Review Paper on Automatic Engraver

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Abstract: - **Nowadays more and more individuals are turning to robots to do their work, because robots are more versatile, accurate, reliable and also reduce human efforts. We have the technologies like, automatic speech writing machine, TTS, speech to text output machine, printers, scanners, etc. But the basic problem is, it can only write those fonts which the computer already has. Our project Automatic Engraver will work on IOT principle. We are using Arduino and some other mechanical devices, like Shaft with slider, threaded screw, etc. in our project.**
Our engraver machine will wright and draw in X and Y axis. And we are not using laser as engraving pen, because it harms environment. We are using pen, marker, metal pens etc. for engraving on different types of material like metal, plastic, glass and paper.
We use mechanical, electrical components as well as software for coding.

Keywords: - ARDUNIO, Servo Motor, Stepper Motor, Shaft, Bearing, Pen, Slider, Nut, Spring, Engraving Machine.

INTRODUCTION

In recent time technological advancement can be seen in every area. So, we are making a machine which can reduce time of writing in many fields. So, we can reduce man power and save so many industrial hours as well as personal hours. Now days we have many technologies like listed above for writing and drawing but we want a machine that write on page what we want like documents in offices, assignments of students etc. Also, we can engrave different types of surfaces like glass, metal, plastic etc. with this machine. We are making working model of automatic engraver that can be used for professional as well as industrial use. It is compact machine so can be carried anywhere easily. We can use it for different purposes with only changing its engraving pen. Mainly it can be used in educational purposes, students as well as faculties both can use this to make work fast and efficient. Students use this machine to write assignments as well as in projects. Faculties use this machine to write papers or any other documents.

HISTORICAL BACKGROUND OF ENGRAVING MACHINES

An engraver is mechanical or electromechanical machine for writing characters. The first commercial engravers were introduced in 1874, but did not become common in offices until after the mid-1880s. The engraver quickly became an indispensable tool for practically all writing other than personal handwritten correspondence. In 1575, an Italian printmaker, Francesco Rampazetto, invented the scrittura tattile, a machine to impress letters in papers. In 1714, Henry Mill obtained a patent in Britain for a machine that, from the patent, appears to have been similar to an engraver. In 1802, Italian Agostino Fantoni developed a particular engraver to enable his blind sister to write. Between 1801 and 1808, Italian Pellegrino Turri invented an engraver for his blind friend Countess Carolina Fantoni da Fivizzano. In 1823, Italian Pietro Conti da Cilavegna invented a new model of engraver, the tachigrafo, also known as tachitipo. In 1829, American William Austin Burt patented a machine called the "Typographer" which, in common with many other early machines, is listed as the "first engraver". From 1829 - 1870, many printing or typing machines were patented by inventors in Europe and America, but none went into commercial production. American Charles Thurber developed multiple patents, of which his first in 1843 was developed as an aid to the blind, such as the 1845 Chirographer. Hansen Writing Ball, in 1865, Rev. Rasm Malling-Hansen of Denmark invented the Hansen Writing Ball, which went into commercial production in 1870 and was the first commercially sold engraver. It was a success in Europe and was reported as being used in offices in London as late as 1909. James Fields Smathers of Kansas City invented what is considered the first practical power-operated Engraver in 1914. In 1920, after returning from Army service, he produced a successful model and in 1923 turned it over to the Northeast Electric Company of Rochester for development. In 1928, Delco, a division of General Motors, purchased Northeast Electric, and the engraver business was

spun off as Electromatic Engravers, Inc. In 1933, Electromatic was acquired by IBM, which then spent $1 million on a redesign of the Electromatic Engraver, launching the IBM Electric Engraver Model 01 in 1935. In 1964, a man named C. Kumar N. Patel created a laser engraver. In 2001, TYKMA Technologies is formed, eventually becoming TYKMA and merging with Electrox. The new company, TYKMA Electrox, stands as a fully integrated worldwide organization offering efficient and modern MOPA fiber laser engraver systems. There are positive and negative effects with the laser engraver on society. Some negative effects it could have on society is the amount of radiation it emits is too strong to exposed to and could eventually cause some major side effects if that were to take place. So, we are moving towards IOT based engraver, which operas by Arduino. Different types of Engraver Machines available at market are as follows: -

- Mechanical Engraving Machine
- Rotary Engraving Machine
- Manual Engraving Machine
- CNC Engraving Machine
- Laser Engraving Machine

LITERATURE REVIEW

Out team goes through various different review papers so we can know about other people's work on different types of engraving machine. We find some very useful papers that are listed below.

1. M. Aditi, S. Karpagam, B. Nandini, B. S. Murugan have done study on the Automated writing and drawing machine. Which is use to write with speech recognition system for physical handicap person. In this machine robotic arm is programmed to write down words which pronounces in the microphone. They use Arduino with CNC machine, It can draw most of basic shapes & texts. Which is faster and more accurate than humans.

2. Sonali Dhanwade, Reshma Magar, Asmita Deshmukh have done research on developing a writing machine which helps the students or office workers to write. It is used to write the characters, words from document with the help of hardware and software. They use UNO Arduino, servo motor, Grbl shield, motor driver and Benbox software, stepper motors (taken from old DVD writers). The main advantage of this proposed system is to just recognize the file from computer which want to write on paper using this writer machine without any hassle. It will reduce the workload as well as your time. They focus on reducing the size of the hardware so the total system will become smaller.

3. Saif Aldeen Saad Obayes, Ibtesam R. K. Al-Saedi, Farag Mahel Mohammed have done research on Prototype Wireless Controller System based on Raspberry Pi and Arduino for Engraving Machine. Wireless controller system provided a simple NC (Numerical Control) machine network technology. This machine is used to write on different things by pen. Like on paper, metal, plastic etc. The work area is 200mm in X axis, 200mm in Y axis & 70mm in Z axis. GRBL is software for controlling the motion of machines that make things. Benbox software is used to convert the image into g-code format.

4. Infantantoabishek.J, Nandhagopal.V. S, Kesavan.S, Hakkim.M, Sivakumar.S have done research Mini CNC Engraver Machine which is similar to CNC milling machine. It reduces worksheet residue & frequency of errors. They have 3 dimensional (X, Y&Z axis) working area of 230mm x 290mm. This machine can engrave on plastic, steel, aluminum, wood etc. It gives the better precision accuracy at competitive development cost. With the help of G code, it gives better productivity & reduces the work load also it gives the information about the positions of all the stepper motor on the computer screen so we can easily start or stop the system motor whenever we want.

5. R. Balathangam, P. Mathipriya, R. Pavithra, G. Prithiviraj, U. Poornima have done design and development of Arduino controlled writing robot. The main objective of this machine is to develop writing robot by speech recognition technique. In this writing robot visual basic software is used and for speech recognition, Arduino microcontroller has been used. First, user is to feed message via mic that will be filtered by amplifier and low pass filter. Then the analog signal given to the personal computer with microsoft visual basic studio. Using speech to text conversion algorithm analog signal converted into text depend on the user's input. Then the converted text will send to the Arduino controller using serial cable. Servo motor used to control the angular movement of robot hand. It makes writing on a paper using robot hand fixed with pen.
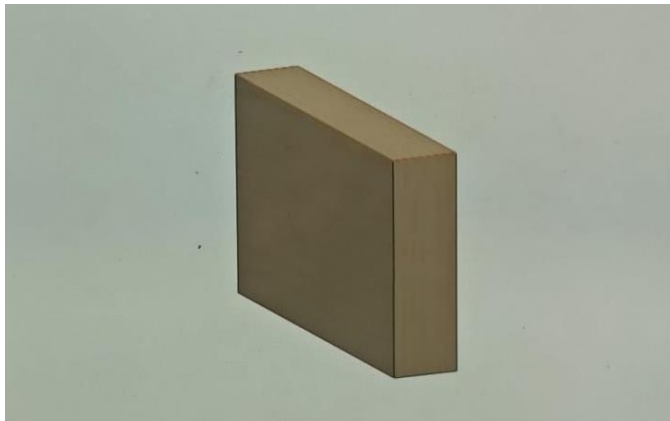
SYSTEM

In our project we are making automatic engraving machine which is compact, affordable, works in X and Y axis and which can engrave different surfaces. Our automatic engraver has work area of A4 size. Our main aim is to reduce cost and compact size for easy to carry. We are using servo motor and stepper motor for motion in X and Y axis. We are using wood for body part because it has low weight, easy operations on it and easy to attach other parts on it. In our project we are using Arduino as controller and Arduino IDE software for coding. Our system can connect to laptop through USB and it will take commands from it and draw or write with attached pen holder. We will enter code in software which we want to print and also give RPM for motion and spacing. After running code, the pen will move in X & Y directions. For repeat the process multiple time we have to run code multiple times. If we want to draw something the we have to add drawing in code. Motor is connected to pen holder with lead screw and shafts. The pen

holder is flexible so we can engrave different surfaces with various types of engraving pens. The components are:

- Servo motor
- Stepper motor
- Wooden sticks
- Glue
- Lead screws
- Pens
- Springs
- Screws
- Acrylic material
- Bearings
- Plain shafts with slider
- Threaded shafts with coupling and nuts
- 2 axis stepper motor board drivers

MODELLING OF DIFFERENT COMPONENTS

Before making any machine, that is very important step to design that machine and decide dimensions of the omponents and decide weight of the whole machine. For the modelling of our engraver machine we use SOLIDWORKS. Following are the images of that components which are we made in SOLIDWORKS.
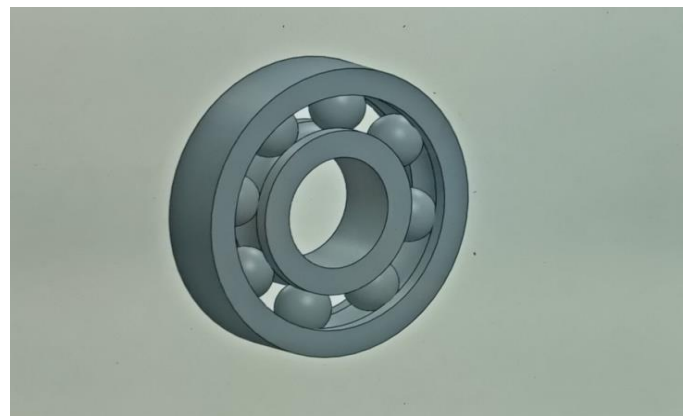

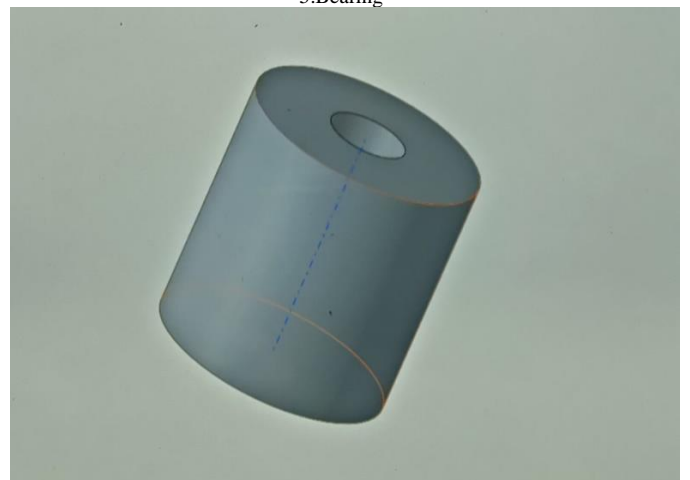1.Wooden block

2. Stepper motor
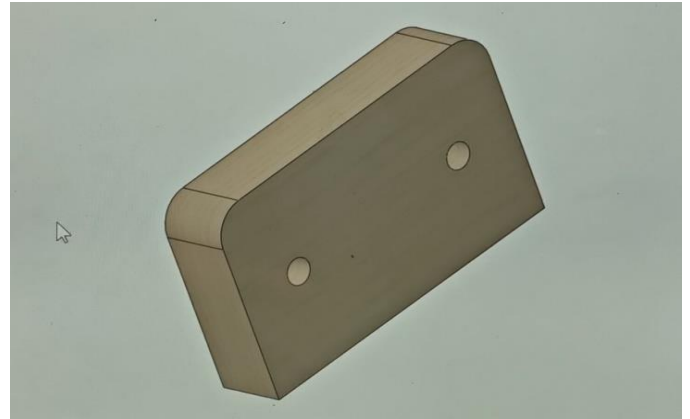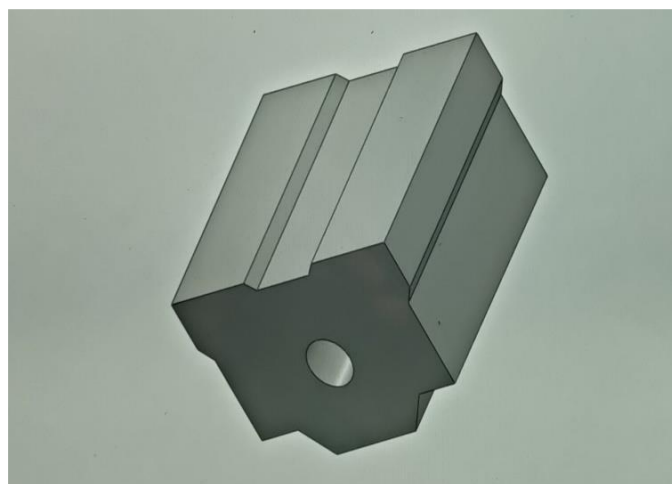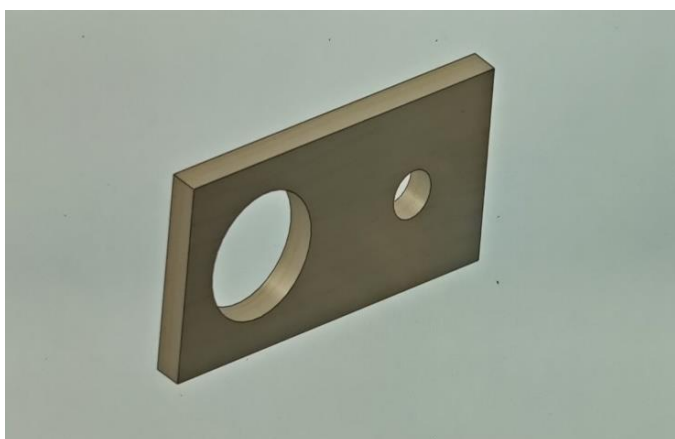

3.Wooden block
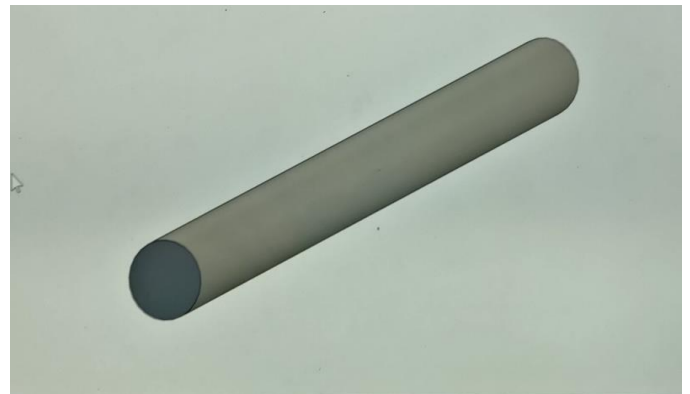
4.Shaft

5.Bearing

6.Coupling

7.Shaft

8.Block

9.Nut

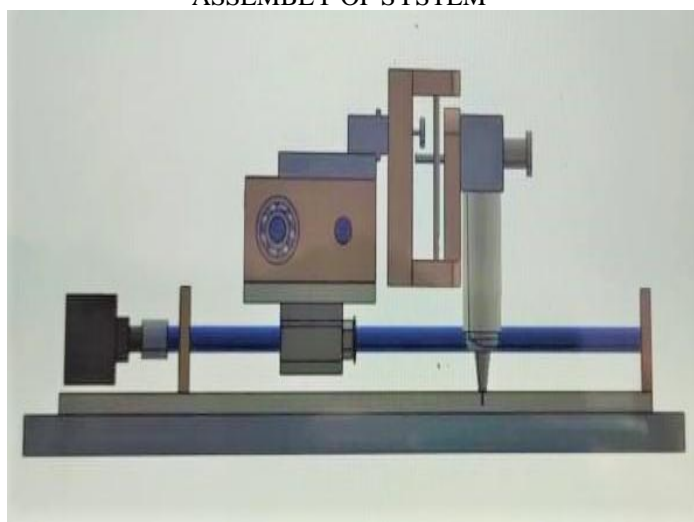

10.Slider

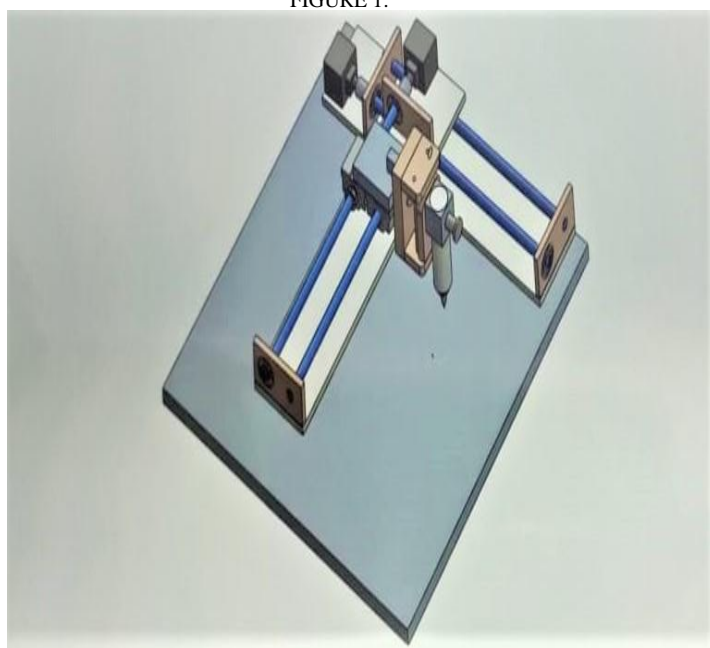## ASSEMBLY OF SYSTEM

FIGURE 1.

FIGURE 2.

CONCLUSION

This machine will give better accuracy and reduce work load with the combination of hardware and software. This machine can engrave different surfaces with just changing the engraving pen. This machine will be easy to use and convenient. This machine can be use by teachers, students and in offices where still some documents are writing manually. Making a small machine brings a flexibility to do work. Students can write their assignments with this machine; we can draw or write on smartphone case covers. This machine has wide range of applications. We can draw company name and logos on different surfaces with this machine. So, this machine is useful for industrial purposes and personal purposes because of low cost
and great flexibility.

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[6] Youtube: https://youtu.be/S8YVlR_1hlo

[7] Youtube: https://youtu.be/atkGcfnsK3A