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"A REAL TIME DESIGN AND DEVELOPMENT OF PEN PLOTTER MACHINE FOR AUTHENTICATION SYSTEM AND SIGNATURE PLOTTING"

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ABSTRACT

This project describes a serial communication based CNC Pen Plotter Machine based on software and hardware for signature making based on Fingerprint authentication system and signature of the authentication person. Mini CNC Plotter Machine is an embedded system that works on the Principle on 'Computer Numeric Control (CNC)'. The system basically works with three stepper motors (two for X-axis & one for Y-axis) and micro-servo controller (for Z-axis). Where in Arduino Circuit plots the input given from the computer through 'ENSCAPE Software' on the sheet which is placed on the drawing board using micro-controller. The plotter has four axis control (2 X-axis and 1 Y& Z axis resp.) and a micro-servo controller for movement of pen. This system reduces human effort and also reduces the chances of error. The efficient and correct mounting of all the parts and proper use of software and correct alignment of circuit makes the system more efficient
.

Keywords: Servo Motor, ATmegha328, Arduino uno, Fingure Print module.

I. INTRODUCTION

This project is about to design to save the signature of any person in the database of the module which will be tart printing as per the user thumb authentication system. This technology will help the disable person for giving per signature ass per their thumb impression. This technology based on CNC machine pen plotter system.
Introduction to plotter: In today's world the basic requirement of any industry is to produce large quantity and quality products with low production and installation cost having

high surface finish and great dimensional accuracy. So this can be achieved by a machines which are controlled by computer i.e. Computerized Operated Machines. They are basically known as CNC machines. By using a CNC machine the products are produced at a faster rate with high accuracy and less human interference. The CNC machines usually are of various types. The most common used CNC machines use two-axis CNC machine and three-axis CNC machine. The CNC machine is a system. This system consists of three important parts viz. Mechanical design, Drive modules, and system software. The mechanical design consists the body of the system. The drive modules consists of the microprocessor. And finally the System Software is used to generate the drawing on the sheet. Mini CNC plotter Machine is the automation of machines that are operated by precisely programmed commands. The main function of CNC plotter is used for plotting various drawings of products. The working principle of CNC plotter is very similar to CNC machine. In this system instead of plotting the drawing of product by hand, it is plotter by a computer controlled pen. It produced a high quality work as compared with the human work. Automation and precision are the main advantages of CNC plotter table. In this project we will show how to build your own low cost mini CNC plotter. The printing area will be restricted to 400*400mm, because it works on serial communication.

II. LITERATURE REVIEW

"Low Cost Computer Numeric Controller Using Open Source Software and Hardware". Muhammad Yaqoob Javed, Sayyed Tahir Hussain Rizvi , M. Amer Saeed, Kamran Abid, Osama Bin Naeem, Adeel Ahmad, Kamal Shahid[2015]

This paper will present the design and fabrication of Laser Powered 3axis computer numerically controlled(CNC) machine which comprise the use of a graphical user interface(GUI) and Arduino micro

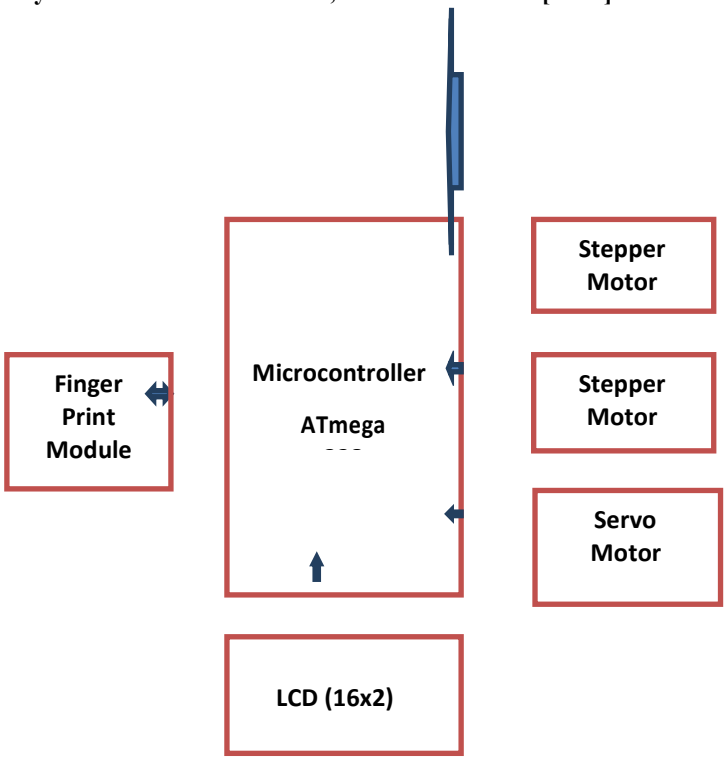
controller to produced pulse width modulation(PWD) outputs in order to run the stepper motors that will be used in this work have heavily increase a passion in future studies on the design of body structure that can holds an electrical and electronic platform with a cooling system hence in this project the temperature of stepper motors and easy drives in increasing after an 90 minutes of running condition while cooling would help to increase reliability term performance.

"A Literature Review on Machining Of Different Materials with CNC". Er.Manpreet Singh, Er.Sanjeev Verma, Dr.Sanjiv Kumar Jain [2014].

The reliability of any automated fingerprint based recognition system strongly relies on the precision obtained in the extraction process. Extraction of appropriate features is one of the most important and also difficult tasks for a recognition

system. There have been many algorithms developed for extraction of both local and global structures. Most algorithms

"Metrological Control of Selected Surface Types of A Mechanical Part By Using on-Machine Measurement System" Michal OMAMIK, Ivan BARANEK [2011].



Has proposed the CNC control for machine centres with learning ability and automatic intelligent generating of NC program on the bases of a neural network which is built in into a CNC unit of a special device , this neural network is used for mining drilling threading operation alike has learned to generate NC program which is part of CAM system.

III. BLOCK DIAGRAM

Fig.1 Block Diagram of Pen plotter

IV. WORKING

As per the block diagram the fingerprint module will scan the user thumb and find the authentication for digital data processing by the microcontroller. After authentication the controller will display the status of the system and give command to the servo Motor to process the writing the command to the device. Here we are about to use ATMega328 Microcontroller for data processing and control of the system.

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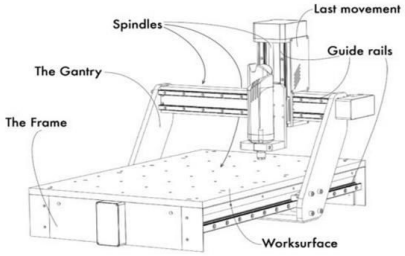


Fig.2 Setup of mini CNC machine plotter

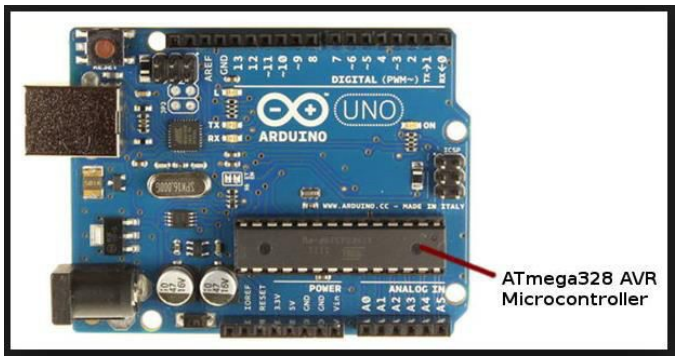
The main components used in block diagram as given below.

A. Fingure print module

Finger Print Sensor (R305) -TTL UART is a finger print sensor module with TTL UART interface. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The finger print module can directly interface with 3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC.

B. Microcontroller ATMega328

The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2- wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.



C. Stepper Motor

Fig.3 Stepper Motor

A stepper motor or stepping motor is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any feedback sensor, as long as the motor is carefully sized to the application in respect to torque and speed.

Switched reluctance motors are very large stepping motors with a reduced pole count, and generally are closed-loop commutated.

D. Servo Motor

Fig.4 Servo Motor

The Servo Motor basically consists of a DC Motor, a Gear system, a position sensor and a control circuit. The DC motors get powered from a battery and run at high speed and low torque. The Gear and shaft assembly connected to the DC motors lower this speed into sufficient speed and higher torque. The position sensor senses the position of the shaft from its definite position and feeds the information to the control circuit. The control circuit accordingly decodes the signals from the position sensor and compares the actual position of the motors with the desired position and accordingly controls the direction of rotation of the DC motor to get the required position. The Servo Motor generally requires DC supply of 4.8V to 6 V.

E. LCD Display

LCD stands for liquid crystal display. Character and graphical lcd's are most common among hobbyist and diy electronic circuit/project makers. Since their interface serial/parallel pins are defined so its easy to interface them with many microcontrollers. In an mxn lcd. M denotes number of coulombs and n represents number of rows. Like if the lcd is denoted by 16x2 it means it has 16 coulombs and 2 rows

V. TOOLS USED

Hardware Requirements

- USB To TTL Converter
- Microcontroller ATMega328
- Fingure Print Module (R305)
- Stepper Motor
- Servo Motor 6) LCD (16*2)

Software Requirements

- AVR Studio
- PCB Artist
- Win AVR
- *Language use*
- Embedded C
- Why?

C is the most widely **used programming** language for **embedded** processors/controllers. Assembly is also **used** but mainly to implement those portions of the code where very high timing accuracy, code size efficiency, etc. are prime requirements

VI. CONCLUSIONS

As per result oriented we can complete abstract a serial communication based CNC Pen Plotter Machine based on software and hardware for signature making based on Fingerprint authentication system and signature of the authentication person. Mini CNC Plotter Machine is an embedded system that works on the Principle on 'Computer Numeric control (CNC).

VII. REFERENCES

[1] "Metrological Control of Selected Surface Types of A Mechanical Part By Using on-Machine Measurement System" Michal OMAMIK, Ivan BARANEK [2011].
[2] "Intelligent Computer Numerical Control Unit for Machine Tools" Joze BALIC [2000]
[3] "A Literature Review on Machining Of Different Materials with CNC". Er. Manpreet Singh, Er Sanjeev Verma, Dr. Sanjiv Kumar Jain [2014].
[4] "Fabrication of Low Cost 3-Axis CNC Router". Dr. B. Jayachandraiah, O. Vamsi Krishna, P. Abdullah Khan, R. Ananda Reddy. [JUNE 2014].
[5] "Low Cost Computer Numeric Controller Using Open Source Software and Hardware". Muhammad Yaqoob Javed, Sayyed Tahir Hussain Rizvi , M. Amer Saeed, Kamran Abid, Osama Bin Naeem, Adeel Ahmad, Kamal Shahid[2015]
[6] V.K. Pabolu and K.N.H. Srinivas, "Design and implementation of a three -dimensional CNC machine", Int. J. Computer Science and Engineering,vol.2,pp. 2567-2570 2010
[7] T. Andrei and I. Nae, "Practical Applications Performed by a Stepper Motor CNC Router" Seria Technical, Volume-12 Page No-127-138, 2010.
[8] X. Xu, Y. Li, J. Sun and S. Wang, "Research and development of open CNC System Based on PC and Motion Controller", Procedia Engineering, Volume-29, Page No-1845-1850, 2012.
[9] V.K. Pabolu and K.N.H. Srinivas, " Design and implementation of a three dimensional CNC Machine", International Journal Computer Science and Engineering, Volume-2, Page No-2567-2570, 2010.

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