Development of Pic & Place Agriculture Robot

Srinivasa Nayaka K R[1], Dr. Mallikarjuna.C[2]
Student[1], Dept. of Mechanical Engineering Professor, Dept. of Mechanical Engineering
M-Techin Industrial Automation EngineeringVTU PG Centre, Mysore, Karnataka, INDIA
VTU PG Centre, Mysore, Karnataka, INDIA cmvtuvmysore@gmail.com
srinivasanayakakr@gmail.com

Abstract: ***Today the environmental influence of agricultural production is very much in focus and the demands to the industry is increasing. In the present scenario, most of the cities in India do not have sufficient skilled man power in agricultural sector and that effect on the growth of developing country. Hence farmers have to use new technology for farming activity like (plowing, seed sowing, fertilization, water sprinkling, etc.). Seed sowing Machine which developed so long are operated manually or there is no Smart Work done by it thinks seed sowing. Basic method is that seed sowing carry by hand this is also known as dibbling i.e. the making of holes and then by hand dropping the seed .also there are slot are make for used the large equipment like leveling and dropping . So it's time to automate the sector to decreases this problem.***

In this project, we are developing an agricultural-based robot this robot should helpful for farmer people. In this robot, automatic seed placing and pumping the water to seed and we are using pick and place set up to remove the dry plant and sowing the seeds in that same place. We are using the sensor to find the conditions of agriculture land. If any obstacle is dedicated means the robot will stop that place and soil moisture sensor is using to find the dry or wet condition in the plant if the plant is dry means the pump motor should be on and water will supply to plant. This function is done by Bluetooth. The Bluetooth is placed on the Arduino Uno microcontroller. All the instructions are sending through android mobile using the voice controlling method.

I. INTRODUCTION

Today the environmental influence of agricultural production is very much in focus and the demands to the industry is increasing. In the present scenario, most of the cities in India do not have sufficient skilled man power in agricultural sector and that effect on the growth of developing country. Hence farmers have to use new technology for farming activity like (plowing, seed sowing, fertilization, water sprinkling, etc.).Seed sowing Machine which developed so long are operated manually or there is no Smart Work done by it thinks seed sowing. Basic method is that seed sowing carry by hand this is also known as dibbling i.e. the making of holes and then by hand dropping the seed .also there are slot are make for used the large equipment like leveling and dropping . So it's time to automate the sector to decreases this problem. There is a need to study on new agricultural equipment system. Figure 1: Traditional Method for Plowing in Agriculture New

originate idea of this project is doing the growth of Plowing, seed sowing of crops and fertilization, water sprinkling which is covering the land automatically so that human power will get reduce up to 90%. Agricultural Robots is a robot developed for doing agricultural work.

The energy uses for robotic machine is minimum then other machines like other agriculture tool and also this energy is developed from the solar energy which is found in nature .Now a day robotics is important in all fields like industrial, medical, and other one fields. The main application area of robots in agriculture is at the harvesting stage and Seed Sowing Stage. Driverless robots are designed to replace human power. The data logger through Wi-Fi module on web server increases the effectiveness of the system so that surveillance of all actions will be maintained. The future scope for this project is not only detecting obstacle but also avoiding it successfully without disturbing the main course of the system. In this project, the robot system is used to develop the process of cultivating agricultural land without the use of man labor. The aim of the paper is to decreases the man labor, time and increases the harvesting. In today's generation number of the countries does not have enough human labor in agricultural sections and it affected on the growth of developing countries so it's time to automate the sections to less this problem. In India, there are 70% people dependent on agriculture. So its important to study the agriculture. Innovative idea of this project is to automate the process of sowing crops such as groundnut, sunflower, and baby corn and so on. The farming system like plowing, seed sowing, fertilization, water sprinkling, etc is the different process. All the processes are advance to increase the farming mechanism which works without the man labor need. There are small devices developed and they need use of less knowledge and equipments. Seeding preparation is our day to day life we use tractor in farms, but it uses more time and the man shortage is faced continuously. It also uses large power that can be decreasing with this system. Speed of the DC motor which is an electrical component by using a delay in the source coding. We are motivated for doing this project because of today's agricultural problems and here we get to deal with the controller, its interfacing with the dc motors, interfacing with the ultrasonic sensor, a linear actuator which is used for opening and closing of the valve required for the dart of seeds and so on.

A robot can be defined as a programmable, self-controlled device consisting of electronic, electrical, or mechanical units. More generally, it is a machine that functions in place of a living agent. Robots are especially desirable for certain work functions because, unlike humans, they never get tired; they can work in physical conditions that are uncomfortable or even dangerous; they can operate in airless conditions; they do not get bored by repetition; and they cannot be distracted from the task at hand.

This project is about an autonomous robot which is used in various industries. The robot is powerful, reliable and is mainly used to reduce manpower and therefore in increasing the economy of the country.
The most apparent reasons that are associated in installing of robotic systems are:
1) Saving of manpower.
2) Improved quality & efficiency.
3) Ability to work in any hostile environment.
4) Increased consistency & flexibility.
5) Increased yields and reduced wastage.

The robot in this project is independent and intelligent. This robot uses a Arduino microcontroller, an LCD, IR sensors, motor drivers and motors. The components mentioned belong to the hardware section of the project and the programming language i.e., Embedded C and the platform used for this language i.e., Kiel software form the software section.

Objective

In manufacturing industries, the pick and place robot was invented to be used as hardware tool solving and accomplition most of the tasks that cannot be done by human being and also to be faster and pinch the production time.

In this project, we are developing an agricultural-based robot this robot should helpful for farmer people. In this robot, automatic seed placing and pumping the water to seed and we are using pick and place set up to remove the dry plant and sowing the seeds in that same place. We are using the sensor to find the conditions of agriculture land. If any obstacle is dedicated means the robot will stop that place and soil moisture sensor is using to find the dry or wet condition in the plant if the plant is dry means the pump motor should be on and water will supply to plant. This function is done by Bluetooth. The Bluetooth is placed on the Arduino Uno microcontroller. All the instructions are sending through android mobile using the voice controlling method.

The additional objective of this project is:

a. To study the concept on how Pick and Place robot function and operate
b. To design the hardware for pick and place robot with locomotion
c. To design the software for the pick and place robot using microcontrollers

The design of autonomous mobile robots capable of intelligent motion and action involves the integration of many different bodies of knowledge. The aim of this project is to idealize an existing autonomous mobile robot, on all levels. This includes the mechanics, kinematics, dynamics, perception, sensor fusion, localization, path planning and navigation. All these aspects have to be reviewed and modified to a modular system, if necessary new modular modules have to be designed and developed.

II. PROPOSED METHODOLOGY

This project consists of an agricultural-based robot. In this robot, we are using the sensor to find the conditions of agriculture land and L293D IC is using to operate the robot forward, backward, right side and left side the ultrasonic sensor is using find an obstacle in way of moving time and soil moisture sensor is using to find the dry and wet conditions in agriculture land. If we find any dry plant pick and place is help to remove the dey plant and we sowing the seed in that place after that supply the water to the seed in this method this all process is controlled by Arduino Uno. All the instructions are given through Bluetooth form android application.

Block Diagram

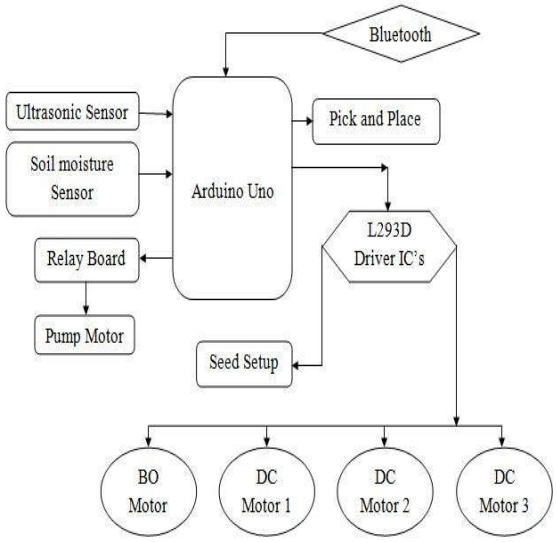

Figure1. Block diagram of Automatic Seeding Agriculture and Pick and Place Robot using Arduino

This process involves the use of a pick and place robot for industrial purposes. The block diagram as shown in Fig 1 consists of components that are as mentioned: microcontroller, LCD, motor drivers, motors, IR proximity sensor, robotic arm and a power supply.

The microcontroller consists of the instruction sets to control the action of the robot. The microcontroller and other devices get power supply from AC to DC adapter through voltage regulator.An ultrasonic sensor consists is used for detecting objects. An L293D dual H-Bridge motor driver is used which enables interfacing of two DC motors which can be controlled in both clockwise and counter clockwise direction.The motor driver output is connected to the motors which will drive the robot in the required

direction. As we use 2 motor drivers, one of them drives the motors used for locomotion and the other drives the robotic arm to pick and place the object.

Once the microcontroller receives the signal from the IR sensor about the clear path or the obstacle, it takes the necessary action i.e., it continues to move in the predefined path or stops respectively. On reaching the destination the robotic arm picks the object and follows the predefined path to place it in the required location. On completing this task the robot moves back to its initial position. Lastly, the LCD is used to display information about the direction the robot is going to take.

Hardware Tools

- Arduino Uno
- L293D Driver IC
- Bluetooth
- DC Motor
- Soil Moisture Sensor
- Ultrasonic Sensor
- Pick And Place Setup

Software Tools

- Arduino IDE
- Embedded-C

III. SCOPE OF THE PROJECT

Pick and place automation speeds up the process of picking the parts up and placing them in new locations, while also increasing production rates. These pick and place robots are more accurate and do not fatigue while doing back-breaking or hard manoeuvre movements that may be difficult for humans. The consistency, quality and repeatability of a pick and place robot system is unmatched. These systems are also versatile and can be reprogrammed and tooled to provide multiple application for consumers. An increase in output with the pick and place robot system offer long term savings to companies. With the advancements in technology and affordability of robots, more pick and place robotic cells are being installed for automation application.Industrial robots are used to assemble the vehicle parts. As the assembly of the machine parts is a repetitive task to be performed, the robots areconveniently used instead of using mankind (which is costlier and less precised compared to robots.).

The auto industry is the largest users of robots, which automate the production of various components and then help, assemble them on the finished vehicle. Car production is the primary example of the employment of large and complex robots for producing products. We use robotic arms to carry out dangerous work such as when dealing with hazardous materials, to carry out work in the outer space where man cannot survive and to do work in the medical field such as conducting experiments without exposing the research. Some of the most advanced robotic arms have such amenities as a rotating base, pivoting shoulder, pivoting elbow, rotating wrist and gripper fingers. All of these amenities allow the robotic arm to do work that closely resembles what a man can do only without the risk.

The concept of creating machines that can operate autonomously dates back to classical times, but research into the functionality and potential uses of robots did not grow substantially until the 20th century. Throughout history, robotics has been often seen to mimic human behavior, and often manage tasks in a similar fashion. Today, robotics is a rapidly growing field, as technological advances continue; research, design, and building new robots serve various practical purposes, whether domestically, commercially, or militarily.

The following are the necessary features of a robot:

1. **Sensing:** The robot should be able to sense its surroundings. It would do this in ways that are not similar to the way that humans sense the surroundings; like: light sensors (eyes), touch and pressure sensors (hands), chemical sensors (nose), hearing and sonar sensors (ears), and taste sensors (tongue) will give the robot awareness of its environment.

2. **Movement:** A robot needs to be able to move around its environment. Whether rolling on wheels, walking on legs or propelling by thrusters a robot needs to be able to move. Either the whole robot moves or just parts of the robot moves.

3. **Energy:** A robot needs to be able to power itself. A robot might be solar powered, electrically powered, battery powered etc. The way the robot gets its energy will depend on what the robot needs to do.

4. **Intelligence**: A robot need to be "smart." This is where programming enters the picture. A programmer is the person who makes the robot 'smart.' The robot will have to have some way to receive the program so that it knows what it is to do.

IV. TYPES OF ROBOTS

Mobile robots are also found in industry, military and security environments. They also appear as consumer products, for entertainment or to perform certain tasks like vacuum cleaning. Mobile robots are the focus of a great deal of current research and almost every major university has one or more labs that focus on mobile robot research.

Mobile robots are usually used in tightly controlled environments such as on assembly linesbecause they have difficulty responding to unexpected interference. Because of this most humans rarely encounter robots. However domestic robots for cleaning and maintenance are increasingly common in and around homes in developed countries. Robots can also be found in military applications.

Broadly, the autonomous robots can be classified as follows:

1 Industrial Robots

Industrial robots usually consist of a jointed arm (multi-linked manipulator) and an end effector that is attached to a fixed surface. One of the most common type of end effector is a gripper assembly.

2 Service Robot

Most commonly industrial robots are fixed robotic arms and manipulators used primarily for production and distribution of goods. The term "service robot" is less well-defined. The International Federation of Robotics has

proposed a tentative definition, "A service robot is a robot which operates semi- or fully autonomously to perform services useful to the well-being of humans and equipment, excluding manufacturing operations.

3 Modular Robot

Modular robots are a new breed of robots that are designed to increase the utilization of robots by modularizing their architecture.[52] The functionality and effectiveness of a modular robot is easier to increase compared to conventional robots. These robots are composed of a single type of identical, several different identical module types, or similarly shaped modules, which vary in size. Their architectural structure allows hyper-redundancy for modular robots, as they can be designed with more than 8 degrees of freedom (DOF).Modular robots may be composed of L-shaped modules, cubic modules, and U and H-shaped modules. Modular robotic technology is currently being applied in hybrid transportation industrial automationduct cleaningand handling. Many research centres and universities have also studied this technology, and have developed prototypes.

4 Collaborative Robots

A collaborative robot or cobot is a robot that can safely and effectively interact with human workers while performing simple industrial tasks. However, end-effectors and other environmental conditions may create hazards, and as such risk assessments should be done before using any industrial motion-control application.

5General-Purpose Autonomous Robots

General-purpose autonomous robots can perform a variety of functions independently. General-purpose autonomous robots typically can navigate independently in known spaces, handle their own re-charging needs, interface with electronic doors and elevators and perform other basic tasks. Like computers, general-purpose robots can link with networks, software and accessories that increase their usefulness. They may recognize people or objects, talk, provide companionship, monitor environmental quality, respond to alarms, pick up supplies and perform other useful tasks. General-purpose robots may perform a variety of functions simultaneously or they may take on different roles at different times of day. Some such robots try to mimic human beings and may even resemble people in appearance; this type of robot is called a humanoid robot. Humanoid robots are still in a very limited stage, as no humanoid robot can, as of yet, actually navigate around a room that it has never been in. Thus, humanoid robots are really quite limited, despite their intelligent behaviors in their well-known environments.

6 Military Robots

Military robots include the SWORDS robot which is currently used in ground-based combat. It can use a variety of weapons and there is some discussion of giving it some degree of autonomy in battleground situation.Unmanned combat air vehicles (UCAVs), which are an upgraded form of UAVs, can do a wide variety of missions, including combat.

V. ADVANTAGES

1. Accuracy of Pick and Place Robots: Robots are outfitted with wide reaches and slim arms, steady repeatability and precise tooling – all of which allows them to be extremely accurate. This high precision capability makes them a good match for pick and place applications.

2. Flexible Pick and Place: One of the main advantages of robotics is flexibility. Pick and place robots are easily programmable. They are able to accommodate multiple changes in product shape and type. In addition, robots provide a high level of movement flexibility.

3. Increase Consistency with Pick and Place: Pick and place robot systems have the ability to improve product quality and cycle time. Robotic movements are regulated, so the results are always the same. Quality is improved because of this regularity. Furthermore, this consistency allows the processes to take place.

4. Robots are Space-Efficient: Because they are designed with compact bases, pick and place robots are ideal if you are looking to conserve floor space. Robots can be programmed to move within strict work envelope limits – leading to even better use of space.

5. Robots Maximize Safety: Pick and place applications can be physically demanding. They are labour-intensive, repetitive, and monotonous. Depending on the weight and size of a part, moving it from one place to another can be very demanding work. Pick and place robots are unaffected by the stresses of the application. They are able to work without taking breaks or making mistakes.

6. Save with Pick and Place Robots: Incorporating pick and place robots can effectively cut your costs. Robotic precision and reliability allow for less wasted material and more efficient use of time. Plus, the initial investment in robots is quickly recouped – making pick and place robots an extremely cost-effective solution.

7. Cost-Effectiveness: The afore-mentioned features combine to lend a high degree of cost- effectiveness to such systems. Cost effectiveness also accrues from the fact that pick and place systems empower businesses to take up orders in bulk and thus aid business expansion and also reap the benefits of large-scale production.

VI. APPLICATIONS

The following are a few applications of pick and place robots in various industries

1. Auto Industry

The auto industry is the largest users of robots, which automate the production of various components and then help, assemble them on the finished vehicle. Car

production is the primary example of the employment of large and complex robots for producing products. Robots are used in that process for the painting, welding and assembly of the cars. Robots are good for such tasks because the tasks can be accurately defined and must be performed the same every time, with little need for feedback to control the exact process being performed.

2. Material Transfer, Machine Loading and Unloading

There are many robot applications in which the robot is required to move a work part or other material from one location to another. The most basic of these applications is where the robot picks the part up from one position and transfers it to another position. In other applications, the robot is used to load and/or unload a production machine of some type.
Material transfer applications are defined as operations in which the primary objective is to move a part from one location to another location. They are usually considered to be among the most straightforward of robot applications to implement. The applications usually require a relatively unsophisticated robot. These are the pick and place operations.The machine loading and unloading applications are material handling operations in which the robot is used to service a production machine by transferring parts to and/or from the machine.

Robots have been successfully applied to accomplish the loading and/or unloading function in the production operations:
· Die casting
· Plastic moulding
· Forging and related operations
· Machining operations
· Stamping press operations

The other industrial applications of robotics include processing operations such as spot welding, continuous arc welding, spray coating, also in assembly of machine parts and their inspection.

3. Medical Application

Medical robotics is a growing field and regulatory approval has been granted for the use of robots in minimally invasive procedures. Robots are being used in performing highly delicate, accurate surgery, or to allow a surgeon who is located remotely from their patient to perform a procedure using a robot controlled remotely. More recently, robots can be used autonomously in surgery.

VII. HARDWARE IMPLEMENTATION

This chapter deals with the working principle of the project and the hardware implementation and a brief description of the components.

Working principle

The detailed block diagram of the system is as shown in the Fig 2. The program in the microcontroller AT89S52 is written in Embedded C. The microcontroller consists of the instruction sets to control the action of the robot. The microcontroller and other devices get power supply from AC to Dc adapter through a voltage regulator.An IR sensor is connected to the port 1.0 of the microcontroller. It generally consists of a photodiode and an IR LED. The IR LED continuously emits IR radiation which when finds an obstacle, reflects it back to the photodiode. In turn the photodiode gives an output voltage to the comparator which compares the received input voltage to a reference voltage. If the input voltage is lesser than the reference voltage, then the output of the comparator is low indicating the absence of any object.

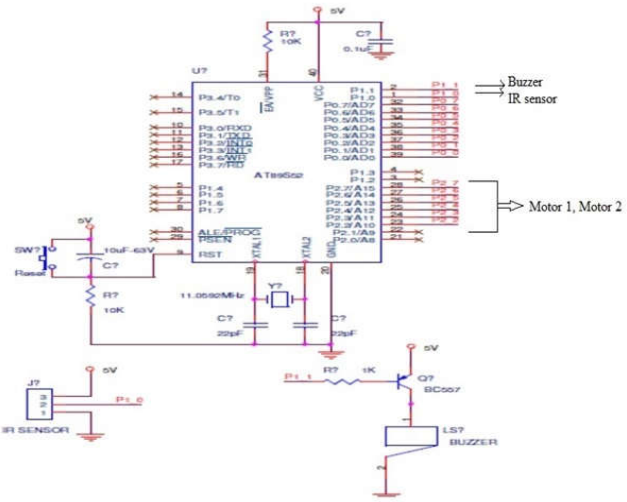

Fig 2Detailed Block Diagram

Alternately, if the input voltage is higher than the reference voltage, the output of the comparator is high indicating the presence of an obstacle in the path of the robot. This high signal is again send to the gear motor through port 0 of the microcontroller which in turn indicates the motors to stop.

Arduino Uno

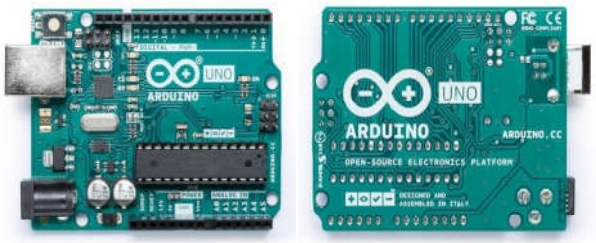

Figure 3 Arduino Board

The Arduino is simple for beginners to use, but it is sufficiently versatile for advanced users. It operates for Mac, Windows, and Linux. Teachers and students use it to create inexpensive science equipment, prove the concepts of chemistry and physics, or start programming and robotics. Designers and engineers develop the immersive designs for installations and experiments on modern musical instruments by performers and artists. Naturally,

makers use it to build several designs, for example, shown in the Maker Faire. Arduino is an effective platform for learning new material. Anyone, kids, hobbyists, artists and programmers, can either start tinkering on the directions of a kit step by step, or can exchange ideas with other members of the Arduino group online. In thousands of diverse projects and software, Arduino was used.

For physical computing, there are various other microcontrollers and platforms. ,Parallax Basic Stamp Netmedia's BX-24, Phidgets MIT handyboard and several others provide similar features. Both these tools take the messy microcontroller programming specifics and wrap it in a user-friendly box. In addition, Arduino simplifies the operating process of microcontrollers, but gives instructors, students and amateurs an advantage over other systems:

- **Inexpensive** - Compared to other systems, Arduino boards are very low-cost. Arduino module can be manually assembled in the least expensive version, and even the preassembled modules in Arduino cost under $50.
- **Cross-platform** - The Arduino Software (IDE) is running on operating systems Windows, Macintosh OSX and Linux. Many devices with microcontrollers are Windows mostly.
- **Simple, clear programming environment** - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.
- **Open source and extensible software** - The platform is available for expansion by professional programmers as Open Source Tools. The language can be extended by C++ libraries, meaning that people who want to know the technical specifics can step from Arduino to the AVR C programming language it is based on. Similarly, if you wish, you can explicitly connect AVR-C to your Arduino programmes.

- **Open source and extensible hardware** - Arduino board's plans are released under a Creative Commons licence, so expert circuit designers can create, expand and enhance their own modules version. In order to learn how it works and save money even relatively inexperienced users can create the breadboard module version.

  Arduino UNO is the best electronics and coding board to be started. The UNO is the most stable board to start playing on, when it first encounter with the platform. The UNO is the most commonly used and recorded panel of the entire Arduino family.

  Arduino Uno is an ATmega328P-based microcontroller board (datasheet). This system contains 14 digital input and output pins (6 for PWM output), 6 analog inputs, a ceramic 16 MHz resonator (CSTCE16M0V53-R0), a USB link, a power socket, an ICSP header and a reset button. It provides all the necessary elements to support the microcontroller; it can be conveniently attached to a device with a USB cables or powered by an AC-to-DC adapter and battery.You can tinker with your Uno without worrying too much, you can change the chip for few bucks and start again in the worst case scenario.

  "Uno" in Italian means one and has been selected as a label for Arduino (IDE) 1.0 updates. Arduino Software's Uno board and version 1.0 (IDE) have now developed to newer iterations, the Arduino's reference versions. The uno board is the first in a series of Arduino USB boards and the Arduino platform's reference model; the Arduino boards index displays a wide range of existing, past or obsolete boards."

Features of Arduino Uno Board:

1. Reset Button – This restarts every Arduino code that is loaded.
2. AREF – stands for "analog references" and is used for describing an external voltage of references.
3. Ground Pin – The Arduino has some base pins and they all work together.
4. Digital Input/Output – Digital input or output can be used on pins 0-13.
5. PWM – Analog performance can be simulated by the pins labelled with the symbol (~).
6. USB Connection – Used to power up your sketches and upload your Arduino.
7. TX/RX – Data indicator LEDs are Transmit and received.
8. ATmega Microcontroller – This is the brain and the location of the programming.
9. Power LED Indicator – This LED lights up once the board is attached to a power source.
10. Voltage Regulator – This controls the voltage into the Arduino board.
11. DC Power Barrel Jack – This is used for the power supply of your Arduino.
12. 3.3V Pin – This pin provides your projects with 3.3 volts of power.
13. 5V Pin – The pin provides your projects with 5 volts of power.
14. Ground Pins – The Arduino has some base pins and all of them are the same.
15. Analog Pins – These pins can read and translate the signal from an analog sensor.

4.2.2 LCD

A 16 x 2 LCD is used which can display upto 32 characters. It displays information related to the direction taken by the robot. The most commonly used Character based LCDs are based on Hitachi's HD44780 controller. LCD is connected to the microcontroller. It receives information from the microcontroller through the port 2.

The LCD here is an additional feature which is used to guide the user about the various ongoing processes taking place in the robot like initialization and the various movements and directions taken by the robot.

Figure 4. LCD Display

4.2.3 Robotic Arm

A Robotic arm [3] is a type of mechanical arm as shown in Fig 4.6, usually programmable, with similar functions to a human arm; the arm may be the sum total of the mechanism or may be part of a more complex robot. The links of such a manipulator are connected by joints allowing either rotational motion (such as in an articulated robot) or translational (linear) displacement. The links of the manipulator can be considered to form a kinematic chain. The terminus of the kinematic chain of the manipulator is called the end effector and it is analogous to the human hand.The end effector, or robotic hand, can be designed to perform any desired task such as welding, gripping, spinning etc., depending on the application.

Figure 5.Robotic Arm

4.2.4 IR Proximity Sensor

The LM358 Op-Amp as shown in the Fig 4.7,is used in the comparator mode. The IR photodiode (receiver) is used in a potential divider in a reverse bias mode.

Figure 6. IR Proximity Sensor

The following figure shows the flow chart of the working of the pick and place robotic system. The battery is connected and the robot is initialized or made ready to perform the action according to the code loaded into the robot.

VIII. RESULTS

This chapter is focused on the results, conclusion and the enhancements that can be made for the project in future that is the scope for future work.

Results

In this project a pick and place robot is successfully assembled and programmed to move a certain distance from an initial point, pick an object, take a u-turn and travel back the same distance to the destination. The distance here is measured using a time delay which is given in the program. This value can be varied according to the user requirement.

Figure 7. Hardware Model

The Fig 7 shows the first step in the construction of robot – the base of the robot. The automation industry is the largest users of robots, which automate the production of various components and then help, assemble them on the finished vehicle.This project successfully demonstrates a pick and place robot which picks an object from a source, travels a particular distance and places it in the destination.The proposed objective of travelling a certain distance from the source to the destination, picking the target placed at the destination, and finally returning to the destination with the target is successfully achieved.The next step in the construction of the robot is the manipulator base to which the main arms of the robot are connected. As shown in the fig, it contains the use of two plates which are connected to the frame containing a motor.This robot makes use of four motors – two of 100rpm and other two which are 45 rpm each.The robotic base uses two 100 rpm robot which are used for locomotion while the 45 rpm motors are used for the movement of the robotic arms.

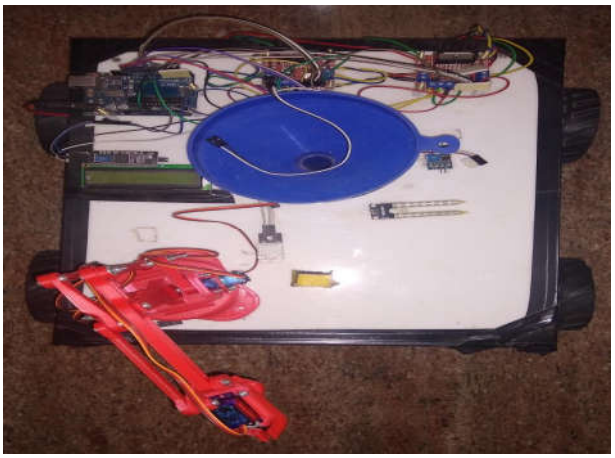

Figure 7. The robot with manipulator

The Fig 7 shows the robot assembly with the robotic arm fixed to it. This Fig shows the mechanical assembly of the robot to which the electronic hardware's are implemented to make it a locomotive pick and place robot.

The Fig 8 shows the final robotic assembly with the necessary hardware components, which is ready perform the required action. It consists of components like microcontrollers, battery, an LCD is used to display details like name of the project and the direction in which the robot moves. This final assembly with all the required hardware's peregrinates to the source, picks the object, travels back and places the object at the destination.

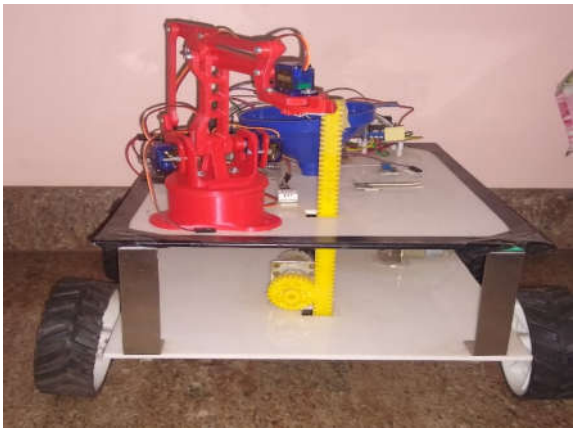

Figure 8 Final robot assembly

IX. CONCLUSION

The Agriculture seeding and pick and place robot which is assembled and programmed here is used to pick an object from a source and place it at the destination. The locomotion of the robot is made possible by using two gear motors. The gear motors are driven by programming them in embedded C using arduino software. The robot peregrinates so that it picks an object from the source and places it at the destination. Thus by developing the proposed project the industries can be automated reducing the workload.

Future Work

The visual sensing system can be based on anything from the traditional camera, sonar, and laser to the new technology radio frequency identification (RFID), which transmits radio signals to a tag on an object that emits back an identification code. All four methods aim for three procedures—sensation, estimation, and matching.

Image quality is important in applications that require excellent robotic vision. Algorithm based on wavelet transform for fusing images of different spectra and different foci improves image quality. Robots can gather more accurate information from the resulting improved image.

REFERENCES

[1] Agriculture Robotics in Japan Nobutaka Ito ProfessorDept. Of Bioproduction and Machinery Mie University, Japan, IEEE International Workshop on Intelligent Robots and Systems IROS '90

[2] Amrita Sneha.A,, ― Agricultural Robot for Automatic Ploughing and Seeding,‖ 2015 IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2015)

[3] Timo Blender, ―Managing a Mobile Agricultural Robot Swarm for a Seeding Task,‖ 978-1-5090-3474-1/16/$31.00 ©2016 IEEE

[4] Tim Mueller-Sim, Merritt Jenkins, Justin Abel, and George Kantor, The Robotanist: A Ground-Based Agricultural Robot for High-Throughput Crop Phenotyping2017 IEEE International Conference on Robotics and Automation (ICRA) Singapore, May 29 - June 3, 2017.

[5] DBR Conveyor Concepts LLC. (2016) Bringing new Technology to the agricultural industry. [Online]. Available: http://www.dbrconveyorconceptsllc.com/

[6] SajjadYaghoubi et al., "Autonomous Robots for Agricultural Tasks and Farm Assignment and Future Trends in Agro Robots," International Journal of Mechanical & Mechatronics Engineering IJMME-IJENS, vol.13, no. 03, pp. 1-6, June 2013.

[7] A. Gollakota and M. B. Srinivas, "Agribot — A Multipurpose Agricultural Robot," in India Conference (INDICON), Hyderabad, 2011, pp. 1-4.

[8] C. Schlegel, A. Steck, and A. Lotz, ―Robotic software systems: From code-driven to model-driven software development,‖ in Robotic Systems- Applications, Control and Programming, A. Dutta, Ed. InTech, 2012, pp. 473–502, ISBN: 978-953-307-941-7.

[9] A.Gollakota, Srinivas, Agribot: A Multipurpose agricultural robot, INDICON, vol.1, no.4, pp.16-18, 2011

AUTHORS BIOGRAPHY

SrinivasaNayaka K R
Student[1], Dept. of Mechanical Engineering
M-Tech in Industrial Automation Engineering
VTU PG Centre, Mysore,
Karnataka, INDIA

Dr. Mallikarjuna.C
Professor, Dept. of Mechanical Engineering
VTU PG Centre, Mysore,
Karnataka, INDIA