International Journal of Progressive Research in Science and Engineering
Volume-1, Issue-5, August-2020
www.ijprse.com

Semi-Automated Agriculture Robot for Seeding Function

Shashanka Gowda S [1], Praveen Kumar K[1], Ravi Kumar A[1], Thribhuvan S S[1]

[1]*Student, Department of Electronics and Communication Engineering, Visvesvaraya Technological University, Karnataka, India.*

East West Institute of Technology, Bangalore, Karnataka, India.

Corresponding Author: shashankgowda.s125@gmail.com

Abstract: - Farmers are using the same methods and equipment from the ages. There is need for development of effective ploughing, spraying and machine for increasing the productivity. Conventional techniques depend on human power for lifting, dragging, seeding and water spraying. The agriculture vehicle performs agricultural operations autonomously such as ploughing, seeding and water spraying these allowing farmers to reduce the environmental impact, increase precision and efficiency, and manage individual plants in novel ways. The vehicle is using RF Technology is something that is very new to the agriculture industry, but is quickly gaining popularity from agriculture research companies. Although still in the research phase of development, autonomous Vehicle are quickly becoming more of a reality than an idea.

Key Words— ***Agriculture, Seeding, Ploughing, Water Spraying, RF Technology, Autonomous Vehicle.***

I. INTRODUCTION

Agriculture in India constitutes more than 60% of the occupation. It serves to be the backbone of Indian economy. It is very important to improve the efficiency and productivity of agriculture using new technology available with engineers. Earlier method requires more labours, more time, more cost and energy consuming. Whereas farming based on drilling operators of such power units are exposed to high level of noise and vibration, which are detrimental to health and work performance. In India there are 9.87 million farmers available so this agriculture vehicle with multiple operations will be helping them undoubtedly.

The farmers using Conventional methods to do the farming which was time taking and cost them more labours. The agriculture vehicle performs agricultural operations autonomously such as ploughing, seeding and water spraying these allowing farmers to reduce the environmental impact, increase precision and efficiency, and manage individual plants in novel ways. The applications of agriculture vehicle are spreading every day to cover further domains, also replacing human operators with autonomous vehicles which provides effective solutions with return on investment. This is especially important when the task that has to be performed is potentially harmful for the safety or the health of the workers. The vehicle is using RF Technology is something that is very new to the agriculture industry, but is quickly gaining popularity from agriculture research companies. RF wireless communication technology is used for control agriculture vehicle from distance, without human intervention. Implementing Also, the vehicle includes automatic watering the plant based on value of soil moisture sensor and detecting the obstacle using IR sensor. The IR sensors are configured with two modes which are manual and automatic modes.

II. METHODOLOGY

Input to the proposed system is control switches and desired output is the execution of ploughing and sowing task. This execution in the project is achieved through mechanical parts. Two DC motors are used for driving the four wheels of vehicle, DC motors are required for movement of these vehicle, to rotate 360-degree angle, to move forward and back word direction. Other two DC motors are connected to L293D IC to enable ploughing and seeding parts rotation in both clockwise and anticlockwise direction. Relays are connected to DC motors of water pump and seed dropping.

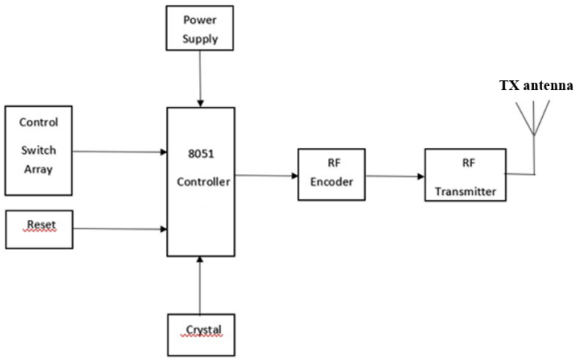

Fig.1: Block diagram of Proposed system (Transmitter).

The Block Diagram of RF controller is as shown in Fig 4.6. The 8951 controller is interfaced with the RF transmitter in the module, an array switches is used to provide command inputs to the 8951 microcontroller to perform the necessary operation. Control array switches will provide the commands

International Journal of Progressive Research in Science and Engineering
Volume-1, Issue-5, August-2020
www.ijprse.com

to the micro controller. the control switches will provide the particular control input to the microcontroller so that the actuation operation is performed as per the requirement of the user. The user input from the switches will be received as a series of number to the microcontroller.

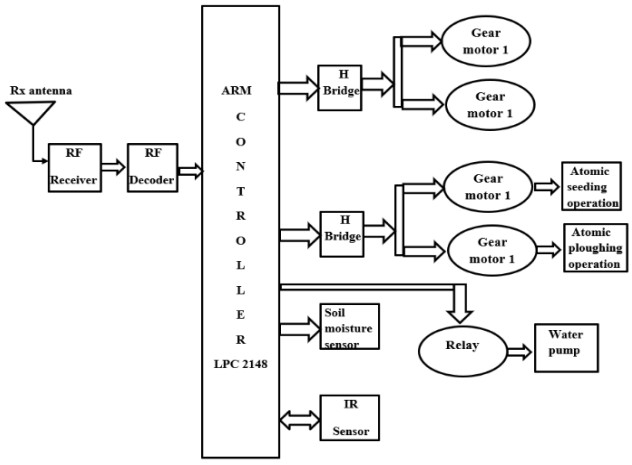

Fig.2: Block diagram of Proposed system (Receiver)

The Block diagram of proposed system is as shown in Fig 4.1. the RF Receiver gets the transmitted flag from the transmitter side, by utilizing ARM LPC2148 as its controller to work. It exhibits the progression of recipient task, LPC2148 is interfaced with RF Decoder, H-Bridge and hand-off LPC2148 ARM controller. H-bridge is an circuit which enables forward and backward operation of the DC electric motors. four geared motors are used two motors are used to control the moment of the vehicle and another geared motor is used to adjust the ploughing level in the device and fourth geared motor is used for the seeding operation.

III. IMPLEMENTATION

The steps followed during the process flow are as follows:

Step1: Initially the vehicle will check the moisture level of the soil using soil moisture sensor and differentiate weather the soil is wet or Dry.

Step2: The soil moisture sensor data is updated to the Arm controller.

Step3: Depending on the threshold of soil moisture sensor value, the water pump is automatically turned OFF. if the soil is wet and it will again continuously monitor the soil moisture data.

Step4: The ploughing and seeding functions will start after soil moisture sensing and depending on the input from sensor.

Step5: The vehicle is configured in two modes mainly automatic and manual mode, depending on the mode set by the user the Receiver will take the command inputs.

Step6: In automatic mode the vehicle will automatically detect the obstacle and move to the other direction by taking command input that is programmed.

Step7: In Manual mode the user will provide a command input to the vehicle, the vehicle will move manually depending on the input given by the intended user.

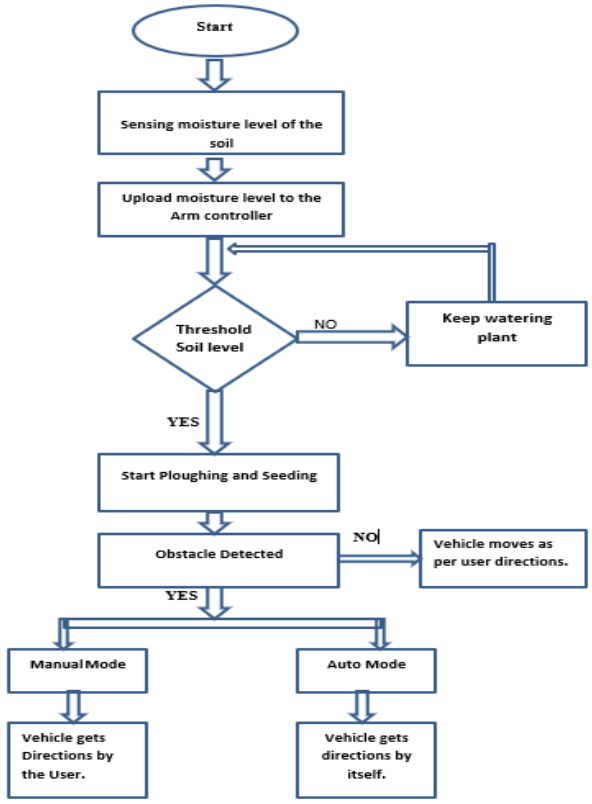

Fig.3: Flowchart of Proposed System

In automatic mode the Infrared sensor will continuously monitor for the obstacle. If any obstacle is detected the value input to the infrared sensor will changes. Depending on the changes in the value in the sensor the obstacle distance is calculated and the vehicle will automatically turn to other direction to avoid any damages.

In manual mode the user will give the command input to the vehicle through RF transmission and Reception of data. The vehicle is configured to move forward, backward, left and right moment of the vehicle depending the RF commands sent through the array of switches.

International Journal of Progressive Research in Science and Engineering
Volume-1, Issue-5, August-2020
www.ijprse.com

IV. Results And Discussion

The Vehicle will work under 2 Modes.

- Automatic Mode
- Manual Mode

A. Automatic Mode

If the switch is in automatic mode, then the vehicle performs all the operation by itself such as the vehicle will automatically take commands when an Obstacle is detected as shown in Fig, the vehicle is taking different path for Ploughing and seeding operation due to Obstacle detection.

The vehicle is developed which performs the operations such as seeding, ploughing and automatic water spraying. The seeding operation should be synchronized with the moment of vehicle so geared motor is used for efficient working of the vehicle.

Fig.4. Automatic Mode

B. Manual Mode

If the switch is in manual mode, then the vehicle and all operation is controlled by us.

An agriculture vehicle is developed which performs the operations such as seeding, ploughing and water spraying. The seeding operation should be synchronized with the moment of vehicle so geared motor is used for efficient working of the vehicle.

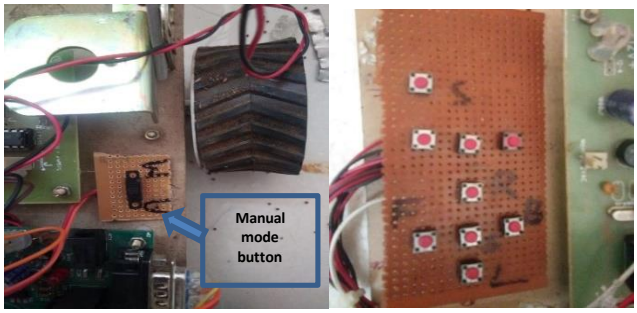

Fig.5. Manual Mode

Depending on the soil moisture the water pump will automatically turned ON and OFF by the vehicle. If the soil is wet the water pump will be OFF. If the soil is Dry the water pump will be turned ON as shown in the Fig 6.

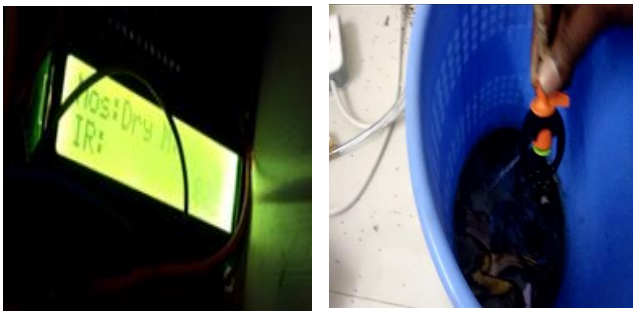

Fig.6. Water Supply based on Soil Moisture Sensor data

V. Conclusion

The Proposed System will expand the utilization of cutting-edge innovation in the field of agribusiness, yet in addition to convey the innovation near the compass of farmers in money related angle, in an extremely helpful manner. It decreases certain monotonous work in agribusiness and thus urges numerous individuals to take up farming as an occupation. The vehicle is anything but difficult to work and is easy to understand. It additionally helps the farmers in hitting their objective of high efficiency.

In this project we implemented a water sprinkler for different crops by sensing moisture level of soil. We constructed a prototype model of multipurpose agriculture vehicle, which perform functions such as Ploughing, Seeding and Obstacle detection.

References

[1]. M Ramya, Ritula Thakur" Agricultural Robot: Intelligent Robot for Farming" IARJSET ISSN (Online) 2393- 8021 ISSN (Print) 2394 1588 International Advanced Research Journal in Science, Engineering and Technology ISO 3297:2013 Certified Vol. 3, Issue 8, August 2016.

[2]. V. K Tewari,V.Maheswari, Dr.V.Nandagopal3" Design And Implementation Of Seeding Agricultural Robot" Journal of Innovative Research and Solutions (JIRAS) A unit of UIIRS Print ISSN: 2320 1932 / Online ISSN – 2348 3636 Volume No.1, Issue No.1. -143, JULY – 2012.

[3]. A Acfernado, Shivaprakash S "Multipurpose agricultural robot" International Journal of Engineering Research ISSN: 2319-6890) (online),2347-5013(print) Volume No.5 Issue: Special 6, pp: 1129 -1254 20 May 2013.

[4]. F A Adamu, MaYan, Guo Xiurong, Lu Huaimin, "Research on a Forestation Hole Digging Robot", Northeast Forestry University, Harbin, International Conference on Intelligent Computation Technology and Automation, Oct 2014.

[5]. Aishwarya B.V, Bill Stout, Maohua Wang, Boris Runov, Robotic Agriculture –The future of agricultural mechanisation? AgroTechnology The Royal Veterinary and Agricultural University Agrovej 10 DK-2630 Taastrup, Denmark.

[6]. Neha S. Naik, Virendra. V. Shete, Shruti. R. Danve," Precision Agriculture Vehicle for Seeding Function", IEEE- 16604748 pp. 26-27, Aug. 2016.

[7]. H Pota, Archana.G, C.Umayal "Agriculture Vehicleic Vehicle Based Pesticide Sprayer With Efficiency Optimization", IEEE- 15668477 10-12 July 2017.

[8]. G. Aravinth Kumar, C. Ram kuma r," Weeding of Vehicles with Agriculture", IEEE-20180, pp.26-28 July 2015.

[9]. J. R. Rosell and R. Sanz, "A review of methods and applications of the geometric characterization of tree crops in agricultural activities," Comput. Electron. Agric., vol. 81, pp. 124–141, Feb. 2016.