Agriculture Based Robot (AGRIBOT)

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ABSTRACT

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.

KEYWORDS:- *Seed Dispenser, Seed Storage, Fertilizer Storage, Fertilizer Dispense, Robotic System, Microcontroller, Power Supply.*

I. 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 [1] [2].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 [1]. 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 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. 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

II. OBJECTIVES

1. Our Project simplifies the farmer hard work.
2. Less time required as compare to the traditional way.
3. Work get completed in accurate manner(distance between the seed)
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III. AIM

As we all know the main requirement in the industry or any firm is man power. So the main objective of our project is to reduce the need of man power.

IV. RELATED WORK

1. AUTOMATED ROBOT FOR SEED SOWING AND FERTILIZER SPRAYING ALONG WITH WEED REMOVER BASED ON MSP430 CONTROLLER [1]

From this paper we Refer-
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. DESIGN AND IMPLEMENTATION OF SEEDING AGRICULTURAL ROBOT [2]

From this paper we Refer-
In Modern world, Automation robot is used in many of the fields such as defence, surveillance, medical field, industries and so on. In this paper, the robot system is used to develop the process of cultivating agricultural land without the use of man power. The aim of the paper is to reduce the man power, time and increase the productivity rate. All the basic automation robot works like weeding, harvesting and so on. Here the designing systems like plough the land, sowing the seed, watering the plant or spraying the fertilizer and navigate the vehicle motion are preferred by this autonomous robot using microcontroller. Based on movement of this robot in the land, the ultrasonic sensor helps in obstacle detection, thereby performs turning the position of robot either in left or right or forward direction. The navigation part has been done in simulation with the help of proteus.

3. ROBOTIC AGRICULTURE – THE FUTURE OF AGRICULTURAL MECHANISATION [3]

From this paper we Refer-
Developed agriculture needs to find new ways to improve efficiency. One approach is to utilise available information technologies in the form of more intelligent machines to reduce and target energy inputs in more effective ways than in the past. Precision Farming has shown benefits of this approach but we can now move towards a new generation of equipment. The advent of autonomous system architectures gives us the opportunity to develop a complete new range of agricultural equipment based on small smart machines that can do the right thing, in the right place, at the right time in the right way.

4. Automatic Seed Plantation Robot.[4]

From this paper we Refer-
This paper presents an 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.

5. Multipurpose agricultural robot [5]

From this paper we Refer-
The paper aims on the design, development and the fabrication of the robot which can dig the soil, put the seeds, leveler to close the mud and sprayer to spray water, these whole systems of the robot works with the battery and the solar power. More than 40% of the population in the world chooses agriculture as the primary occupation, in recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The vehicle is controlled by Relay switch through IR sensor input. The language input allows a user to interact with the robot which is familiar to most of the people. The advantages of these robots are hands-free and fast data input operations. In the field of agricultural autonomous vehicle, a concept is been developed to investigate if multiple small autonomous machine could be more efficient than traditional large tractors and human forces.

6. Agricultural Robot: Intelligent Robot for Farming [6]

From this paper we Refer-
With the advancement of science and recent technologies the attention of scientist is getting directed towards two field – Farming and Robotics System. But the combination of two technologies can serve efficiently for many problems by overcoming the limitation of previous technologies. Robotics technologies alone serve very well for the various problems in the field of engineering, medical, military, industry evolution and other various areas of development and requirements, but here we pile together the new advancement in agriculture with robotics to develop the agriculture system which can be used in more complex dynamic systems. This technology provides optimum and efficient solution for wide ranges of production with their merits and demerits. This robotic system is named as agricultural robot. This paper provides a detail review of the Robot.

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V. PROPOSED SYSTEM ARCHITECTURE

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Explanation-

The primary contributions of this paper are as follows:

- Microcontroller:

  We are using atmegha16 as microcontroller, which is heart of project.

- Solar

  The Sunceram II cells for indoor use thin-film compound semiconductors, and they are ideal for powering loads such as calculators which use very low levels of power and which are used under other types of indoor lighting.

- Battery

  The rechargeable batteries are lead-lead dioxide systems. The dilute sulfuric acid electrolyte is absorbed by separators and plates and thus immobilized. Should the battery be accidentally overcharged producing hydrogen and oxygen.

- Buzzer

  A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

- Display

4-bit data interface for compatibility with other Xilinx boards LCD_E, LCD_RS, LCD_RW line x 16 character

- IR sensor

    IR Based Obstacle Detector and It is adjustable Range with POT

- Weight sensor

    This weight sensor (load cell half bridge 50KG) is suitable for electronic
    Balance and other high accuracy electronic weighing devices.

- Water sprinkler

    The type of water sprinkler used here is E-JET905F. This water sprinkler comes in use the humidity level goes below the set point
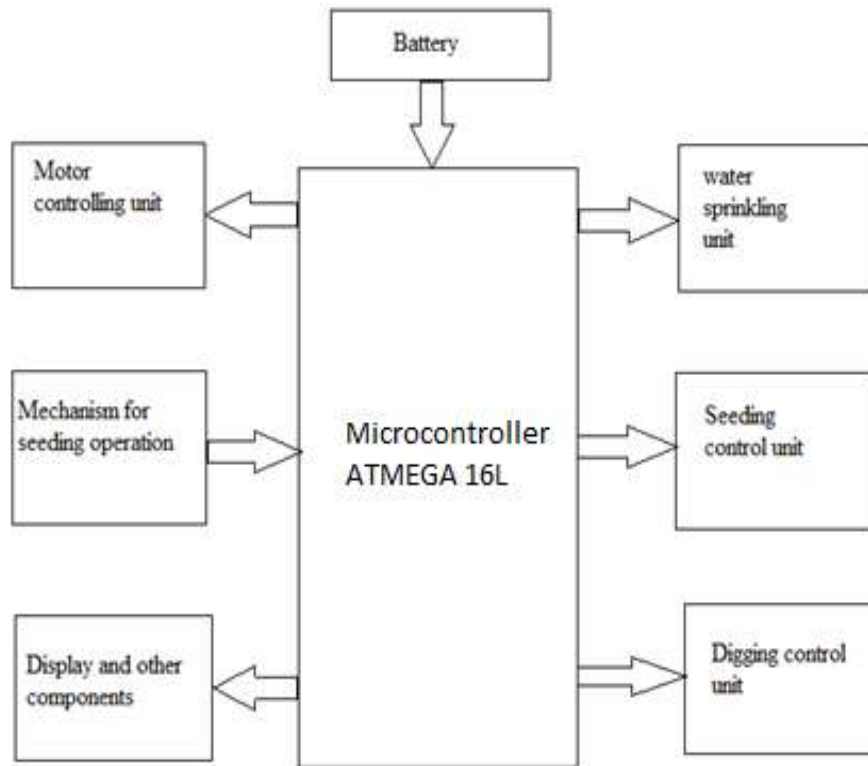

Fig1: Block Diagram

The ATmega16 is low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed. All the operation of

the system will be controller and monitored by controller. Four PWM port pins of controller will be used to drive the robot in all the direction with the help of motors.

All the information related to path and the selection of seeds will be already present in the memory. With the help of suitable mechanism input related to these will be fed to controller and appropriate action will be taken by controller.

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