



Robographia : Robotic Artistic System

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Abstract - Draw-Bot Robot is a machine which work is based on the Principal of Computer Numerical Control. Draw-Bot Robot basically works with two Nima-17 motors and a servo motor, where in the robot plots the input given from the computer on the drawing board using Arduino Uno microcontroller on a open-source physical computing platform arduino. The Draw-Bot plotter has a two axis control and a special mechanism to raise and lower the pen. The drawing robot is a robot which offers the fastest way to powerfully produce very large drawings. This Draw-Bot which is basically centered to the vector graphic device, wherein the robot designs or sketches the input given from the computer on the drawing board or a sheet of paper using arduino UNO microcontroller on a open-source physical computing platform arduino IDE software. The board is fed with polar graph server arduino based program which is required for the accurate diagram. The X-Y robotic plotter, as the name suggests has a two axis control (i.e. X and Y axis), and a distinctive mechanism to lift up and lift down the pen. Each axis is drove using a single servo motor. The plotter works more efficiently, which is used to recording or plotting two dimensional data on a rectangular coordinate system. In this, arduino compatible main board with two stepper motors for ease moving of pen holder and servo motor is used to lift the pen. For this we are using the software like arduino IDE software and G code converter.

Keywords: - Drawbot, Drawing Robot, Sketching, Writing .

I . INDRODUCTION

A . Introduction

A drawbot is a type of machine that can be programmed to draw pictures and designs on paper or other surfaces. It is a type of robotic arm that uses a pen or other drawing tool to create precise and intricate artwork. The drawbot is controlled by a computer program or microcontroller, which sends signals to the motors that move the arm and control the position and pressure of the pen.

Drawbots are a popular tool for artists, designers, and hobbyists who want to create unique and intricate drawings or patterns. They can also be used in engineering, architecture, and other fields where precise and controlled movements are required.

The design of a drawbot can vary depending on the specific application, but most drawbots consist of a base, an arm, and a pen holder. The arm is connected to the base with one or more joints that allow it to move in different directions, and the pen holder is attached to the end of the arm. The pen holder can be adjusted to change the position and angle of

the pen, and the pressure on the paper can be controlled by adjusting the weight or spring tension of the pen.

Drawbots can be built using a variety of materials and components, including motors, microcontrollers, sensors, and power sources. They can be programmed using a variety of software tools, including open-source programming languages such as Python or C++. Drawbots are a versatile and creative tool that can be used for a wide range of applications. They are a fun and educational project for makers of all levels, and can be used to create unique and personalized artwork or to explore the principles of robotics and automation.

B . Overview

"Robographia" aims to revolutionize the intersection of robotics and art, presenting a groundbreaking solution to the creation of automated artworks. Leveraging cutting-edge technology, Robographia offers a unique platform for artists and enthusiasts alike to explore the fusion of mechanical precision with creative expression. By combining sophisticated algorithms with tactile robotics, Robographia empowers users to generate intricate and captivating art pieces with unparalleled precision and efficiency.

However, the project faces several challenges inherent to its innovative nature. Foremost among these challenges is the need to establish trust among potential users, particularly in a field where traditional human craftsmanship has long been revered. Addressing concerns surrounding the credibility of the robotic system's artistic capabilities and ensuring transparent communication about its processes and outcomes will be paramount in gaining the trust of both artists and investors.

Moreover, in an era where the proliferation of misinformation and fraudulent activities is a pervasive issue, Robographia must prioritize the implementation of robust security measures to safeguard user data and prevent unauthorized access. Building a foundation of trust and reliability is essential for the success and widespread adoption of the Robographia platform.

In summary, Robographia's mission to redefine artistic creation through robotics presents an exciting opportunity to push the boundaries of creativity and innovation. However, to realize its full potential, the project must navigate challenges related to trust, transparency, and security, ensuring that users feel confident in the platform's capabilities and integrity.

C . Challenges

Artistic Authenticity: One challenge is ensuring that the artworks created by Robographia maintain a level of artistic authenticity and aesthetic appeal comparable to those produced by human artists. Achieving this requires fine-tuning the algorithms and parameters used by the robotic system to generate and execute artistic designs.

Versatility and Adaptability: Robographia may encounter challenges in adapting to different artistic styles, techniques, and mediums. The system must be versatile enough to accommodate a wide range of artistic preferences and effectively translate them into tangible artworks.

Precision and Accuracy: Ensuring precise and accurate execution of artistic designs is crucial for Robographia to produce high-quality artworks. Challenges may arise in calibrating the robotic components, such as the drawing mechanism and motion control system, to achieve the desired level of precision.

User Experience: The user experience of interacting with Robographia plays a significant role in its adoption and success. Challenges may arise in designing an intuitive and user-friendly interface for artists and enthusiasts to interact with the robotic system, from uploading designs to monitoring the drawing process.

Maintenance and Reliability: Like any mechanical system, Robographia requires regular maintenance and upkeep to ensure optimal performance and longevity. Challenges may arise in maintaining the reliability of the robotic components, addressing wear and tear, and troubleshooting technical issues that may arise during operation.

Artificial Intelligence Integration: If Robographia incorporates artificial intelligence (AI) for design generation or adaptive learning, challenges may arise in training and optimizing the AI algorithms to produce desirable artistic outcomes while maintaining computational efficiency and resource utilization.

Market Acceptance and Perception: Overcoming skepticism and gaining acceptance within the art community and broader market can be a challenge for a novel concept like Robographia. Educating potential users about the capabilities and value proposition of the robotic artistic system will be essential for driving adoption and overcoming resistance to technological innovation.

D. Objective

Automation of the drawing process: The primary objective of drawbot is to automate the process of drawing so that artists and designers can focus on the creative aspects of their work rather than the technical details of the drawing process.

Precision and accuracy: Drawbots can offer highly accurate and repeatable drawings, which can be useful in various applications such as technical drawing, graphic design, and art.

Flexibility and adaptability: Drawbots need to be designed to work with a wide range of surfaces and drawing tools, and they should be able to adjust their movements to accommodate these differences.

Safety and user-friendliness: Drawbots need to be designed with safety in mind, especially if they are intended for use by children or inexperienced users. They should be easy to use and maintain, and include features such as safety guards, automatic shut-off mechanisms, and warning systems.

Creativity and exploration: While drawbots are designed to automate the drawing process, they also offer opportunities for creative input from the artist or designer. Drawbots can

generate aesthetically pleasing designs, and they can be used to explore new possibilities in art and design.

Education and learning: Drawbots can be used as educational tools for teaching technical drawing and design concepts to students of all ages. They can help students develop their skills in areas such as geometry, spatial reasoning, and programming.

Research and development: Drawbots can also be used as platforms for research and development in fields such as robotics, artificial intelligence, and human-computer interaction. They can help researchers explore new approaches to automation, sensing, and control in a real-world context.

E . Background :

"Robographia: Robotic Artistic System" represents a groundbreaking fusion of technology and artistry, offering a glimpse into the future of creative expression. At its core, Robographia seeks to redefine the boundaries of traditional art by harnessing the power of robotics and artificial intelligence to produce stunning visual compositions.

The inspiration behind Robographia stems from the intersection of human creativity and technological innovation. In an era where automation and digitalization dominate various aspects of our lives, Robographia serves as a testament to the harmonious coexistence between humans and machines in the realm of artistic endeavor.

Drawing upon advanced algorithms and machine learning techniques, Robographia is endowed with the ability to analyze and interpret diverse artistic styles, allowing it to emulate the techniques of renowned artists or even forge entirely new aesthetic paradigms. Equipped with an array of precision tools and materials, the robotic arm executes each stroke with meticulous accuracy, imbuing each artwork with a sense of dynamic energy and fluidity.

F . Research Gap:

One potential research gap for the "Robographia: Robotic Artistic System" project lies in the development of an adaptive and context-aware drawing algorithm. While current robotic drawing systems can reproduce predetermined images with remarkable precision, they often lack the ability to dynamically adjust their drawing style or technique based on contextual factors such as the content of the image being drawn, the intended audience, or the cultural background of the artwork.

Addressing this research gap would involve the design and implementation of a sophisticated AI-driven algorithm that enables Robographia to analyze and interpret various contextual cues, allowing it to adapt its drawing style in real-time to better align with the artistic intent or the preferences of the viewer. This could involve integrating techniques from computer vision, natural language processing, and cognitive psychology to develop a more nuanced understanding of the artistic context and enable the robot to make informed decisions about how to render a given image.

By bridging this research gap, Robographia could evolve from a mere drawing tool into a truly creative collaborator, capable of engaging in meaningful interactions with artists and audiences and contributing to the exploration of new frontiers in robotic artistry. Additionally, such advancements could have broader implications for human-robot interaction and the development of AI systems that are capable of adapting to diverse and dynamic environments.

G . Scope:

Improved accuracy and precision: Drawbots offer the potential for highly accurate and precise drawings, which can be useful in a variety of applications, such as technical drawing, graphic design, and art.

Increased efficiency and productivity: Drawbots can automate the drawing process, which can save time and increase productivity, especially in applications where repetitive drawings are required.

Greater flexibility and adaptability: Drawbots can work with a wide range of surfaces and drawing tools, which can make them more versatile than traditional drawing methods.

Exploration of new creative possibilities: Drawbots can generate unique designs and patterns that may not be possible or practical to create by hand, which can expand the boundaries of creativity and exploration in art and design.

Educational and learning opportunities: Drawbots can be used as educational tools to teach technical drawing and design concepts to students of all ages, which can help them develop skills in areas such as geometry, spatial reasoning, and programming.

Research and development: Drawbots can be used as platforms for research and development in fields such as robotics, artificial intelligence, and human-computer interaction. They can help researchers explore new approaches to automation, sensing, and control in a real-world context.

Personalization and customization: Drawbots can be programmed to create personalized and customized drawings, which can be used in applications such as personalized gifts and branding.

Accessibility: Drawbots can be used to create drawings that are accessible to people with disabilities, such as visually impaired individuals who can feel the drawings.

H . Expected Outcome:

Artistic Exploration: Users will be able to explore their creativity through the robotic drawing system, creating unique artworks that blend human intention with machine precision.

Accessible Art: By making art creation more accessible through technology, Robographia could empower people who may not have traditional artistic skills to express themselves visually.

Educational Tool: Robographia could serve as an educational tool, teaching concepts of robotics, programming, and art in an engaging and hands-on way. It could be used in schools, workshops, and maker spaces to inspire the next generation of creators.

Collaborative Art: The project could foster collaboration between humans and machines, with users providing input or inspiration while the robot executes the drawing. This collaborative process could lead to unexpected and innovative artworks.

Exhibition and Showcases: The completed artworks produced by Robographia could be exhibited in galleries, museums, and tech showcases, sparking conversations about the intersection of art and technology.

Customization and Personalization: Users could customize the drawing parameters and styles of Robographia to suit their preferences, allowing for a wide range of artistic outputs from intricate line drawings to abstract compositions.

Community Engagement: Building a community around Robographia, through online forums or social media, could encourage users to share their creations, exchange ideas, and provide feedback for further improvements.

Commercial Potential: Depending on its capabilities and market demand, Robographia could have commercial potential as a product for artists, hobbyists, or educational institutions.

II. RELATED WORK

[1] The Drawbot is a versatile drawing machine that uses a simple mechanism to create intricate artworks. It consists of a two-axis gantry system controlled by stepper motors, with a pen or other drawing instrument attached to it. Similar to Robographia, the Drawbot allows users to create drawings of various complexities, ranging from simple sketches to intricate designs. It's programmable and can be controlled via software to execute different drawing commands, enabling users to experiment with different styles and techniques. Studying the Drawbot can provide valuable insights into the design, mechanics, and control algorithms of a robotic drawing system. You can analyze its kinematics to understand how it translates digital commands into physical movements, as well as its software interface for generating and executing drawing instructions. Additionally, you can explore how users interact with the Drawbot and the creative possibilities it offers. By examining the Drawbot and similar projects, you can gather inspiration, identify potential challenges, and refine your own ideas for Robographia. You may also discover innovative features or improvements to incorporate into your robotic artistic system, ultimately enhancing its functionality and user experience.

[2] The WaterColorBot is a similar robotic system designed to create watercolor paintings. It consists of a robot arm equipped with a brush that can move across a canvas to paint various designs and patterns. Like Robographia, the WaterColorBot merges technology with artistic expression, allowing users to create intricate artworks without the need for advanced drawing skills. It's also programmable, giving users control over the drawing process and enabling them to experiment with different techniques and styles. Studying the WaterColorBot can provide valuable insights into the design, mechanics, and programming aspects of a robotic drawing system. You can analyze its hardware components, such as the robotic arm and brush mechanism, as well as its software interface for controlling the drawing process. Additionally, you can explore how users interact with the WaterColorBot and the creative possibilities it offers. By examining the WaterColorBot and similar projects, you can gather inspiration, identify potential challenges, and refine your own ideas for Robographia. You may also discover innovative features or improvements to incorporate into your robotic artistic system, ultimately enhancing its functionality and user experience.

[3] The AxiDraw is a versatile pen plotter that can be used for a wide range of drawing and writing applications. It consists of a sturdy frame with two axes of motion controlled by stepper motors, allowing precise control over the movement of a pen or other drawing instrument. Similar to Robographia, the AxiDraw is programmable and can be controlled via software to create drawings of various complexities. It supports a wide range of drawing styles and techniques, from simple line drawings to intricate designs and text. Users can generate drawing instructions using vector graphics software or programming languages like Python, enabling them to create custom artworks with ease. Studying the AxiDraw can provide valuable insights into the design, mechanics, and control algorithms of a robotic drawing system. You can analyze its kinematics to understand how it translates digital commands into physical movements, as well as its software interface for generating and executing drawing

instructions. Additionally, you can explore how users interact with the AxiDraw and the creative possibilities it offers. By examining the AxiDraw and similar projects, you can gather inspiration, identify potential challenges, and refine your own ideas for Robographia. You may also discover innovative features or improvements to incorporate into your robotic artistic system, ultimately enhancing its functionality and user experience.

[4] The Polargraph is a drawing machine that uses a simple yet effective mechanism to create large-scale artworks. It consists of two stepper motors that control the movement of a pen suspended on strings, allowing it to draw on a vertical surface such as a wall or canvas. Similar to Robographia, the Polargraph is programmable and can be controlled via software to create drawings of various sizes and complexities. It supports a wide range of drawing styles and techniques, from simple line drawings to more intricate designs and patterns. Users can generate drawing instructions using vector graphics software or custom scripts, enabling them to create custom artworks with precision. Studying the Polargraph can provide valuable insights into the design, mechanics, and control algorithms of a robotic drawing system. You can analyze its kinematics to understand how it translates digital commands into physical movements, as well as its software interface for generating and executing drawing instructions. Additionally, you can explore how users interact with the Polargraph and the creative possibilities it offers. By examining the Polargraph and similar projects, you can gather inspiration, identify potential challenges, and refine your own ideas for Robographia. You may also discover innovative features or improvements to incorporate into your robotic artistic system, ultimately enhancing its functionality and user experience.

[5] A related work to your project, "Robographia: Robotic Artistic System," could be the "Plotclock" developed by Johannes Heberlein. The Plotclock is a small drawing robot that tells the time by drawing the current time on a whiteboard or other drawing surface. It consists of a two-axis mechanism controlled by stepper motors, with a pen attached to it. Similar to Robographia, the Plotclock demonstrates the capabilities of a simple drawing robot and showcases its potential for creative and practical applications. While the primary function of the Plotclock is to display the time, it also serves as a playful and engaging example of how robotic systems can be used for drawing and visualization tasks. Studying the Plotclock can provide insights into the design, mechanics, and control algorithms of a drawing robot, particularly in the context of interactive and functional applications. You can analyze its kinematics to understand how it translates time data into drawing instructions and how it coordinates the movement of the pen to create recognizable characters and numbers. Additionally, you can explore how users interact with the Plotclock and the possibilities it offers for customization and expansion. By examining the Plotclock and similar projects, you can gather inspiration, identify potential challenges, and refine your own ideas for Robographia. You may also discover innovative features or improvements to incorporate into your robotic artistic system, ultimately enhancing its functionality and user experience.

[6] A related work for your project "Robographia: Robotic Artistic System" could be the "Line-us" drawing robot. Line-us is a small, portable drawing robot designed to create sketches and drawings based on digital input. Similar to Robographia, Line-us is a simple drawing robot that focuses on ease of use and accessibility. It consists of a compact robotic arm with a drawing tool attached, controlled by software that allows users to send drawings from their digital devices. Line-us offers a user-friendly interface and is suitable

for artists, designers, and hobbyists who want to explore the possibilities of robotic art. Its compact size and wireless connectivity make it versatile and convenient for creating artwork anywhere. Studying Line-us can provide insights into the design, mechanics, and control algorithms of a simple drawing robot like Robographia. You can learn how Line-us translates digital drawings into physical sketches and how it coordinates the movement of the drawing tool to create accurate and expressive artwork. Additionally, exploring how users interact with Line-us and the types of artwork they create can inspire new ideas and approaches for your own robotic artistic system. You can leverage Line-us's user-friendly design and innovative features to enhance the functionality and user experience of Robographia, ultimately unlocking its creative potential and expanding its capabilities as a drawing robot.

[7] Another related project for my Robographia endeavor is the "Drawing Machine" created by artist and engineer Eske Rex. Rex's Drawing Machine is a mesmerizing robotic system that explores the intersection of art, technology, and mechanics. Consisting of a large mechanical arm suspended from the ceiling, the Drawing Machine uses precise movements to create intricate drawings on paper placed on the floor. What makes Rex's project particularly intriguing is its blend of precision engineering and artistic expression. The Drawing Machine is programmed with algorithms that dictate its movements, allowing it to produce complex patterns and compositions. Additionally, Rex often incorporates elements of chance and randomness into the Drawing Machine's programming, resulting in unique and unpredictable artworks. By studying Rex's work, you can gain valuable insights into the mechanical design, programming techniques, and conceptual considerations essential for developing your own Robographia robotic drawing system.

[8] A related project to inspire my Robographia is "Der Kritzler" by German artist Jürg Lehnli. Der Kritzler, which translates to "The Scribbler," is a robotic drawing machine that explores the relationship between human input and mechanical output. It consists of a robotic arm equipped with a pen, controlled by custom software developed by Lehnli. What sets Der Kritzler apart is its emphasis on collaboration between humans and machines. Users can interact with the robot by drawing on a touchscreen interface, which the robot then interprets and translates into physical drawings. This dynamic interaction between human creativity and mechanical execution results in unique and unpredictable artworks. Studying Der Kritzler can provide valuable insights into how to design a robotic drawing system that not only autonomously creates art but also engages with human input, fostering a symbiotic relationship between technology and creativity in your Robographia project.

III . SUMMARY TABLE :

Feature	Description
Name	Robographia: Robotic Artistic System
Purpose	Automated drawing system designed to create various artworks using robotic precision
Functionality	Capable of drawing any image or design programmed into its system
Technology	Utilizes robotics, computer vision, and machine learning algorithms for accurate rendering
Input Methods	Accepts input in the form of digital images, sketches, or vector files
Output Formats	Produces artwork on various mediums such as paper, canvas, or digital screens
Customization Options	Allows users to adjust drawing parameters such as line thickness, color palette, and style
Scalability	Can be scaled for different sizes of artwork, from small sketches to large murals
Accessibility	User-friendly interface for artists of all skill levels, from amateurs to professionals
Potential Application	Art creation, educational tool for teaching drawing techniques, advertising installations
Integration Possibilities	Integration with online platforms for custom artwork creation, collaboration with other robotic systems for large-scale projects
Maintenance	Regular maintenance schedule for optimal performance and longevity of the robotic components

IV . HARDWARE USED :

[1] Arduino Uno:

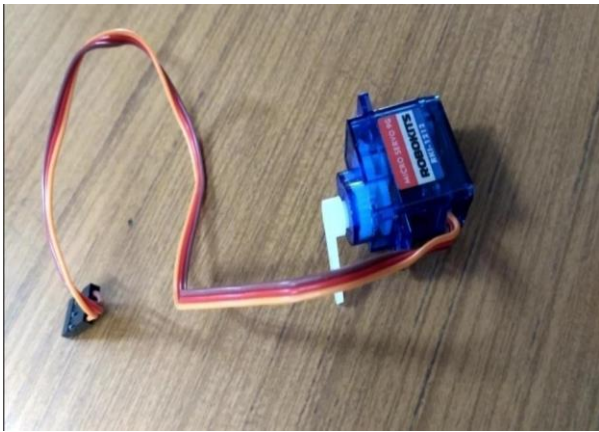


Figure 1 : Arduino Uno

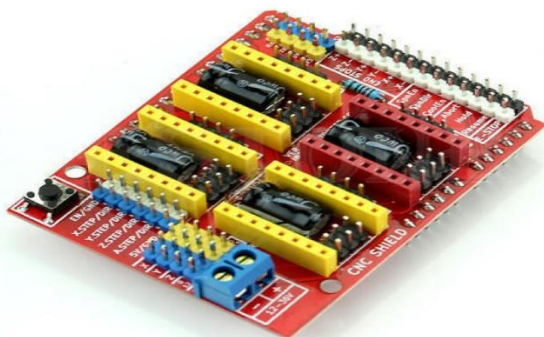
The Arduino board controller was advanced, viable, quick and better accomplishment of force framework control and administration utilizing installed segments. It containing the oscillatory circuit, reset, equipment segments and so on. The MCU is essential thought of the PWM for controlling DC Motor. The output devices are used a LCD display which is connected on digital output of board. This LCD screen is used to display real time value of PWM and information for individual inwheel DC Motors or otherwise voltage across each motor terminal. A serial data communication method is used while the data transfer has intense to passing MCU to external devices such as L293D DC Motor driver, LCD output device. In Arduino controller board, the digital outputs provided through the pin nos are (5), (6), (10) and (11) are selected to transmit the PWM signal to DC Motor driver device.

KEY FEATURES OF ARDUINO BOARD

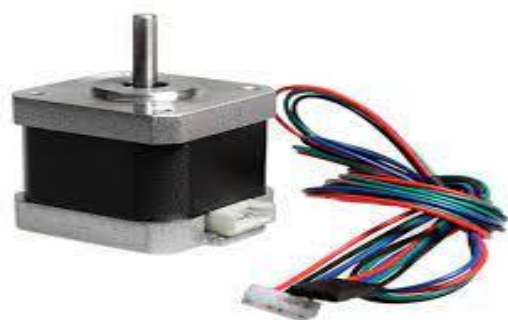
Atmega328p microcontroller is a heart of the Arduino Uno boards. It is largest chip for Arduino UNO. Microcontroller development platform board used along with Arduino IDE (integrated development software) device programs. With simple C language, write programmers over microcontroller as a brain for operation to tell or to read signal from outside world and respond to this signal from arm imagination that how we want microcontroller react to the outside world measuring whatever we control with the data. Microcontroller chip have basic support circuitry chip that allow you to access information and respond to outside world. It has 3.3volt regulator 5volt regulator, and USB input port. The reset switch allows you to reset Microcontroller to start program again. This board essentially is an autonomous board. Initially we need have to program it into flash memory, program remains in the chip even power off conditions. Initially you can get power from USB cable through which we are programmed or a separated 9V battery or from power source to the power this Board. The boards have a set of output digital pin provided 5 volts, analog inputs accept 0-5volt input that can read a voltage signal from outside world and information to microcontroller for realizing programs. We can access 3.3V and 5V for other customized.

[2] Servo Motor:**Figure 2: Servo Motor**

A servo motor is an entirely different story the function of the servo is to receive a control signal that represents a desired output position of the servo shift and apply power to its Dc motor until its shaft turns to that position.

[3] CNC-Shield:**Figure 3: CNC-Shield**

CNC shield CNC shield V3 is an open source hardware used to control stepper motors. Allows you to control 4 motors simultaneously. It uses removable A4988 stepper controls. Stepper motors are connected via 4-pin connectors. Its supply voltage is 12-36V.

[4] Nima 17 Stepper Motor:**Figure 4 : Nima 17 Stepper Motor**

A Step Motor is defined as a device whose normal shaft motion consists of discrete angular movements of essentially

uniform magnitude when driven from a sequentially switched DC power supply. Nima 17 motors are used where we need Accurate movement like floppy disk drives, flatbed scanners, computer printers, plotters, slot machines, image scanners, compact disc drives, intelligent lighting, camera lenses, CNC machines, and 3D printers.

[5] Stepper Driver:**Figure 5:Stepper Driver**

The A4988 Stepper Motor Driver is used to control bipolar stepper motors, including micro stepping. So basically, think of the A4988 as a motor driver. We will use it to send commands from an Arduino or NodeMCU to control how the stepper motor moves. Due to the simplicity of the step motor control and the variety of stepping modes provided by the A4988 driver, it is an ideal solution for building applications that require precise and reliable stepper motor control, such as the movement control of beds, heads, and assemblies in various CNC plotting, milling, and 3D printer designs.

[6] Timing Pulley:**Figure 6: 16 Teeth timing pulley**

The Aluminum GT2 Timing Pulley 20 Tooth 5mm Bore For 6mm Belt is for precise motion control, GT2 belts, and pulleys offer excellent precision at a great price. This pulley has 20 teeth and a 5mm inner bore. Two set screws can be used to attach it firmly to any 5mm diameter shaft. Full aluminum construction means these are very light and very durable.

- Timing pulleys with 16 teeth are used to transmit power from a stepper motor to a timing belt.

- The number of teeth on the pulley determines the speed of the stepper motor.
- A pulley with 16 teeth will cause the stepper motor to rotate 16 times for every revolution of the timing belt.
- Timing pulleys with 16 teeth are commonly used in 3D printers and CNC machines.

[7] Timing Belt:

- 5mm timing belts are a type of synchronous belt that is used to transmit power between two or more rotating shafts.
- They are made of a polyester or polyurethane core that is covered with a layer of rubber or thermoplastic.
- The teeth on the belt are molded into the rubber or thermoplastic layer.
- 5mm timing belts are available in a variety of lengths, widths, and pitches.
- The pitch of a timing belt is the distance between the centers of two adjacent teeth.
- The most common pitch for 5mm timing belts is 5mm.
- 5mm timing belts can be used in a variety of applications, including:
 - 3D printers
 - CNC machines
 - Robots
 - Automotive engines



Figure 7: Timing belt

[8] Bearing 608zz:



Figure 8: Bearing 608zz

A 608ZZ bearing is a single-row deep groove ball bearing with two shields. The shields protect the bearing from dirt and moisture, making it ideal for use in harsh environments. 608ZZ

bearings are commonly used in skateboards, inline skates, scooters, and other recreational equipment. They are also used in a variety of industrial applications, such as conveyors, machinery, and automotive parts. 608ZZ bearings are available in a variety of sizes and materials. The most common size is 8mm x 22mm x 7mm. The material of the bearing can be steel, stainless steel, or nylon. 608ZZ bearings are relatively inexpensive and easy to find.

Advantages of 608ZZ bearings

- They are durable and can withstand high loads.
- They are low-maintenance and require little lubrication.
- They are available in a variety of sizes and materials to meet the needs of different applications.

[9] Bearing 624zz:



Figure 9: Bearing 624zz

The 624ZZ bearing is a single-row deep groove ball bearing with two shields. The shields protect the bearing from dirt and moisture, making it ideal for use in harsh environments. 624ZZ bearings are commonly used in skateboards, inline skates, scooters, and other recreational equipment. They are also used in a variety of industrial applications, such as conveyors, machinery, and automotive parts. 624ZZ bearings are available in a variety of sizes and materials. The most common size is 4mm x 13mm x 5mm. The material of the bearing can be steel, stainless steel, or nylon. 624ZZ bearings are relatively inexpensive and easy to find.

Advantages of 624ZZ bearings

- They are durable and can withstand high loads.
- They are low-maintenance and require little lubrication.
- They are available in a variety of sizes and materials to meet the needs of different applications.

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VI . CONCLUSION

This project helps us to draw an image faster with more accuracy about 80%. Robot has an ability to work at a constant speed without pausing for breaks. Draw-bot is a machine which creates the drawing using Electronic components and programing through image processing. Drawing robot finds its application in many fields. It is a useful device in the field of designing, creating sketches, writing. Letters and images can be drawn by taking the inputs from the PC. Further, additional improvements can be done by incorporating the graphical user interface for making the arm more user could be controlled in remote place by the Web browser.

The existing Drawing Robots are of high cost, difficult to maintain and requires highly skilled operators. Our Draw-Bot overcomes these problems. It is of low cost and easy to control and there is no need of highly skilled operators. It can be used for long hours at a stretch which is not possible in existing ones. It is hoped to extend this work for future development.