AUTOMATIC ROBOTIC ARM PLANTING

A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

ANNA UNIVERSITY: CHENNAI 6000 025

NOV 2023

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BONAFIDE CERTIFICATE

Certified that this project report "AUTOMATIC ROBOTIC ARM PLANTING SYSTEM" is the bonafide work of "KIRUTHIKA.S (927622BME041),KISHORE.T (927622BME042) KIRTHIK.S(927622BME043)" who carried out the project work during the academic year 2023 – 2024 under our supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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This project report has been submitted for the end semester project viva voce Examination held on_________________

INTERNAL EXAMIER

EXTERNAL EXAMIER

DECLARATION

We affirm that the Project titled **“AUTOMATIC ROBOTIC ARM PLANTING “**being submitted in partial fulfilment of for the award of Bachelor of Engineering in Mechanical Engineering, is the orginal work carried out by us . It has not formed the part of any other project or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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ACKNOWLEDGEMENT

Our sincere thanks to Thiru. M. Kumarasamy, Chairman and Dr. K. Ramakrishnan, B.E, Secretary of M. Kumarasamy College of Engineering for providing extra ordinary infrastructure, which helped us to complete the project in time.

It is a great privilege for us to express our gratitude to our esteemed Principal Dr.B.S. Murugan M.E., Ph.D. for providing us right ambiance for carrying out the project work.

We would like to thank Dr.M. Mohan Prasad M.E, MBA., Ph.D, Head, Department of Mechanical Engineering, for their unwavering moral support throughout the evolution of the project.

We offer our whole hearted thanks to our internal guide Dr.S.Padmavathy Associate Professor, Department of Mechanical Engineering, for her/his constant encouragement, kind co-operation, valuable suggestions and support rendered in making our project a success.

We offer our whole hearted thanks to our project coordinator Dr.H.Vinoth kumar M.E., Ph.D., Assistant Professor Department of Mechanical Engineering, for her/his constant encouragement, kind co-operation, valuable suggestions and support rendered in making our project a success.

We glad to thank all the Teaching and Non-Teaching Faculty Members of Department of Mechanical Engineering for extending a warm helping hand and valuable suggestions throughout the project.

Words are boundless to thank Our Parents and Friends for their constant encouragement to complete this project successfully.

INSTITUTION VISION & MISSION

Vision

- To emerge as a leader among the top institutions in the field of technical education.

Mission

- Produce smart technocrats with empirical knowledge who can surmount the global challenges.
- Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students.
- Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

DEPARTMENT VISION, MISSION, PEO, PO & PSO

Vision

- To create globally recognized competent Mechanical engineers to work in multicultural environment.

Mission

- To impart quality education in the field of mechanical engineering and to enhance their skills, to pursue careers or enter into higher education in their area of interest.
- To establish a learner-centric atmosphere along with state-of-the-art research facility.
- To make collaboration with industries, distinguished research institution and to become a centre of excellence

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

The graduates of Mechanical Engineering will be able to

- PEO1: Graduates of the program will accommodate insightful information of engineering principles necessary for the applications of engineering.
- PEO2: Graduates of the program will acquire knowledge of recent trends in technology and solve problem in industry.
- PEO3: Graduates of the program will have practical experience and interpersonal skills to work both in local and international environments.
- PEO4: Graduates of the program will possess creative professionalism, understand their ethical responsibility and committed towards society.

PROGRAM OUTCOMES

The following are the program outcomes of Engineering Graduates: Engineering Graduates will be able to :

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of
13. technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs) The following are the Program Specific Outcomes of Engineering Graduates: The students will demonstrate the abilities

1. **Real world application:** To comprehend, analyze, design and develop innovative products and provide solutions for the real-life problems.
2. **Multi-disciplinary areas:** To work collaboratively on multi-disciplinary areas and make quality projects.

Research oriented innovative ideas and methods: To adopt modern tools, mathematical, scientific and engineering fundamentals required to solve industrial and societal problems

Course Outcomes	At the end of this course, learners will be able to:	**Knowledge Level**
CO-1	Identify the issues and challenges related to industry, society and environment.	Apply
CO-2	Describe the identified problem and formulate the possible solutions	Apply
CO-3	Design / Fabricate new experimental set up/devices to provide solutions for the identified problems	Analyse
CO-4	Prepare a detailed report describing the project outcome	Apply
CO-5	Communicate outcome of the project and defend by making an effective oral presentation.	Apply

MAPPING OF PO & PSO WITH THE PROJECT OUTCOME

Course Outcomes	**ProgramOutcomes**												**Program Specific Outcomes**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO - 1	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 2	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 3	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 4	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3
CO - 5	3	3	3	3	2	2	2	2	3	3	2	2	3	2	3

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ABSTRACT

In this project, we're developing a clever robotic arm designed to make planting in agriculture more accurate and efficient. Imagine it as a smart helper for farmers. This robotic arm uses advanced technologies like computer vision and machine learning to figure out the best spots to plant seeds and adjust to different soil conditions automatically. The main goal is to improve planting precision, reduce the need for manual labor, and ultimately increase crop yield

By tackling issues like labor shortages and promoting sustainable farming practices, our project aims to not only make planting more efficient but also contribute to a more resourceful and productive agricultural environment. This project revolves around creating a smart robotic arm for better and more planting in farming. The robotic arm uses advanced technology like computer vision and machine learning to identify the best spots for planting and adapt to different soil conditions.

The goal is to improve planting accuracy, reduce the need for manual work, and ultimately boost crop yield in agriculture. The system includes sensors to collect real-time data on soil quality and moisture levels. This information helps the robotic arm adjust planting depth and spacing on the go.

The project also features a simple interface for farmers to input specific details about the crops and monitor the planting process from a distance. By addressing challenges like labor shortages and promoting sustainable farming, this technology aims to make planting more efficient and resource-friendly Our project focuses on developing an intelligent robotic arm to revolutionize the way planting is done in agriculture. Think of it as a high-tech assistant for farmers. Using cutting-edge technologies like computer vision and machine learning, the robotic arm identifies optimal planting locations and adapts to diverse soil conditions.

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The nature of this projecr integrades mechanical engineering, robotics, and artificial intelligence to create a versatile solution for addressing the envolving needs of modern industries. The integration of cutting-edge technologies not only stream lines processes but also contributes to resource conservation and increased productivity. The automatic robotic arm not only addresses current challenges in planting processes but also lays the foundation Using advanced technologies like computer vision and machine learning, the robotic arm autonomously identifies the best planting locations and adjusts to varying soil condition

SCOPE OF THIS PROJECT

The scope of an automatic robotic arm planting project is Incorporate sensors for soil quality, moisture, and environmental conditions to ensure optimal planting conditions and Add sensors to check soil quality and moisture so the robot plants in the best conditions. Implement the precise control mechanisms for seed placement, depth, and spacing to enhance planting accuracy and Developing a navigation system to guide the robotic arm across the planting area efficiently, avoiding obstacles.

Designing an efficient power system for sustained operation, considering the energy requirements of the robotic arm and associated electronics. Create a user-friendly interface for programming and monitoring the robotic arm, allowing users to set parameters and receive real-time feedback. Making it easy for people to tell the robot what to do and see how it's doing. Implement a system for recording and analyzing planting data, aiding in performance evaluation and optimization. Keep tracking of planting data to see how well the robot is working.

Integrate the safety mechanisms to prevent collisions, emergency stops, and ensure overall safe operation. Considering the the project adaptability to different soil types, crops, and field conditions for versatility. Try to keep the project affordable for setup and maintenance. Design the system to be scalable for various field sizes and adaptable for potential future upgrades.

Test the robot in different situations to make sure it works well. The machine aims to address the ongoing challenges associated with labor shortages in the agricultural sector, providing a sustainable solution for farmers to maintain and scale their crop production The future scope of this project is about, implement the machine learning algorithms to optimize planting based on historical data, adapting to changing environmental conditions and crop types.

Enhancing the robot's decision-making abilities by integrating advanced artificial intelligence for adaptive learning and improved planting strategies. Develop self - diagonistic capabilities, enabling the robotic arm to identify issues and perform basic maintenance tasks autonomously, reducing downtime. It will explore the possibility of expanding the robot’s functionalities to include harvesting, making it a comprehensive solution for the entire crop cycle. Ensuring the robotic arm can adapt various crops, adjusting planting techniques based on specific crop requirements.

Stay informed about and envolving regulations releated to autonomous farming equipment to ensure compliance. Incorprating features for remote monitoring and control, enabling operators to oversee and manage the robotic arm system for distance. The projects scope extends beyond immediate functionalities, social impact. This automatic robotic arm planting will very use to the farmers and time saving and reduce the man work. Encouraging an open source approach to certain components of the robotic arm system, fostering collaboration innovation, and knowledge sharing within the robotics and planting communities.

CHAPTER-1

INTRODUCTION

Introducing an innovative project focused on revolutionizing agricultual practices, the Automatic Robotic Arm Planting System. This cutting-edge technology combines robotics, artificial intelligence, and precision agriculture to enhance planting processes. By automating tasks traditionally performed by human hands, this system aims to improve efficiency, reduce labor requirements, and optimize crop yields. Join us in exploring the future of sustainable and advanced farming with the Automatic Robotic Arm Planting System. A robotic arm is a robot manipulator, usually programmable, with similar functions to a human arm. The links of such a manipulator are connected by joints allowing either rotational motion such as in an articulated robot or linear displacement.

The links of the manipulator can be considered to form a kinematic chain. The business end of the kinematic chain of the manipulator is called the end effectors and it is analogous to the human hand. The end effectors can be designed to perform any desired task such as welding, gripping, spinning etc, depending on the application. The robot arms can be autonomous or controlled manually and can be used to perform a variety of tasks with great accurancy.

The robotic arm can be fixed or mobile and can be designed for industrial or home applications. This report deals with a robotic arm whose objective is to imitate the movements of a human arm using accelerometers as sensors for the data acquisition of the natural arm movements.

This method of control allows greater flexibility in controlling the robotic arm rather than using a controller where each actuator is controlled separately. The processing unit takes care of each actuator's control signal according to the inputs from accelerometer, in order to replicate the movements of the human arm.

The block diagram representation of the system to be designed and implemented. A robot a programmable multifunction manipulator designed to move material, parts, tools, or specialized devices through variable programmed motions for the performance of a variety of tasks". In this highly developing society, time and man power are critical constrains for completion of task.

The automation is playing important role to save human efforts in most of the regular and frequently carried work. The idea that machines can begin to imitate human actions, even in ways we have not thought of, the main motives for the creation of robot have been very practical. First, as modern industry has become more complex, there has been a growing need for getting work done in environments that are dangerous for humans.

As an example, work in a nuclear reactor plant often requires contact with radioactive materials. Second, as robots became more advanced and less expensive, they are being set up in industry situations where working conditions are not so much dangerous as unpleasant for various reasons.

These situations typically involve high degrees of the Heat, Noise, Poisonous gases, Risk of injury by machines, Monotonous, boring work. Robots have already taken over a number of such unpleasant jobs in industry welding in automobile factories, which involves heat, noise and heavy exertion. Robots are obedient, untiring and precision welders.

Simple robots many routine jobs in industry. Pick and place robots are useful in simple assembly operations such as stuffing printed circuit boards and loading and unloading parts from machines. Our robotic arm is equipped with advanced sensors and computer vision technology to identify optimal planting locations based on soil conditions and crop requirements.

By integrating automation into the planting process, we aim to reduce human labor, minimize errors, and increase overall efficiency. This project not only aligns with the ongoing trend of smart farming but also addresses the challenges associated with labor shortages in agriculture.

By leveraging robotics and intelligent algorithms, we strive to revolutionize traditional planting methods and pave the way for a more precise, environmentally friendly, and economically viable approach to agriculture. The robotic arm's key features include adaptive gripping mechanisms for various seed types, real-time data analysis for dynamic planting patterns, and the ability to adjust planting depth based on soil composition.

Its modular design ensures scalability, allowing integration with different agricultural machinery. By reducing human involvement in repetitive tasks, our Automatic Robotic Arm aims to optimize resource usage, minimize environmental impact, and ultimately contribute to a more sustainable and resilient agricultural ecosystem.

As we move forward, this project holds the potential to transform conventional farming practices and set new standards for precision planting in the era of smart agriculture. In addition to its efficiency, the Automatic Robotic Arm contributes to resource conservation through its targeted approach.

The system minimizes the use of seeds and fertilizers by accurately placing them where they are most needed, reducing waste and promoting cost-effectiveness for farmers. the project aligns with broader initiatives promoting sustainable agriculture by the environmental impact associated with traditional farming practices.

Through the integration of cutting-edge technologies, our Automatic Robotic Arm aims to contribute to the ongoing transformation of agriculture into a more efficient, eco-friendly, and technology-driven industry, In response to these challenges, our team imagine as a future where automation becomes an integral part of agricultural practices, ensuring sustainability and optimizing yields.

The Automatic Robotic Arm presented in this project is a testament to our commitment to harnessing the power of robotics and artificial intelligence for the betterment of farming communities worldwide.

As we stand at the intersection of technological innovation and agricultural advancement, our project on the Automatic Robotic Arm for Precision Planting seeks to redefine the landscape of modern farming. Agriculture, a cornerstone of human civilization, faces evolving challenges such as population growth, climate change, and the need for increased food production. this cutting-edge technology, we aim not only to enhance planting but also to empower farmers with tools that streamline operations and encourage a more strong and productive agricultural sector.

This project encapsulates our dedication to fostering innovation in agriculture, aligning with the global movement towards smart and sustainable farming practices. And this all are the introduction of our peoject Automatic robotic arm planting.

CHAPTER-2

WORKING

The automatic planting robot starts by looking at the field using special sensors. It checks things like how wet the soil is and what the overall conditions. Knowing the Seeds, that The robot uses smart technology to figure out what kind of seeds it's dealing with. It can handle different types of seeds.

The planning of the route robot decides on the best path to follow in the field. It plans a smart route to plant seeds efficiently without wasting time or energy. which moves carefully, The robot moves precisely across the field, making sure not to bump into anything.

It's careful to avoid damaging other plants. While planting, the robot pays attention to what's happening. If something changes, like the soil getting drier, it adjusts how it plants seeds right then and there. The robot is like a careful gardener. It makes sure each seed is planted at just the right depth in the soil for it to grow well.

Farmers can control the robot from their phone or computer. They can see what's happening in the field, tell the robot what to do, and get updates. The robot is pretty smart. It learns from each time it plants seeds and gets better at doing its job. Over time, it becomes really good at planting in different situations.

The Automatic Robotic Arm for Planting is like a helpful, smart assistant for farmers, making sure seeds are planted just right for a successful and efficient harvest.

CHAPTER-3
MATERIALS

Materials Used:

- Robotic arm components
- Sensors
- Electronics
- Software and programming
- Depth adjustment mechanism
- Connectivity
- Learning and adaptation
- Power source
- Safety Features

Robotic Arm Components:

The robotic arm which is used for motors and servos for movement and mechanical parts of the arm structure, Grippers and adaptors for seed handling

Sensors:

Soil moisture sensors and imaging devices like camera for computer vision. Environmental sensors for climate conditions

Electronocs:

Micro controller or programmable controllers. For power supply units and wiring and connectors

Software and programming :

Programming language for robotics and machine learning tools for seed recognition. Algorithms for path planning and navigation.

Depth Adjustment mechanism:

Mechanism for adjusting planting depth.

Connectivity:

Communication modules for controlling for wireless technologies, and User interface development tools for the mobile app or web platform

Learning and Adaptation :

Machine learning software and frameworks

Power Source:

Batteries or power source for the robotic arm.

Safety Features :

Emergency stop mechanism and safety sensors to avoid collisions

CHAPTER - 4

COST ESTIMATION

Components	Cost (Rs)	Total (Rs)
Soil moisture sensor	**100**	**100**
Distance sensor	**100**	**100**
Camera on vision sensor	**700**	**700**
Temperature and humidity detector	**200**	**200**
Force/Torque	**600**	**600**
Accelerometer and gyroscope	**300**	**300**
GPS Module	**500**	**500**
Pressure Detector	**300**	**300**
Em coder sensor	**400**	**400**
	Total (Rs):3200	

CHAPTER -5
AUTO-CAD

AutoCAD is a 2D and 3D computer-aided design (CAD) software application developed by Autodesk.[1] It was first released in December 1982 for the CP/M and IBM PC platforms as a desktop app running on microcomputers with internal graphics controllers.[2] Initially a DOS application, subsequent versions were later released for other platforms including Classic Mac OS (1989), Microsoft Windows (1993) and macOS (2010), along with companion web and mobile applications.

AutoCAD is a general drafting and design application used in industry by architects, project managers, engineers, graphic designers, city planners and other professionals to prepare technical drawings. After discontinuing the sale of perpetual licenses in January 2016,[3] commercial versions of AutoCAD are licensed through a term-based subscription

5.1 HISTORY

Before AutoCAD was introduced, most commercial CAD programs ran on mainframe computers or minicomputers, with each CAD operator (user) working at a separate graphics terminal.

A man using AutoCAD 2.6 to digitize a drawing of a school building.

AutoCAD was derived from a program that began in 1977, and then released in 1979[5] called Interact CAD, also referred to in early Autodesk documents as Micro CAD, which was written prior to Autodesk's (then Marinchip Software Partners) formation by Autodesk cofounder Michael Riddle.

The first version by Autodesk was demonstrated at the 1982 Comdex and released that December. AutoCAD supported CP/M-80 computers. As Autodesk's flagship product, by March 1986 AutoCAD had become the most ubiquitous CAD program worldwide. The first UNIX version was Release 10 for Xenix in October 1989, while the first version for Windows was Release 12, released in February 1993.

5.2 FEATURES

ESRI ArcMap 10 permits export as AutoCAD drawing files. Civil 3D permits export as AutoCAD objects and as Land XML. Third-party file converters exist for specific formats such as Bentley MX GENIO Extension, PISTE Extension (France), ISYBAU (Germany), OKSTRA and Micro drainage (UK); also, conversion of .pdf files is feasible, however, the accuracy of the results may be unpredictable or distorted. For example, jagged edges may appear. Several vendors provide online conversions for free such as Comet docs.

AutoCAD and AutoCAD LT are available for English, German, French, Italian, Spanish, Japanese, Korean, Chinese Simplified, Chinese Traditional, Brazilian Portuguese, Russian, Czech, Polish and Hungarian (also through additional language packs).[16] The extent of localization varies from full translation of the product to documentation only. The AutoCAD command set is localized as a part of the software localization.

AutoCAD supports a number of APIs for customization and automation. These include AutoLISP, Visual LISP, VBA, .NET and ObjectARX. ObjectARX is a C++ class library, which was also the base for the products extending AutoCAD functionality to specific fields creating products such as AutoCAD Architecture, AutoCAD Electrical, AutoCAD Civil 3D third-party AutoCAD-based application

There are a large number of AutoCAD plugins (add-on applications) available on the application store Autodesk Exchange Apps. AutoCAD's DXF, drawing exchange format, allows importing and exporting drawing information.

5.3 AUTO-CAD TOOLS USED FOR DESIGNING

1.LINE

You can invoke the LINE command by choosing the LINE tool from the Draw panel, or you can also invoke the LINE tool by entering LINE or L at the Command Prompt. You will have to specify the starting point of the line by clicking the mouse then you will be prompted to specify the second point. You can terminate the LINE command by pressing ENTER, ESC or SPACEBAR

2.CIRCLE

A circle is drawn by using the CIRCLE command. You can draw a circle by using six different tools, ie., by specifying center and radius, by specifying center and diameter, by specifying two diametrical ends, by specifying three points on a circle, tangent to two objects, tangent to three objects.

3.RECTANGLE

You can draw rectangles by specifying two opposite corners of the rectangle, specifying the area and the size of one of the sides, or specifying the rectangle's dimensions.

4.POLYLINE

Polylines means many lines. To draw a polyline, you need to invoke the PLINE command. After invoking the PLINE command and specifying the start point, the following prompt is displayed

5.TRIM

When creating a design, you may need to remove the unwanted and extending edge. In such cases, you can use the Trim tool. On invoking the Trim tool, you will be prompted to select the cutting edges. These edges can be lines, polylines, circles, ares, ellipses, rays, splines, text, blocks, lines or even viewports. Aller the cutting edge edges are selected, you must select each object to be trimmed.

6.EXTEND

The Extend tool may be considered as the opposite of the Trim tool. You can extend lines, polylines, rays, and area to meet the other objects using the Extend tool. You can use this option whenever you want to extend the objects that do not actually intersect the boundary edge but would intersect its edge if the boundary edges were extended.

7.COPY

This tool is used to make the copies of the selected objects and place them at the specified location. On invoking this tool, you need to select the objects and then specify the base point. Next, you need to specify the second point where the copied objects have to be placed. You can continue specifying the second point for creating multiple copies of the selected entities,

8.MIRROR

This tool is used to create a mirror copy of the selected objects. The objects can be mirrored at any angle. This tool is helpful in drawing symmetrical figures. On invoking this tool, you will be prompted to select objects. On selecting objects to be mirrored, you will be prompted to enter the first point of the mirror line and the second point of the mirror line. A mirror line is an imaginary line about which the objects are mirrored.

9.ROTATE

On invoking this tool, you will be prompted to select the objects and the base point about which the selected objects will be rotated. By default, a positive angle results in counterclockwise rotation, whereas a negative angle results in a clockwise rotation. The Rotate tool can also be invoked from the shortcut menu by selecting an object and right-clicking in the drawing area, and choosing Rotate from the shortcut menu.

10.ERASE

Sometimes, you need to erase the unwanted objects from the objects drawn. To erase an object, choose Erase tool from the Modify panel. To invoke the Modify toolbar, choose

View>>Windows>Toolbars>AutoCAD>Modify from the ribbon. A small box, known as a pick box, replaces the screen cursor on invoking the Erase tool. To erase the object, select it by using the pick box, the selected object will be displayed in dashed lines, and the Select objects prompt will be displayed again. You can either continue selecting the objects or press ENTER to terminate the object selection process and erase the selected objects.

11.MOVE

The Move Tool is used to move one or more objects from their current location to a new location without changing their size or orientation.

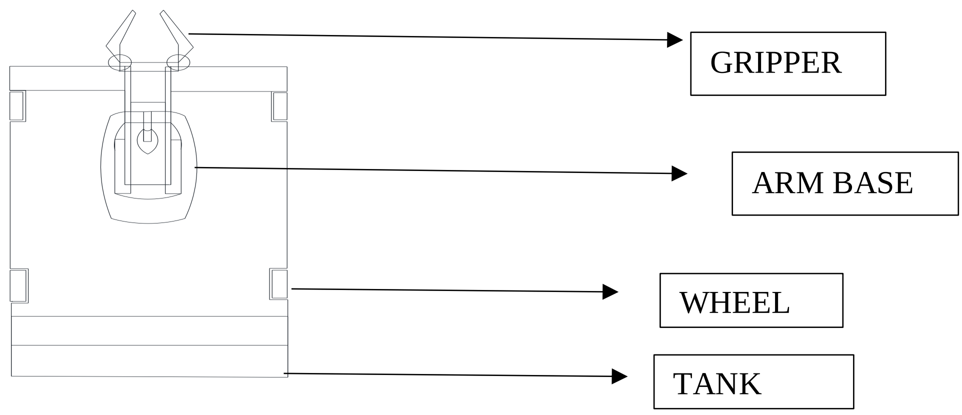
12.SCALE

Sometimes you need to change the size of objects in a drawing. For this purpose, the Scale tool comes in handy

CHAPTER-6

DESIGN

AUTOMATIC ROBOTIC ARM PLANTING MACHINE



F.g:6 AUTOMATIC ROBOTIC ARM PLANTING

CHAPTER-7
Working principle

It checks things like how wet the soil is and what the overall conditions.

Knowing the Seeds, that The robot uses smart technology to figure out what kind of seeds it's dealing with. It can handle different types of seeds.

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The Automatic Robotic Arm for Planting is like a helpful, smart assistant for farmers, making sure seeds are planted just right for a successful and efficient harvest.

The robotic arm uses its motorized joints to navigate to the designated planting location based on the map and programmed instructions.

The planting area is prepared beforehand, often with automated tilling and furrowing machines.

The robotic arm moves the seedling to the designated planting location within the furrow. Depending on the machine's design, the gripper might release the seedling directly, or it might place it in a pre-dug hole created by a separate planting mechanism.

CHAPTER-8

USES

- Basically it can be used in the planting
- Used in places where there is a continuous of farming
- Reduces the manpower. It is useful for domestic farming
- Large scale farming
- Enable precise control over planting depth, spacing, and seed placement
- Greenhouse and environmental controlled
- Crop rotation and adaptable for different type
- Time efficiency operates continuously
- Resource conservation
- Adaptive planting strategies

CHAPTER-9

ADVANTAGES

- Budget friendly
- Eco friendly
- Easy to maintain
- No skilled person are required
- Smart farming integration
- Labor reduction
- It allows real time monitoring and data collection
- Fast planting
- Precision agriculture
- Reduced worker fatigue and risk of injury

CHAPTER-10

CONCLUSION

In conclusion, the Automatic Robotic Arm for Precision Planting stands as a transformative solution that marries cutting-edge technology with the age-old practice of farming.

This project not only addresses the challenges faced by modern agriculture but also a new era of precision, efficiency, and sustainability. The benefits of this robotic arm extend beyond mere automation; it signifies a shift towards smarter, data-driven farming practices.

By harnessing the power of sensors, machine learning, and precise mechanics, the system ensures each seed is planted with meticulous care, optimizing resource utilization and promoting environmental responsibility.

The adaptability of the robotic arm to different crops, coupled with its ability to learn and adjust in real-time, reflects a commitment to versatility and continuous improvement.

It empowers farmers with tools to overcome labor shortages, reduce manual workload, and make informed decisions based on real-time data. the potential of the Automatic Robotic Arm for Precision Planting, we envision a future where agriculture becomes not only more productive but also more sustainable.

This project represents a significant stride towards a technologically advanced, efficient, and environmentally.

The Automatic Robotic Arm for Precision Planting transcends its immediate application, becoming a symbol of the agricultural sector's evolution towards a more sophisticated, efficient, and sustainable future.

It reflects a harmonious blend of technology and tradition, where innovation serves as a catalyst for positive change in the way we cultivate the land and nourish our growing global population.

REFRENCES

1.ShantanU K.Mahale, Ankush A. Mathur, Prasad A. Nandalwar, Nitesh N. Shukla,Vivek S.Narnaware, “Design,fabrication and testing of 6 DOF spot welding robotic arm”, IJSDR ISSN: 2455-2631 (Volume 3, Issue 4), April2014.

2. Muhammad Bilal, Muhammad Osama Khan, Awais Mughal, Noman Ali,“Design and control of 6 DOF robotic manipulator”, University of engineering and technology Lahore Faisalabad campus, May2018

3. Om Prakash Gujela, VidhatriGujela, Dev Prakash Gujela) “International Journal of Advanced Research in Electrical,Electronics and Instrumentation Engineering”.(An ISO 3297: 7 Certified Organization),Vol.4, Issue 9, September 2015.

4. Atharva C Paralikar, Sweekar S. Mutha, Saiyam A. Shah, SarveshVaidya. A “Research Paper on Spray-Painting Robot for Painting Irregular Workpiece”s, IRJET,Volume: 06 Issue: 06 | June 2019.

5. Marquee Hire” Robotic bible educates everyone”. Robotics Bible, September 28th,2011

6.Sadegh Poozesh, Nelson Akafuah Research Article “Effects of automotive paint spray technology on the paint transfer efficiency” – a, Kozo Saito First Published March 22, 2017.

7. Sulabh Kumra (Rochester Institute of Technology) “Design and development of 6-DOF robotic arm controlled by Man Machine” Conference: Computational Intelligence & Computing Research (ICCIC), 2012 IEEE International Conference on “6 DoF Robotic Arm”., Interface December 2012 DOI:10.1109/ICCIC.2012.6510243

8. Md. Tasnim Rana and Anupom Roy, “ Design and Construction of a Robotic Arm for Industrial Automation”, IJSRD ISSN: 2278-0181 Vol. 6 Issue 05, May 2017

9. Yagna Jadeja, Bhavesh PandyaI,” Design And Development Of 5-DOF Robotic Arm Manipulators” INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH, VOLUME 8, ISSUE 11, NOVEMBER 2019