WIRELESS AGRIBOT FOR PLOUGH SEED AND SPRINKLER

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Abstract- Agriculture is an essential thing for survival of the humans and the farmers who do agriculture spend so much of time in ploughing the field and irrigating the field etc. The proposed system is a boon to farmers which combines the robotics with agriculture and capable of moving around the field like a farmer and plough the field and sow the seed in the predetermined row and irrigate the field along the rows autonomously. In addition to this, obstacle detection and clearance are also done. All these operations are controlled via Bluetooth module.

Index Terms- Agriculture, Obstacle detection, Robotics. (Mention 4-5 keywords)

I.   INTRODUCTION

Agriculture is considered to be the basis of life for the human species as it is the main source of food grains and other raw materials. It plays a vital role in the growth of country's economy. It also provides large ample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, the traditional methods of farming are still used by many farmers which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. This paper therefore proposes a system which is useful in monitoring the field data as well as controlling the field operations which provides the flexibility. The proposed system concentrates on performing functions like ploughing, sowing seeds, irrigation, detection of obstacles.

Engineering research in field of agriculture holds a key for sustainable future of Mankind. Technological advancements in farming, referred to as Agtech as grabbed a massive attention among researchers, investors and end users. It focuses on every aspect of farming, starting from Crop selection, Land Preparation, Seed Selection and sowing till the crop is harvested. In past half decade the trends in Agtech have been promising with countries like USA, Canada, Australia, India and Brazil.

Agtech is automation of conventional farming techniques using modern day robots and drones. Initially, the main use of Agricultural robots had been in harvesting of crops. However, the Drones revolutionized the orthodox laborious techniques to easy, quick and more precise methods which help in maintaining the nutritional values of soil and improving crop quality thereby, increasing the overall yield.

Robots like these have many benefits for the agricultural industry, including a higher quality of fresh produce, lower production costs, and a decreased need for manual labor. They can also be used to automate manual tasks, such as weed or bracken spraying, where the use of tractors and other manned vehicles is too dangerous for the operators.

II.   LITERATURE SURVEY

A technological revolution is taking place in the area of machine tools, inspection devices and handling equipment. This new revolution has been triggered off by electronics and sustained by ever- increasing capabilities of computers. This has led to emergence of a new technology called mechatronics symbolizing the synthesis of mechanical as Computer controlled robots are used in industry for welding, assembling and machining, and to handle various materials. Over the past few years, there has been significant interest in designing smart agricultural systems. The use of smart farming techniques can enhance the crop yield, while simultaneously generating more output from the same amount of input. But still, most of the farmers are unaware of the latest technologies and practices. Due to this the yield of crops are becoming low. Also, there are a number of factors that contribute to the

low yield of crops such as proper soil preparation, seed rate, seed cultivar, different sowing time, lack of moisture in the fields, water logging and salinity, lack of application of fertilizers, plant protection, adoption of modern technologies, proper marketing and lack of investment. Farmers suffer large financial losses because of usage of incorrect irrigation mechanisms, insect pests and attack of plant diseases, usage of uncalculated number of pesticides and insecticides, and wrong prediction of weather. For getting higher yield on Crops, monitoring is the vital task for the farmers. Due to the various constraints involved in agriculture, there is an urgent need to develop enhanced and economically realistic strategies in growing of crops. The farm irrigation systems in the previous years used simple timers and switches to control the irrigation mechanism for a predetermined time period irrespective of the weather conditions or moisture content present in the soil. By incorporating various advanced sensing and controlling techniques, the crop yield has increased to some extent while simultaneously the labour costs have decreased. Thus, there is a need for wireless technologies and automation in agriculture farming[1,2].
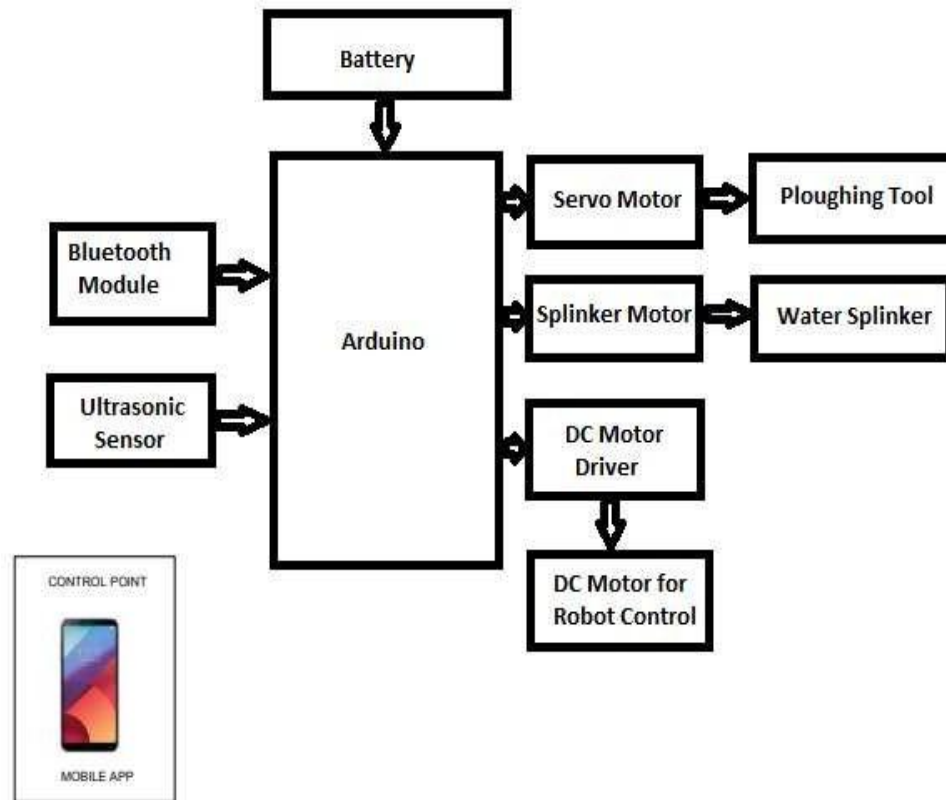
Gokul, R. Diksith, M. Gopinath, S. AjithSundaresh elaborated to remove unwanted plants using the robot which is controlled by Bluetooth. It only allows short-range communication between devices. In the future Bluetooth wireless technology has the skill to have simultaneous handling between both data and voice transmissions, 2019[3]. Y Nikhil Kumar, M Koteshwarrao, Khushwant, Rahul raj, Promaananya chakrobarty, M Himakiran, Dr. Gopi Krishna Saramekala. Designed a system that accomplishes the actions of functioning the digging and seed sowing using the components such as dc shunt motor, Arduino, Solar panel. The commands are given to cultivating robots by using android applications. Inaccurate sprinkling may not fulfill the tasks of the driller and the opposite force which acts on the motor might result in the crumbling of the driller. In the time ahead, industrial application purpose is more useful, 20194]. K Durga Sowjanya, R Sindhu, M Parijatham, K Srikant, P. Bhargav. presented a paper that works towards designing the agricultural robotic vehicle which can be controlled through Bluetooth for cultivating, sowing, and sprinkling systems. Bluetooth works in a short-range. In the future, it can be expanded to hold something with the help of UV sensors along with cameras, 2017[5]. Sourabhumarkar, Anil Karwankar designed an agribot including the hardware and software facet. It is estimated that farmers find it difficult to buy expensive robots. It helps the farmers to lift the corps efficiency and also reduces the need for manual labor to the farmer, 2016[5]. Amirta, Sneha A, Abirami E, Ankita A, R Praveena, R Srimeena presented a paper deals with a robot accomplishing the operations like seed distribution, fruit detaching, and pesticide spraying automatically. Failed to successfully bring out the accuracy of specific tasks. Additional activities like yielding, irrigation can be performed by using a single multitasking robot, 2015[6].

III. PROPOSED WORK

The agriculture has always been the backbone of India's sustained growth. As the population of India continues to grow, the demand for production will also grows. Hence, there is a great need for multiple cropping in the farms and this in turn requires efficient and time saving machines. The paper discusses the modern way agriculture which will be helpful for the agriculture industry to move towards mechanization.

The methodological procedure, circuit diagram and the block diagram are included in this section. The development of the agricultural robot consists of the integration of hardware techniques and software tools. Arduino Uno microcontroller is the master controller of the developed robot. All the operations of the robot are controlled through Bluetooth connectivity. The robot for agricultural purpose is an autonomous robot which is controlled remotely through a wireless Bluetooth connectivity between the Smartphone and the robot. The Bluetooth electronics app is used to control each and every operation of the robot. The Bluetooth HC-05 module is fixed on to the robot which receives signals from the Bluetooth electronics app and sends these signals to the microcontroller for processing of operations.

The microcontroller is powered by a 12V DC battery and it consists of a voltage regulator, which is used to regulate the voltage input for the controller. The microcontroller gives a 5V supply to the driver circuit. This supply is insufficient to actuate DC motors. Thus, driver circuit amplifies 5V current into 12V current and drives the motors connected to it. The L293D motor driver 1 circuit is used to control the bidirectional motion and receives signals from the microcontroller. The DC motors control wheel motion and other activities of the robot. The L293D motor driver 2 circuit which controls two Dc motors. One DC motor is used for line marker and another one is used for seed dispenser. A line marker is used to mark a line along which seeds are dispensed. The marker has a single tooth and only one line is marked along the path of the robot. The depth through which the mark is done can be controlled

Block diagram of Wireless Agribot

through the Smartphone. The seed storage device is a cone like structure or a hopper in which seeds are stored for seeding purpose.

This proposed work acts as a boon to farmers which combines the robotics with agriculture and capable of moving around the field like a farmer and plough the field and sow the seed in the predetermined row and irrigate the field along the rows autonomously. In addition to this, obstacle detection is also implemented.

IV.   RESULTS AND DISCUSSION(IF ANY)

The smart agriculture robot can be directed to various directions like forward, reverse, left and right. These directions are commanded by the user by clicking on the respective options on the webpage. On receiving the command, the Arduino will send it to the microcontroller. The microcontroller then drives the motor driver circuit to move the robot. In addition to these movements, several functions like ploughing, seed sowing, watering, obstacle detection and obstacle clearance are performed. The hardware components and various sensors are interfaced with the microcontroller. The Obstacles in the field are detected using ultrasonic sensor and temperature is measured using temperature sensor. Arduino integrates all the functions like ploughing, sowing of seeds, obstacle detection, obstacle clearance and irrigation. These functions are controlled with the help of Bluetooth module.

A.   PLOUGHING

The Ploughing tool is interfaced with the Arduino. The ploughing tool can be operated in three modes namely on, off and mid. The microcontroller will receive the command to work on any of these three modes and it directs the ploughing tool to plough the field accordingly.

B. SEED SOWING

The seeds are stored in a small container and it is closed with a small flip. This flip is controlled by the servomotor to open and close the container. The servomotor is capable of rotating to 180 degrees. Meanwhile, when the servomotor is at 180 degree, it automatically opens the container and hence the seeds are sown in the field.

C. WATERING

The temperature sensor interfaced with the Arduino helps to send the information about the temperature to the user via Bluetooth module. After knowing the temperature, water can be poured on the field. This can be done with the help of relay and solenoid valve. The relay makes the solenoid valve to allow and stop the flow of water to the field.

D. OBSTACLE DETECTION

The Ultrasonic sensor is used for the obstacle detection. The obstacles at a distance of 10cm can be detected. After detection, the robot automatically stops. Then the obstacle clearance tool which is connected to the servomotor can be used to break the obstacles.

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V. CONCLUSION

This proposed work may improve the way of agriculture is done by the farmer to savemoney, time and energy.This system may monitor and report real time situation of the robot in an accurate manner to the farmer's mobile, thus helping the farmer to be awareof the tasks performed.By implementing this project in the field of agriculture we can help thefarmers in the various stage of agriculture i.e., during the Seeding and fertilizing.This project is very useful for the farmers who are intended to do agricultureactivity but facing the labor problem.

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