shown in block diagram. 2.13.2. This system has two main sections, robot end and control section, which are intercommunicated.

VII. SCOPE

By using this robot in the field of agriculture it can help the farmers in the initial stage of agriculture. This robot is a small scale effort but the same can be implemented with enormous results in a large scale that benefits all farmers. Apart from ploughing, seed dispensing, spraying pesticides and fruit picking other farming process like harvesting, irrigation etc. can also be implemented in one robot thus making the machine capable of multi-tasking. Also looking forward to learn about and implement agricultural based agro-bots like Nursery bot, Herder bot, Wine bot, Bee bot, and Hamster bots that would qualify the standards from the current precision to autonomous farming methodologies. This robot can be a better substitute for the human who performs the seeding and fertilizing. This robot is very useful for the farmers who are interested to do agriculture activity but facing the labor problem.

VIII.COMPARISON BETWEEN SEED SOWING METHODS

S.n.	Parameters	Manual	Tractor	Improved Tech.
1	Man Power	More	Moderate	Less
2	Time Required	More	More	Less
3	Digging and Seeding	Manually	Manually	Automatically
4	Seed Distance space	No	No	Yes
5	Seed Wastage	Moderate	More	Less
6	Energy needed	High	Very High	Less
7	Pollution	No	More	No
8	Alarm and Display	No	No	Yes

Table 1.1

Here the table 1.1 shows the older method and new technique comparison in which all the parameters which calculated under for checking the performance against old and new methods.

IX. MATERIAL OF COMPONENTS

Sr. no	**Component**	**material**
1	Wheel	rubber
2	Chassis	plywood
3	Plough	Mild steel
4	Seeder	Fiber
5	Tank	Plastic
6	Hose pipe	Rubber
7	Support to seeder	aluminum strip
8	Clamp	aluminum
9	Spur gear	Fiber

10	Worm gear	Fiber

Table 1.2

Table 1.2 which shows the various material used for equipment's, according to its prototype design.

X.CONCLUSION

We made an effort to overcome some problems in agriculture. The rapid growth in the industries is influencing the labors that are situating in the villages to migrate to the cities. This creating the labor problem in agriculture. The wages for the labor is also more. As the prices of commodities such as food grains, fuels, cloths and other essentials of daily life is increasing rapidly the labors demand for the more wages from the owners. By using this robot in the field of agriculture we can help the farmers in the initial stage of agriculture i.e. during the seeding and fertilizing. This robot can be a better substitute for the human who performs the seeding and fertilizing. This robot is very useful for the farmers who are interested to do agriculture activity but facing the labor problem and waste in each individual process for a complete cycle

REFERENCES

[1] Mr. Rohit D Kumare And Mr. Suyog Deshapande (2013), "Automated Robot For Seed Sowing And Fertilizer Spraying Along With Weed Remover Based On Msp430 Controller", International journal of current research vol.5.

[2] Suraj Chavan1, Anilkumar Dongare: (2012), "Agriculture Based Robot (AGRIBOT)

[3] Deekshitha K P, P Prasanna (2013), "Automated Agribusiness Furrowing Seeding and Grass Cutting Utilizing Android Smartphone.

[4] Shriyash Thawali (2008)," Design and Manufacturing of Robot for Digging and Seeding in Agriculture.

[5]Prashant G. Salunkhe (2007)" Automatic Seed Plantation Robot**.**

[6] M.Priyadarshini-PG Scholar. (2005)." COMMAND BASED SELF GUIDED DIGGING AND SEED SOWING ROVER.

[7] Swetha S.1 and Shreeharsha G.H.2 Solar Operated Automatic Seed Sowing Machine

[8] ShivaprasadB, Ravishankara M N, B N Shoba (2008), "Design And Implementation Of Seeding And Fertilizing Agriculture Robot.

[9] 1.AmritaSneha.A, 2Abirami.E, 3 Ankita.A,4 Mrs.R.Praveena, 5 Mrs.R.Srimeena- Agricultural Robot for Automatic Ploughing and Seeding

[10] Swati D.Sambare, S.S.Belsare -Seed Sowing Using Robotics Technology

[11] Vijaykumar N Chalwa1, Shilpa S Gundagi2- Mechatronics Based Remote Controlled Agricultural Robot