Multipurpose Agri Robot

Sony Bangar[1] Pandurang Shelar[2] Priyanka Alhat[3] Prof. Rinku Badgujar[4]
[1,2,3,4]Department of computer Engineering
[1,2,3,4]JSPM'S BSIOTR, Wagholi Pune, India

Abstract— In times, Automation mechanism is employed in several of the fields like defence, police work, medical field, industries, agricultural so on. During this project, the mechanism system is employed to develop the agricultural processes while not the employment of force. It provides manual management and keeps a track on the humidness with the assistance of humidness sensors. The most element of our projected system is that the Advanced Virtual computer architecture (AVR) at mega small controller that supervises the whole method. For manual management the mechanism uses the wi-fi affiliation application as management device and helps within the navigation of the mechanism within the sector. Solar array is employed for power offer to the mechanism. This is often particularly necessary for the security and health of the employees. Automation is that the ideal answer to beat all the shortcomings by making machines that perform all operations and automating it to extend yield on an outsized scale.

Keywords: Ploughing, Bluetooth, Water System, Soil Sensors, Ph Sensors

I. INTRODUCTION

Recently computing and robotics technologies have seen major improvements in technologies commonly employed in agricultural robotics: perception, manipulation, and autonomous vehicles. Perception is achieved through a variety of sensors and that can be applied to a small focused workspace or to the monitoring of vast agriculctural field through sensors that are distributed. Main motive of Automation Technology is to reducing the effort of labour, a phenomenon common in the developed world. The reasons are the need for improved the process of farmer working. Robotics and artificial intelligence offers in agriculture field to processes related to seeding, harvesting, to improve productivity and efficiency. The uses of robotics are spreading every day to accomplished further various agricultural fields, as the opportunity of replacing human operators provides effective solutions with return on investment. agricultural robots have been developed and implemented a number of agricultural products in many countries. This Agricultural robot can performs basic functions like harvesting, planting and spray the pesticides. The applications of agricultural robot widely used in the investment and research. autonomous farming is the operation, guidance, and control of autonomous machines to fullfill the agricultural tasks. It motivates agricultural robotics. The main goal of agricultural robotics is more than just the application of robotics technologies to agriculture. The multipurpose agricultural robots are designed to perform the basic functions of agricultural field. by using this robot agricultural operations perform autonomously such as ploughing, seed sowing, mud closing and water spraying. The main aim of the proposed system are to check the soil depending on moisture level in the soil, to ploughing the seeds with teeth's like structure at the end to turn the top layer of soil down, to close the seeds and level the ground automatically and to provide irrigation system by spraying water with a pump in the field.

II. LITERATURE SURVEY

Some biggest issues in the Indian agricultural are input costs, skillful labors, absence of water resources and crop checking. to solve this problem the advance mechanization with robots was utilized as a part of agribusiness. To reduce the farmer efforts robotics is useful. The robot performs functions like seeding system, pest control plowing, mud closing water spraying, etc is designed to ease the work of the farmers and increase the outcome. This beats the adversity of farmers in farming their land irrespective of the weather conditions. For software implementation of the robot Arduino is used and the driver L293D is used to control motor direction. The robot is advanced with hardware such as seed container alongside channels and delving system with cutting edges in the mechanical get together of the vehicle. The sensors utilizing the Bluetooth module were effective and demonstrated the capacity of the equipment stage made out of sensors and microcontrollers. The agricultural robot integrated system uses Wi-Fi for communication between two robots. The ultrasonic proximity sensors use to advert the obstacles in the path. A Seed is picked up from the seed container and lead to the vacuum pump and the linear actuator is used to suck a seed inside the funnel. 100 2018 International Conference on Design Innovations for 3Cs Compute Communicate Control 978-1-5386-7523-6/18/$31.00 ©2018 IEEE DOI 10.1109/ICDI3C.2018.00030 Bluetooth module and GSM directly speak with Arduino utilizing I/O port. Using servomotor the Seed sowing is finished then the servomotor pole can be turned by the required degree which is associated with seed holder that point fall in the dirt. A leveling bar furnished with jagged teeth is fixed on it to plowing the soil. Using a servo mechanism the seed dispenser is done. The advantages of these robots are an efficient use of resources reducing human intervention and ensuring proper irrigation. These robots are helpful in automated weed control, usage of fertilizers based on soil condition, soil sensors are used to check soil conditions in rain feed areas. The proposed design is mainly used to reduce human intervention and plant care.

III. PROBLEM STATEMENT:

To develop a system which is capable of performing following actions:

1) Automatic/Manual ploughing.
2) Automatic/Manual sowing.
3) Automatic/Manual watering.
4) Automatic/Manual soil levelling.

All rights reserved by *www.ijsrd.com*

5) Reducing work of farmers & increasing yield by proper maintenance using sensors such as soil moisture, temperature, humidity, and water.

IV. PROPOSED SYSTEM

The proposed system would be designed to perform farming activity such as plowing, seeding watering along with monitoring systems using sensors. The multipurpose agricultural robot control by android application through Bluetooth. The robot performs three consecutive tasks, such as drilling seeding and watering. This mode of action is used when the user only wants to water the crops. Here also the movement of the robot depends on the command from the android phone. The robot access through Bluetooth without affecting cost. The proposed system block diagram is shown in the following fig.

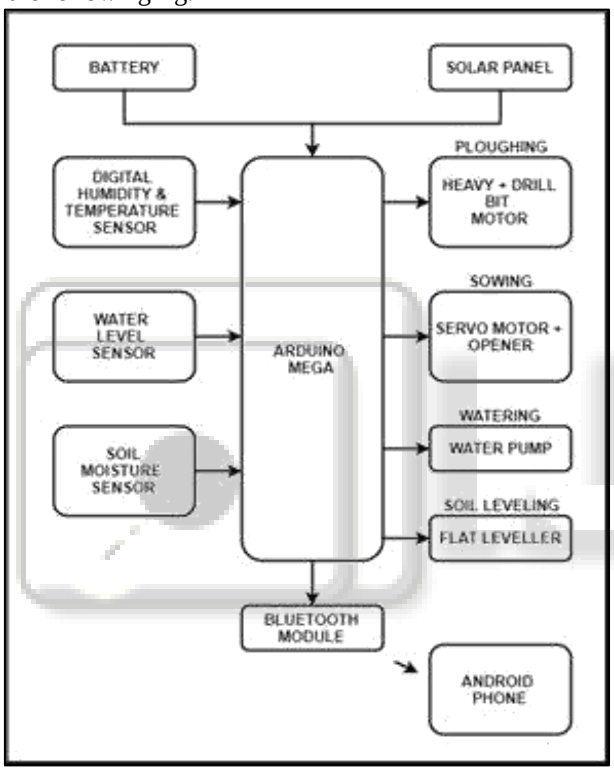


Fig. 1: Block diagram of multipurpose agricultural robot

V. METHODOLOGY:

This project is an Autonomous Agriculture Robot which is controlled over Bluetooth protocol using an Android App. The Android App consists of five buttons for movement of robot. The actions that would be performed by the robot are Forward, Backward, Right, Left and Stop. It also consists of list picker for selecting Bluetooth device connected to the robot. Once the Android application establishes a secure connection with the robot then the app is ready for controlling the actions of robot. The robot is capable of Digging, Sowing, Watering and Soil Levelling. Digging is done using Motor Drill. Sowing action will be performed using Servo Motor for lock mechanism. Watering will be done by Pump Motor. Levelling is done using Flat leveller. The Android App has a button for Starting all these processes. The robot has sensors like soil sensor, water level sensor. The sensor values are automatically senses and shows on the App. The temperature and humidity sensor are used for measuring the temperature and humidity in the surrounding of the robot. The water sensor is used for detecting the water level.The soil moisture sensor is used to sense the moisture content of the soil. The robot works in two modes. In the first mode the robot performs actions such as ploughing, sowing, watering and soil levelling along with movement of robot. In the second mode the robot performs only watering action by sensing the soil moisture content. First mode of operation is used in the initial stages while the second mode of operation is used after the initial stage when the robot only needs to water the field. The sensor data can also be manually updated by the in-app Refresh button.

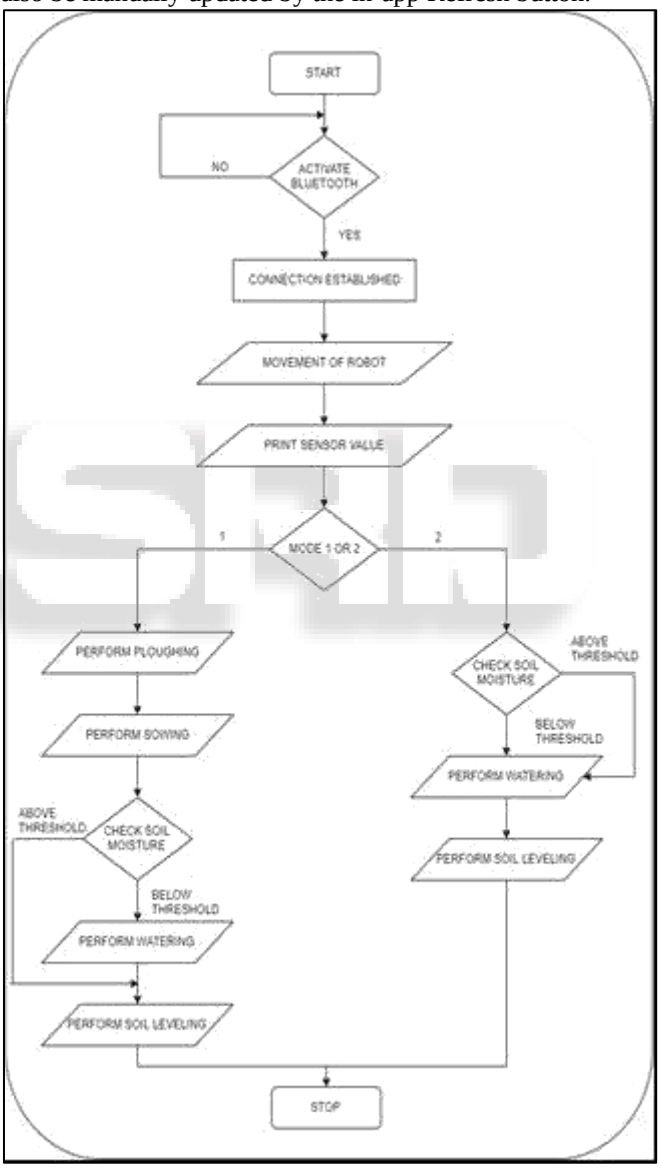
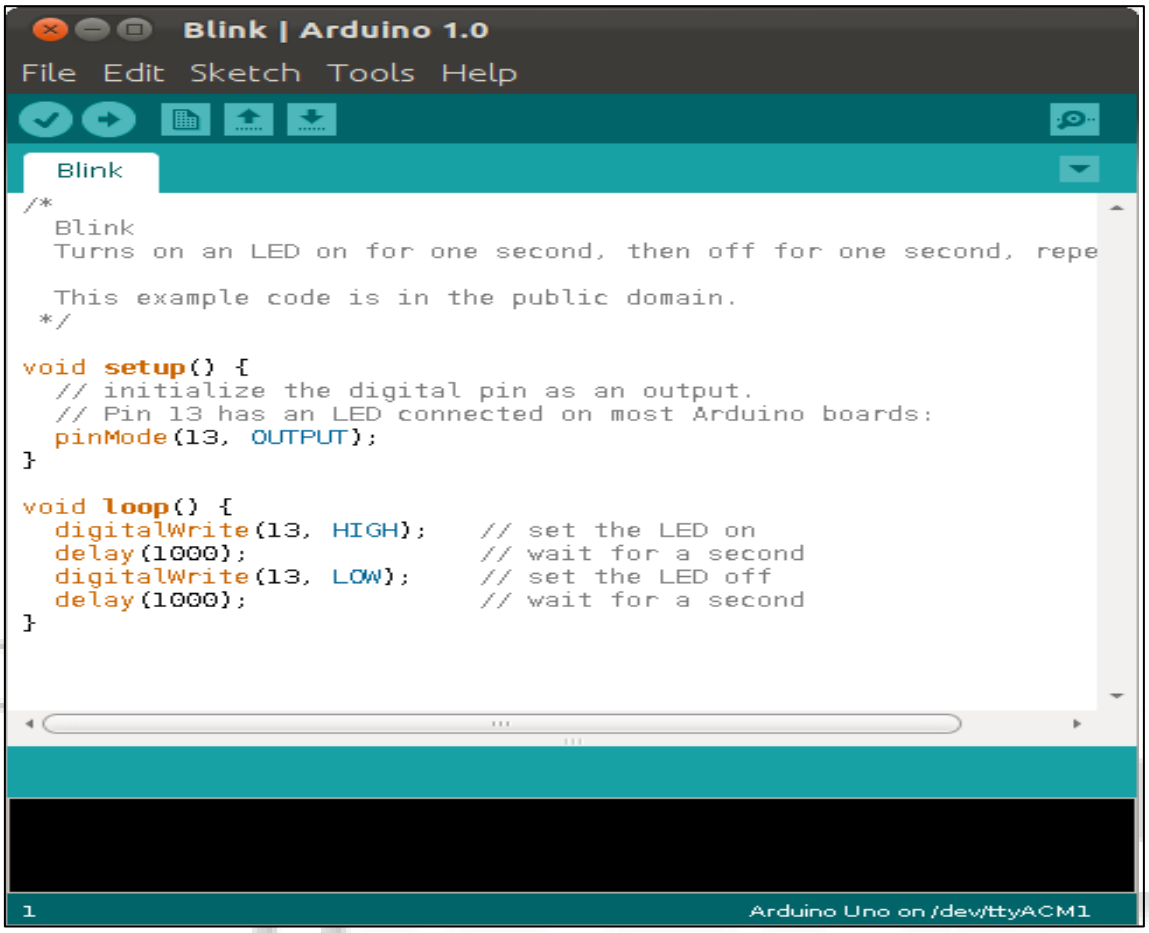


Fig. 2: Flowchart for Proposed Model

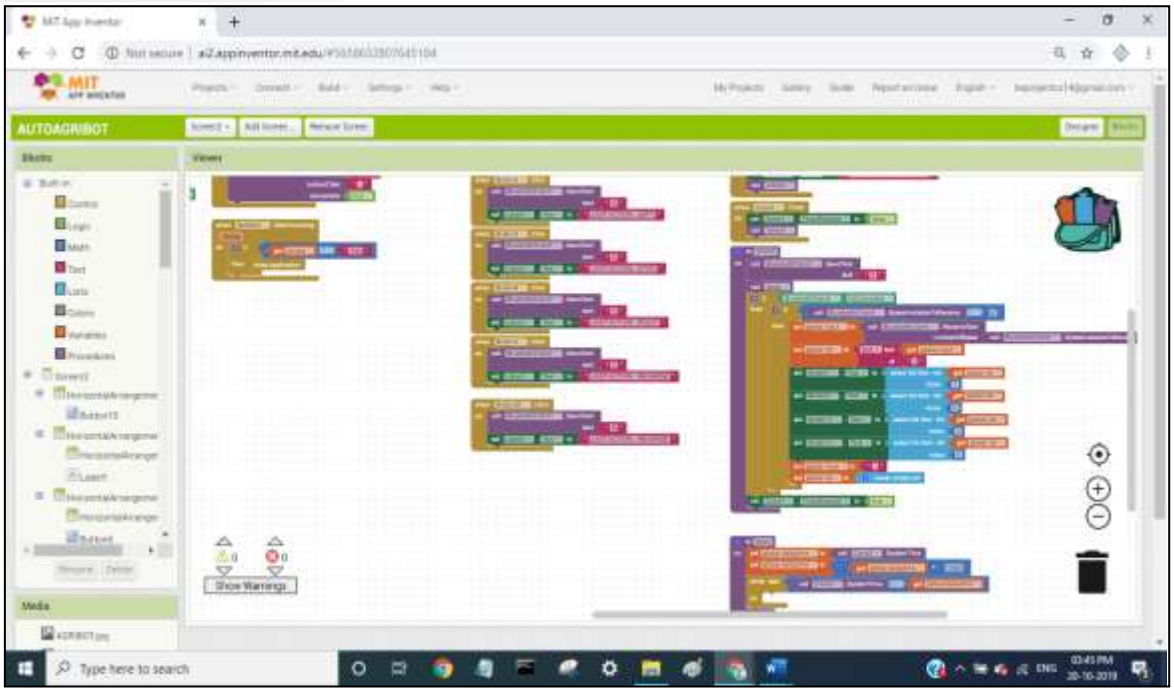
All rights reserved by *www.ijsrd.com*

VI. SOFTWARE USED:

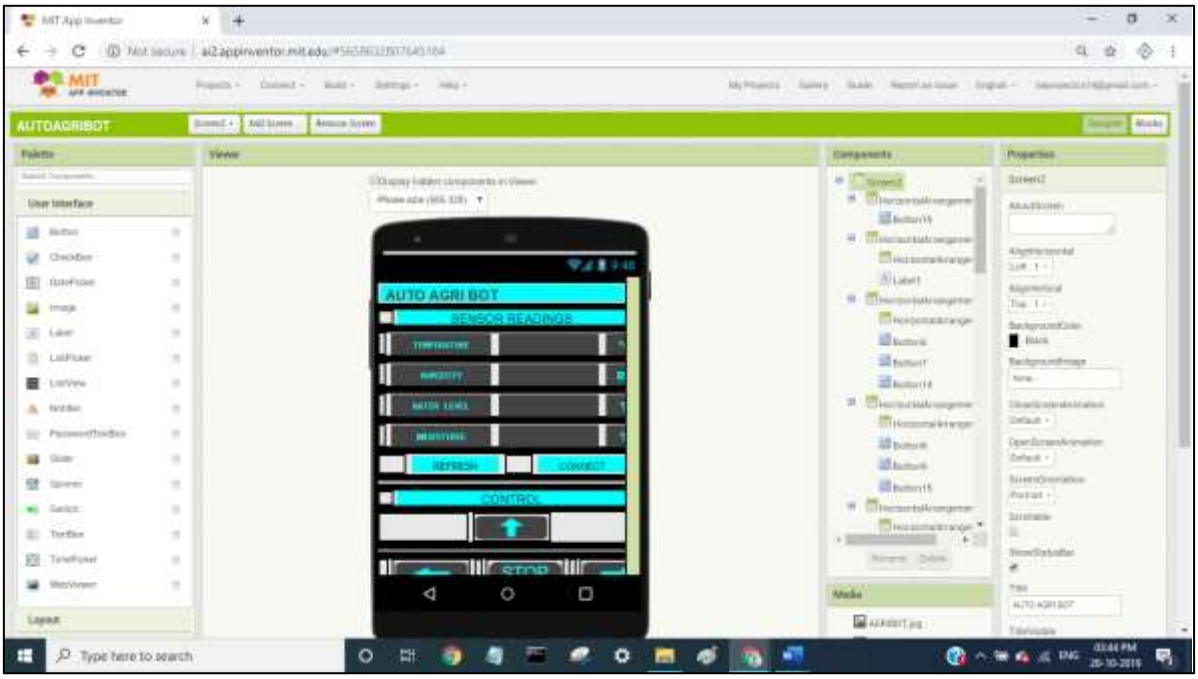
A. ARDUINO IDE 3



B. MIT APP INVENTOR 2



All rights reserved by *www.ijsrd.com*



VII. HARDWARE MODEL

The robot's entire system works with batteries and a solar panel. The robot needs a 12 v battery to operate the system. solar panels absorb sunlight and generate current electricity. The base frame consists of 4 wheels with 4 arms attached and the rear wheel is powered by a DC motor. The cultivator at one end of the frame operates a DC motor that is made to dig the soil. The seed is spread through holes drilled on the shaft by mechanisms connected with the excavated soil process. A leveler is made to close the seeds and a water pump sprayer is used by spraying the water. Bluetooth technology is used by smartphones to control the entire operation of the robot for plowing, seeding and watering systems.

The heart of the proposed system is a microcontroller. The microcontroller is interfaced to provide various operations such as Bluetooth module, DC motors, relay plowing, seeding, leveling, and watering. The entire system of the system is controlled by the Bluetooth module on the Android smartphone. Wireless communication of Bluetooth technology enables the robot to move the four directions forward, backward, right and left. Different commands are used to move the robot forward, reverse, stop, left and right. The microcontroller in the proposed model enables various functions in the area according to the commands received from the smartphone.

VIII. PLOWING FUNCTION

The main purpose of plowing is to bring fresh nutrients to the surface by turning the top layer of soil, In the prototype model shown above, a DC motor with screw rod is used to plow the field. While the screw rod is rotating, the nut rotates between the screws of the welded rod towards the cultivator is then lowered and the soil dug up to 2.5 inches the direction of cultivator can be controlled through the Bluetooth app in smartphones.

A. Seeding function

Seeding is planting seeds in one place or on an object. the prototype model shown above is used for seeds storage and when the wheels are rotated, the seeds are sown. Shaft seeds drop into the field due to the movement of the wheels of the robot.

B. Mud closing and leveling

The flat is to give a flat and even surface area to the field. In the prototype model shown above, the motor drive is used for leveling and closers. In the sown soil the mud is closed and the sliding mechanism is used for leveling.

C. Watering function

Watering is the method in which a controlled amount of water supply to crop at regular intervals for agriculture. in the prototype model shown above, drivers are used for the water pump to watering in the field.

Soil moisture sensor

This Moisture Sensor can be used for detecting the moisture in the soil, let the plant in your garden able to reach out for human help when they are thirsty. This sensor is easy to use, you can simply insert it into the soil and read the data.

D. Temperature sensor

A humidity sensor senses and reports the humidity in the air. It measures moisture and air temperature. The humidity, expressed as a percent, is the ratio of actual moisture in the air to the highest amount of moisture air at that temperature can hold. The warmer the air is, the more moisture it can hold, so the humidity changes with fluctuations in temperature.

IX. ADVANTAGE:

1) Easy to use.
2) Reduces human efforts. 4
3) Performs all primary functions in agriculture.
4) Cost efficient.

All rights reserved by *www.ijsrd.com*

5) Increase yield of crops.

X. DISADVANTAGE:

1) At present robot is not designed for harvesting and weed control features.
2) Seed container and water container needs to be refilled frequently.

XI. APPLICATIONS:

1) Ploughing.
2) Sowing seeds.
3) Watering.
4) Soil levelling.
5) Soil Moisture Analysis.
6) Field Analysis.

XII. CONCLUSION:

This systems are more flexible than traditional systems.This systems helps to reduce human efforts. Thus, it has made possible to automate the most significant working routines. Multipurpose autonomous agricultural robot has successfully implemented and tested for various functions like ploughing, seeding, levelling and water spraying. It was developed by integrating agricultural robot with C programming for aurduino and uses block coding for MIT app inventor.

XIII. FUTURE SCOPE:

1) A camera can be added for image processing feature.
2) Image processing will help in added functionalities like harvesting, weed control, disease identification etc.
3) The robot can be also modified in order to spray pesticides.

REFERENCES

[1] K Durga Sowjanya , R Sindhu, M Parijatham, K Shrikant, P Bhargav" Multipurpose Autonomous agricultural robot"International Conference on Electronic Communication And Aerospace Technology ICECA 2017.
[2] Gulam Amer, S.M.M. Mudassir, M.A. Malik, "Design and operation of Wi-Fi Agribot Integrated system", International Conference on Industrial Instrumentation and Control (ICIC), IEEE, 2015.
[3] Ashish Lalwani, mrunmai Bhide, S. K. Shah, A Review: Autonomous Agribot For Smart Farming, 46th IRF International Conference, 2015
[4] Akhila Gollakota, M.B.Srinivas, Agribot-A multipurpose agricultural robot, India Conference (INDICON), IEEE, 2011.
[5] Sandeep Konam, "Agricultural Aid for Mango cutting (AAM)," Electronics & Communication Engineering, RGUKT, R.K. ValleyKadapa, India, 978-1-4799-3080-7 IEEE 2014

All rights reserved by *www.ijsrd.com*