

CNC PLOTTER BOT

Project done by -

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Abstract

we have observed rapid growth of technology, the usage & utilization of CNC machine in industries are increased. We are fabricating low cost CNC machine to reduce cost and complexity of machine. The Idea behind our project is to design a low cost CNC system the lower cost is achieved by incorporating features of PC with ATMEGA 328 controller in an arduino. We have used a G code for whole system operation.

Components Used

Component
1. DVD writer x 6
2.Arduino uno
3.small servo motor
5.PCB board
6.Acrylic sheet
7.Male headers and other mechanical parts
8.stationery.

9.Encloser box
10.Miscellaneous

Technical Approach

- A pen touches the surface & prints the pixel for logic 1 and lifts up in air for logic zero & actuator changes its position for next commands execution. Presented plotter is one dimensional 1D plotter.

Description of project with Block / circuit diagram:

Methodology- The G code is interfaced with ATMEGA 328 CNC based controller by FTDI module which is used to convert the code in convenient controller code i.e. serial to USB converter. Hence it acts like interfacing module between PC to Controller. This code is further passed to stepper motor by easy drivers which convert the code and as per instructions the stepper motor moves. We need three axis's X,Y,Z which operate as follows X stepper motor move left and right Y stepper motor moves front and back and Z stepper motor up and down as per given dimensions these axis's will move on.

PROCEDURE -

1. Dismantle the stepper motors from the DVD drives .

2. To adjust the [printable area of 4 x 4 cm].
3. A temporary chassis of cardboard was made to test the initial drawings.
4. Separate motors were used at first which led to calibration .
5. Final chassis designs was made, acrylic were chosen as the chassis material.
6. Beard-board were replaced by a custom designed PCB.
7. Final calibration were made to the motors and the arm.
8. An dedicated IP cam , projector were utilized to project the Drawing live on a bigger screen

Project Outcomes

Relevance of Project with Program outcomes:

Program Outcome	Relevance of project (Refer Program Outcomes)
PO1	
PO2	
PO3	
PO4	
PO5	
PO6	Relevance to Society:
	Relevance to Health:
	Relevance to Safety:
PO7	
PO8	
PO9	
PO10	
PO11	
PO12	

Mapping with Program Specific Outcomes of ECE department:

Program Specific Outcome	Mapping (Refer Program Specific Outcomes)
PSO1	
PSO2	

PSO3	
PSO4	

3:STRONG

2:MODERATE

1:WEAK

0:NIL

Conclusion

This setup of hardware with a combination of G-code gives better accuracy and reduces the work load. G code make easy to find the information of locations of all stepper motor moving, as the status of our moving motor are directly seen on computer hence we can start or stop the machine whenever we are needed. Making a small machine brings a flexibility to do work.

Societal Benefit:

CNC bot is extensively used in industrial purpose and for wood carving, it also used now days in health sciences and for sculpting statues.

Future Scope:

Bringing the cnc bot to a larger model with reduced cost can truly help small scale industries and the 3d printing industry.

Further Improvements:

- Our intention is to make a smaller bot at first, and once we are confident of mechanical aspect we are thinking to take it next level (large size, more accuracy, direct link from inks cape without burning the code.)

References

<http://www.instructables.com/id/CNC-Robot-Plotter/>

<https://www.youtube.com/watch?v=C4IH9YWLQkk>

<https://en.wikipedia.org/wiki/MakerBot>

Appendix B: - Program Code (*Assembly / C file*)

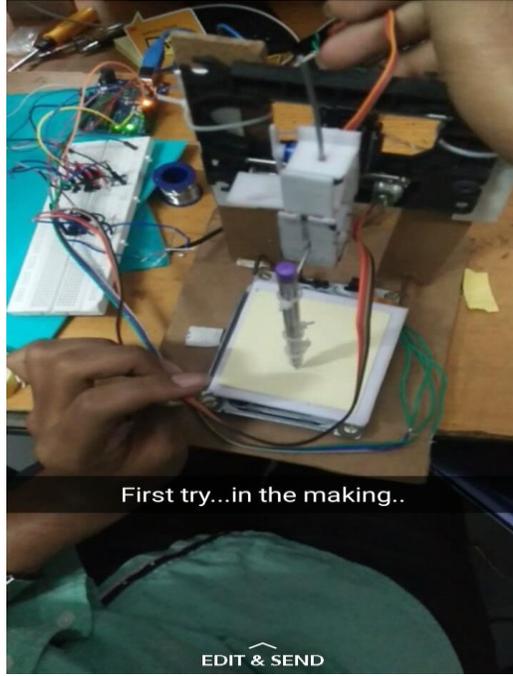
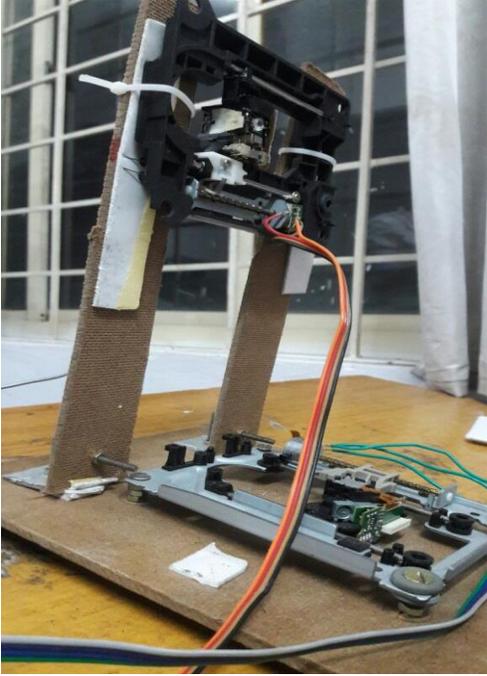
<https://codebender.cc/sketch:146939?referrer=mi.vasilakis>

Appendix C: - Financial Report (*Cost of Components, if possible with photo copy of Bills*)

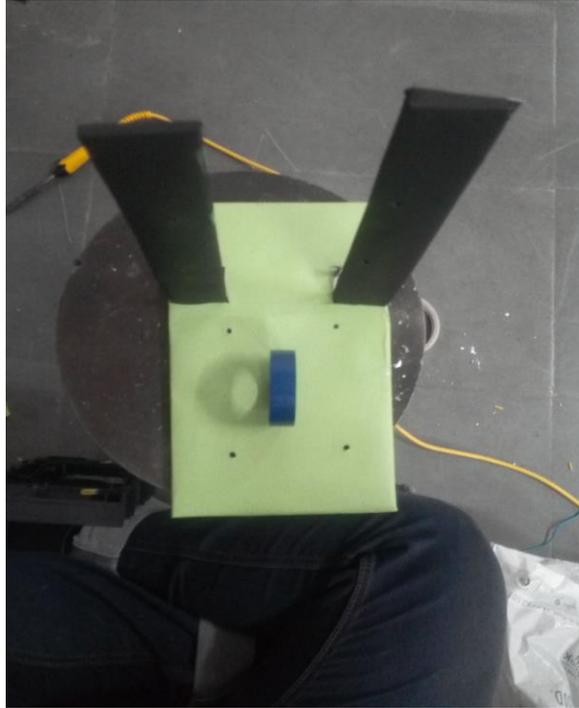
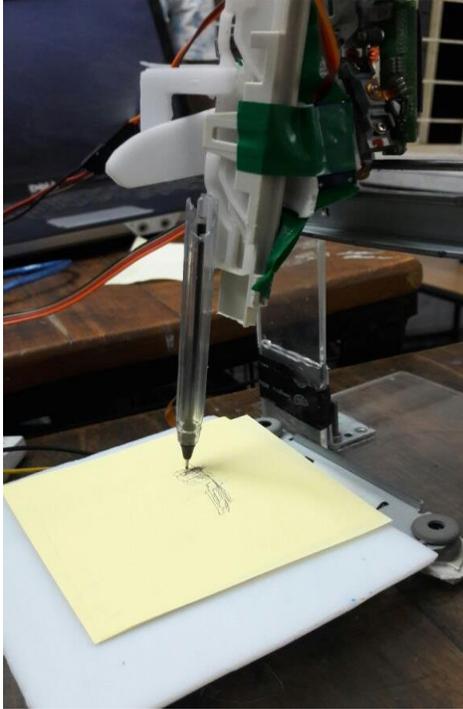
Expenses:

Component	Expenses
1. DVD writer x 6	5000
2.Arduino uno	450
3.small servo motor	215
5.PCB board	115
6.Acrylic sheet	200
7.Male headers and other mechanical parts	500
8.stationery.	470
9.Encloser box	350
10.Miscellaneous	390
Total	7690

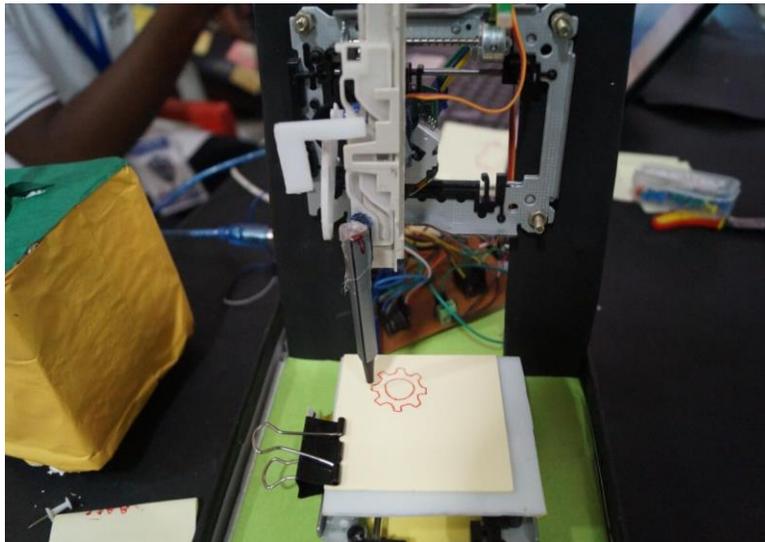
Appendix D:- *Snapshot of project*

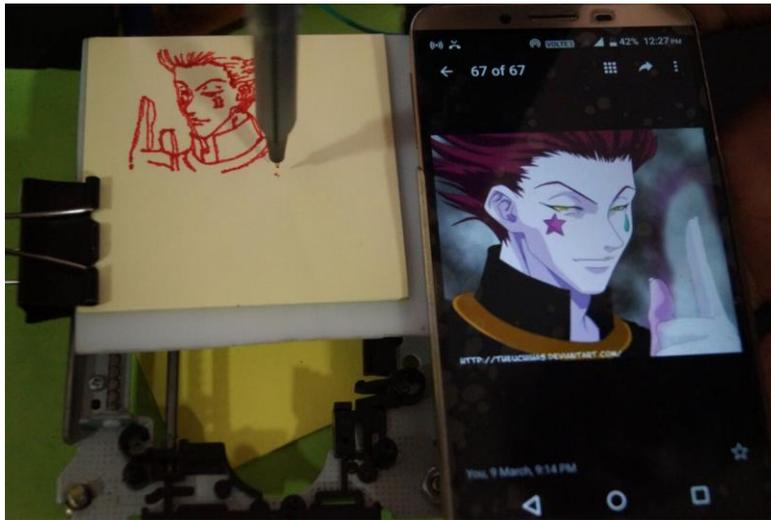


Finalizing:



Finalized product:





Application –1. Draw minute figures concisely – like gears, cycloid's etc.

2. Can be used to design and print PCB