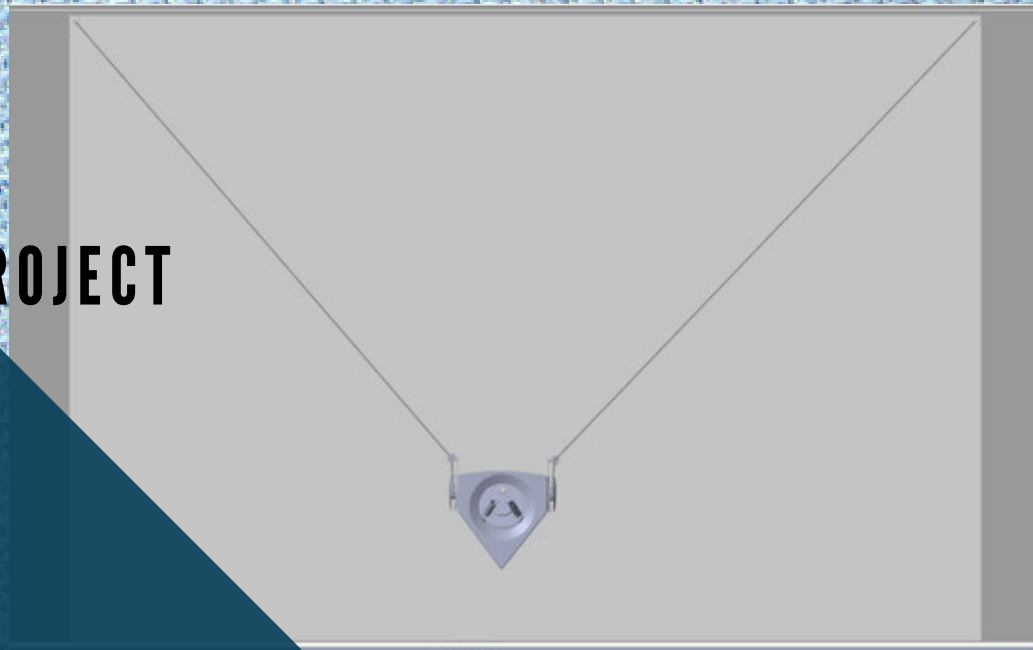
MARS PROJECT



WALL ART BOT

WE PRESENT HERE
HOW OUR BOT WORKS
&
AN OVERVIEW OF
SOFTWARES USED

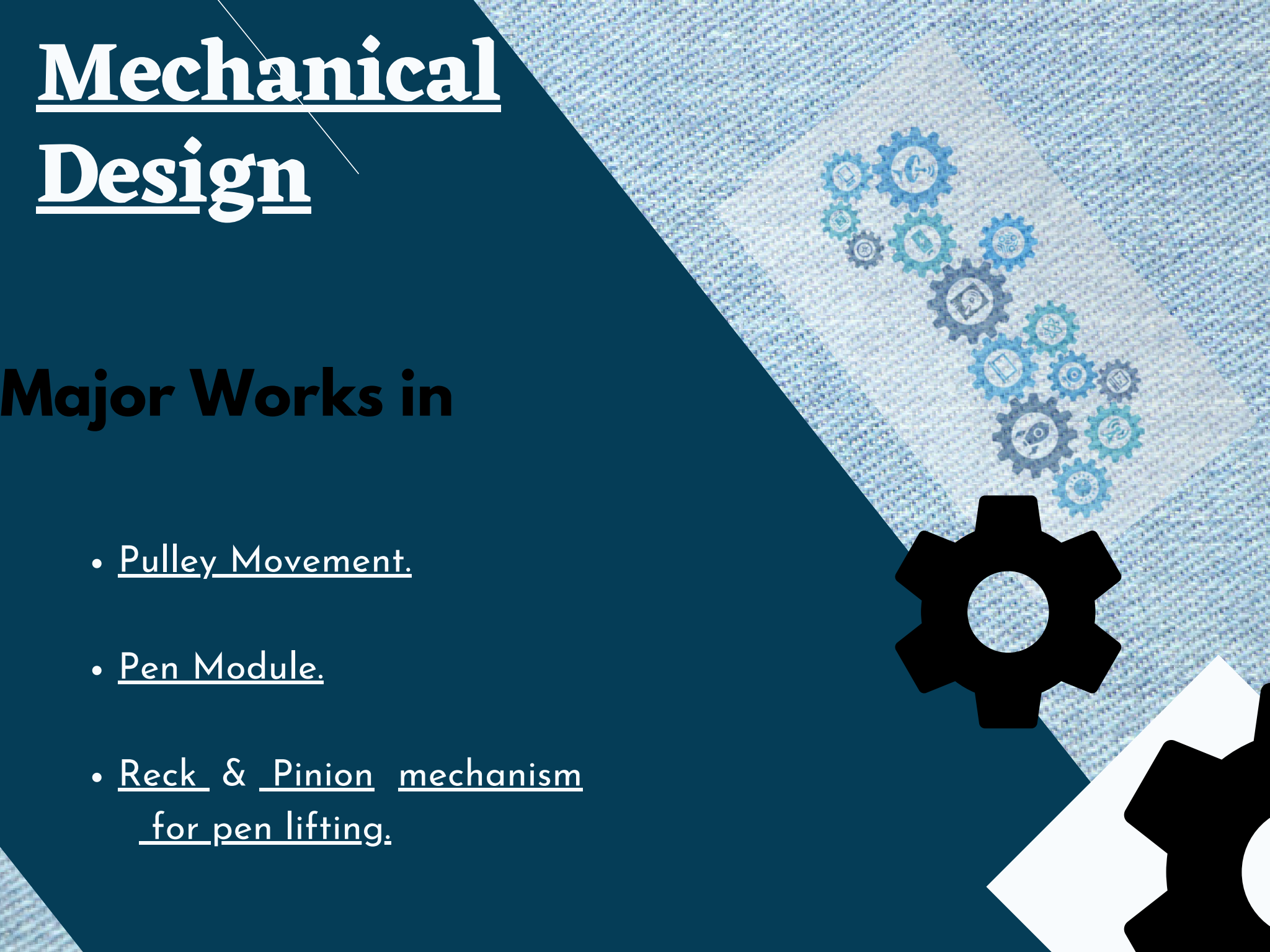
Project's Outline

- Mechanical Design
- Image processing
- Arduino
- Simulation

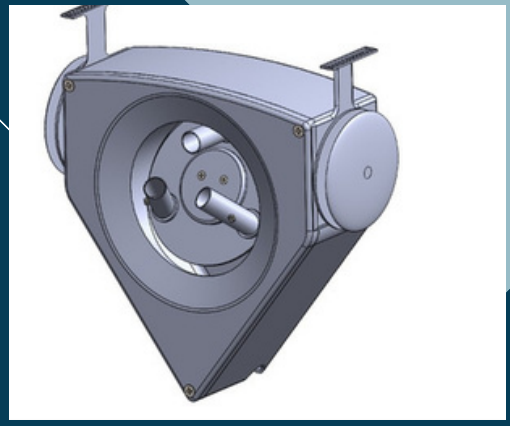
Mechanical Design

Major Works in

- Pulley Movement.
- Pen Module.
- Reck & Pinion mechanism for pen lifting.

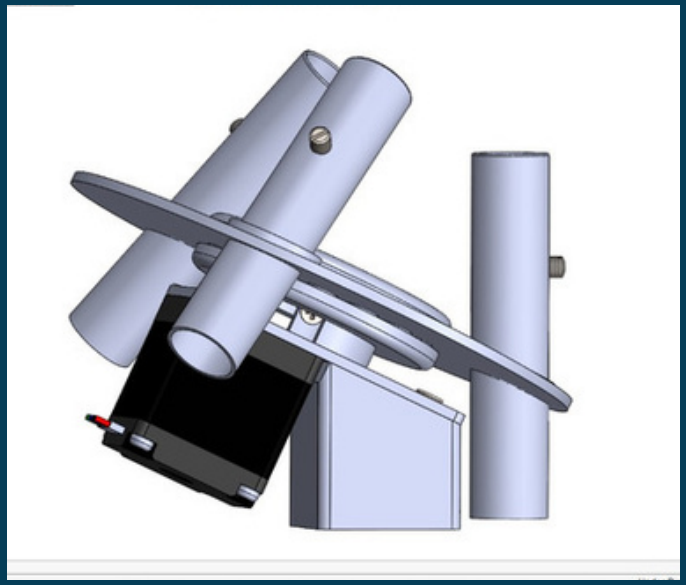


PULLEY MOMENT:



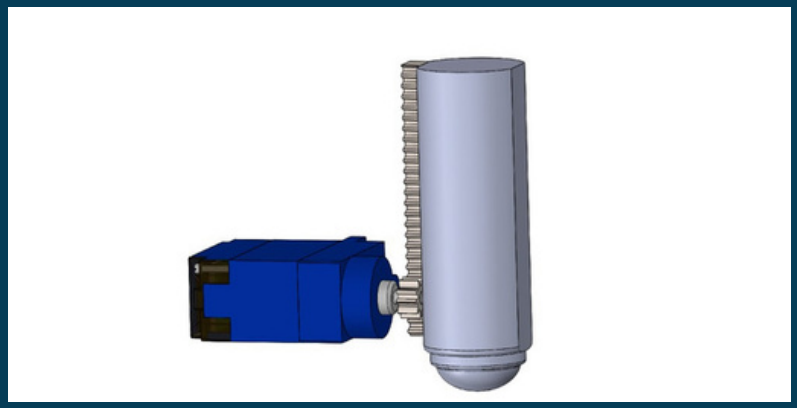
- Used Stepper motors to rotate pulleys
- Helps the pen to reach desired coordinate.

PEN MODULE

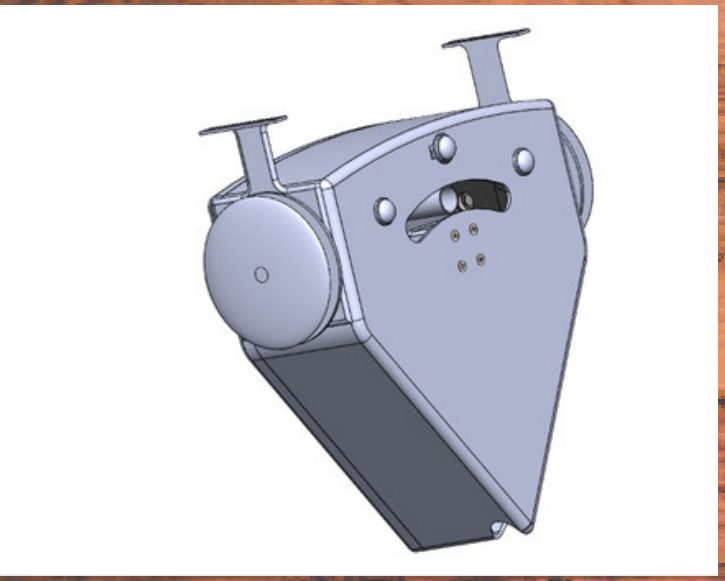


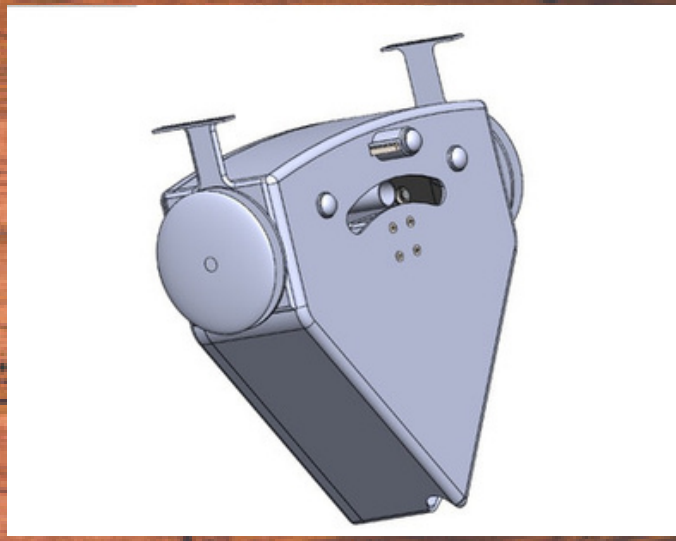
- The pen module which is a disc contains 3 pen holders.
- The disc rotates using a stepper motor and then there are ball bearings that ease the rotation of the disc.

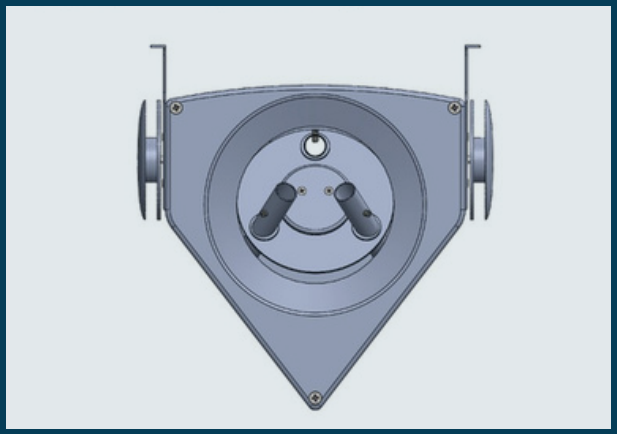
Reck & Pinion mechanism for pen lifting.



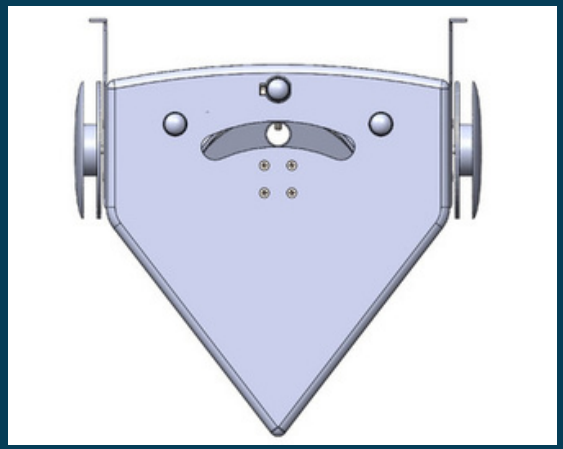
- This particular mechanism helps us to lift the whole bot by providing perpendicular force on the wall while the pen module is in the process of rotation.



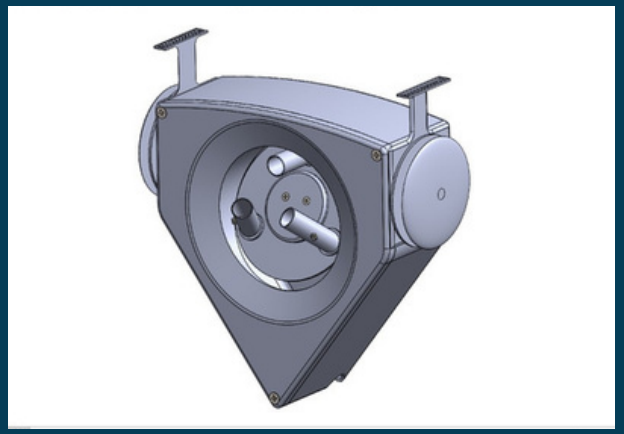




VIEW 1



VIEW 2



VIEW 3

MULTIPLE VIEWS OF THE BOT

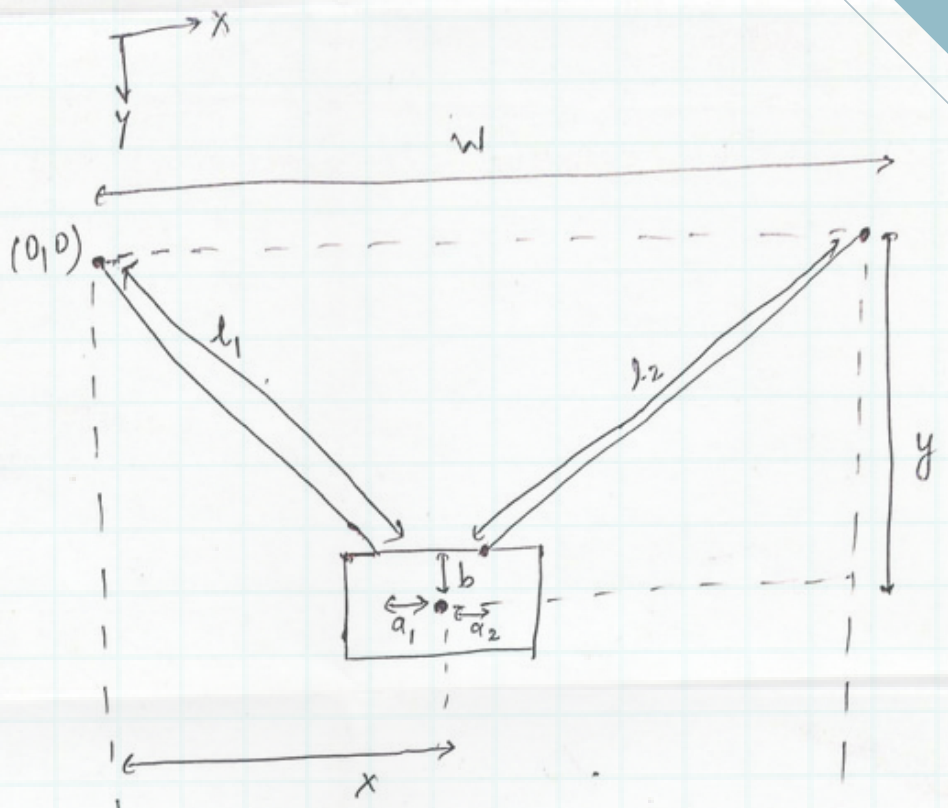
Components

- 2 x Nema 11 Stepper Motor + 1x MG90S Servo Motor
- 1x Arduino UNO R3
- 1x L293D Motor Drive Shield
- 2x L293D Motor Drive IC
- Jumper Wire
- 2 X Command Large Plastic Hooks for walls, 1 Hook and 2 Strips, Holds 2.2kg, Self Adhesive, Damage Free Walls
- Rope - DYNAMICA XBO
- Micro SD Card Reader Module

IMAGE PROCESSING

OPEN CV

- Used python in the open cv to get the coordinates of the respective image.
- Took the help of the serial transfer library to send the array of coordinates into aurdino



At any (x, y)

$$l_1 = \sqrt{(x-a_1)^2 + (y-b)^2}$$

$$l_2 = \sqrt{(w-x-a_2)^2 + (y-b)^2}$$

(No. of steps of motor 1) = $\left(\frac{\text{steps}}{\text{cm}}\right)_1 \times (\Delta l_1)$

(No. of steps of motor 2) = $\left(\frac{\text{steps}}{\text{cm}}\right)_2 \times (\Delta l_2)$

PYTHON

- By using serial Transfer library in python we send array of coordinates to arduino.
- We will send the array in data packets to arduino

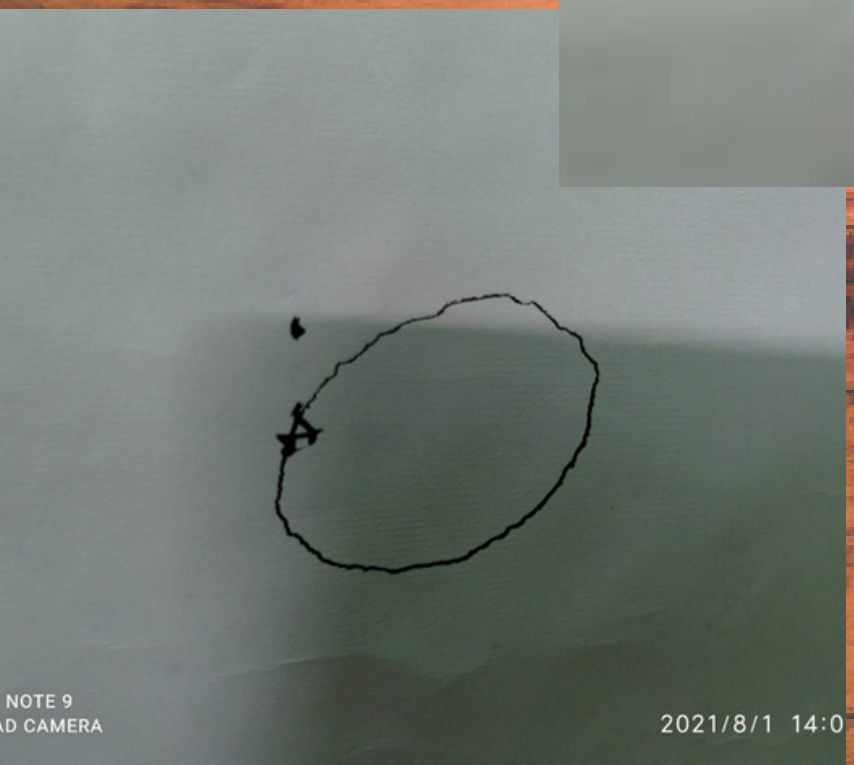
we will also receive feedback from arduino in python for verification of data

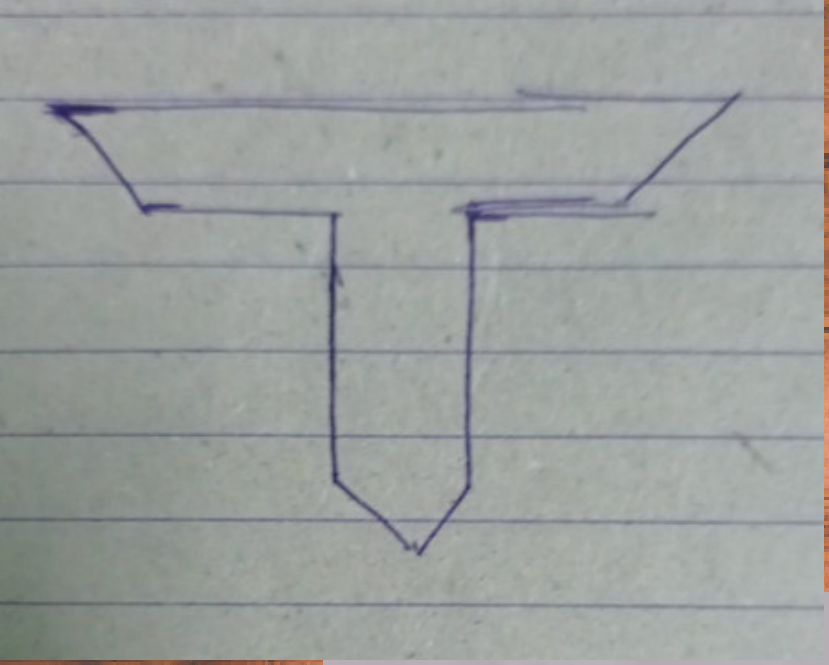
```
SENT: [303.0, 304.0, 305.0, 306.0, 307.0, 308.0, 309.0, 310.0, 311.0, 312.0, 313.0, 314.0, 315.0, 316.0, 317.0, 318.0, 319.0, 320.0,
, 331.0, 332.0]
SENT: [98.0, 98.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 100.0, 100.0, 100.0, 10
RCVD: [303.0, 304.0, 305.0, 306.0, 307.0, 308.0, 309.0, 310.0, 311.0, 312.0, 313.0, 314.0, 315.0, 316.0, 317.0, 318.0, 319.0, 320.0,
, 331.0, 332.0]
RCVD: [98.0, 98.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 99.0, 100.0, 100.0, 100.0, 10

270
SENT: [333.0, 334.0, 335.0, 336.0, 337.0, 338.0, 339.0, 340.0, 341.0, 342.0, 343.0, 344.0, 345.0, 346.0, 347.0, 348.0, 349.0, 350.0,
, 361.0, 362.0]
SENT: [100.0, 100.0, 100.0, 100.0, 100.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0,
, 102.0, 102.0]
RCVD: [333.0, 334.0, 335.0, 336.0, 337.0, 338.0, 339.0, 340.0, 341.0, 342.0, 343.0, 344.0, 345.0, 346.0, 347.0, 348.0, 349.0, 350.0,
, 361.0, 362.0]
RCVD: [100.0, 100.0, 100.0, 100.0, 100.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0, 101.0,
, 102.0, 102.0]
```

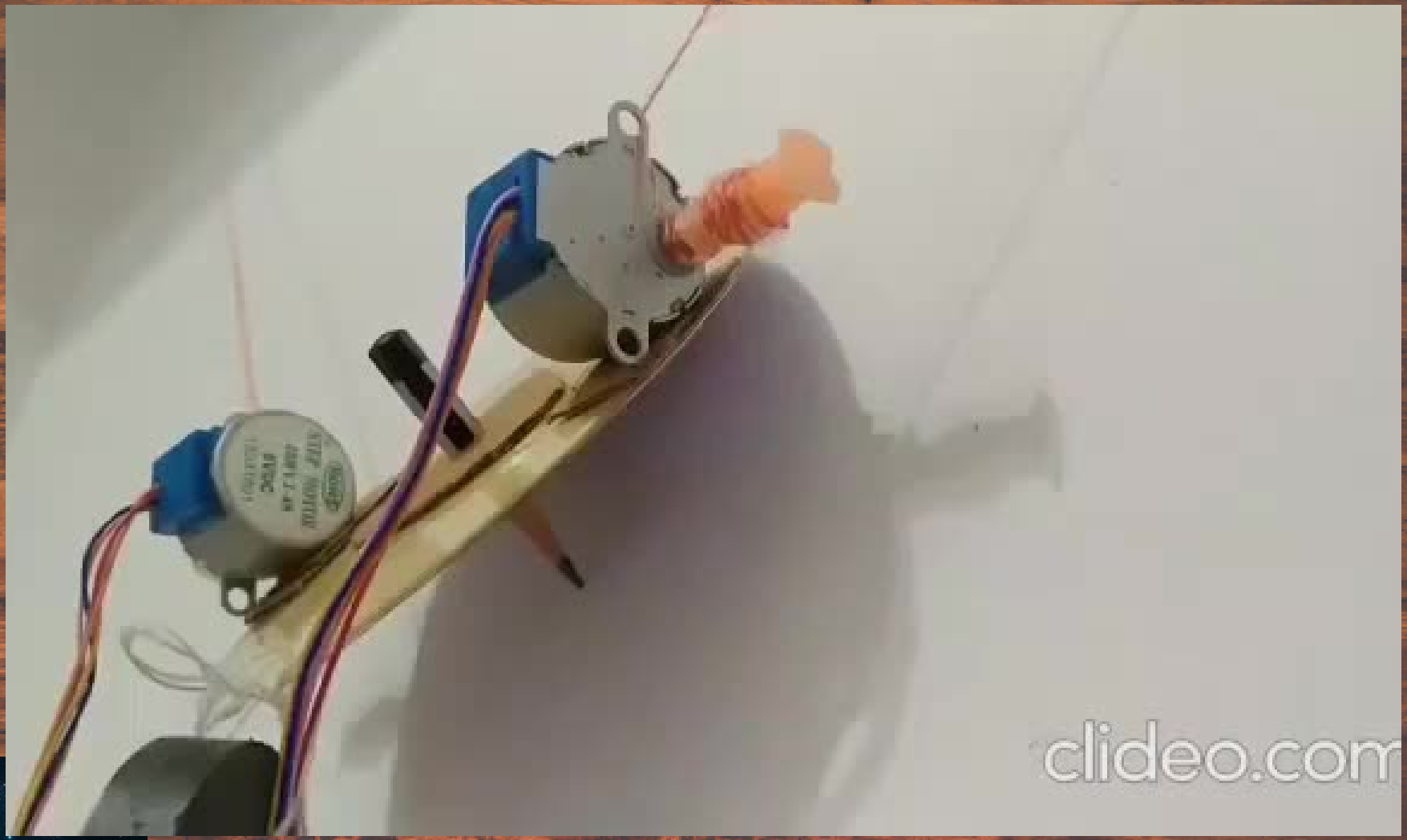
Arduino

- Using serial transfer library in Arduino we will extract the array from data packets.
- we will convert the coordinates to steps and give input to stepper motor
- we will also lift the pen using servo motor


HLW
High Power


NOTE 9
AD CAMERA
2021/8/1 14:0




clideo.com

SIMULATION

MATLAB

- used to predict our bot's performance and to compare alternative solutions for any arising problems

Future improvement

- we will use Raspberry Pi so we can directly send an image from a mobile app. Through this, we can
  also, solve the low memory problem of Arduino

TEAM MEMBERS

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SHIKAR GUPTA (ELECTRICAL)

FIRDOSE KOUSER (ELECTRICAL)

ARADHYA SAXENA (PRODUCTION AND INDUSTRIAL)

MENTORS - PARUL CHAUDARY, NAMAN

Thank you for you time!

- Team WallArt