Project Report

Project name : Sand drawing robot

Team:

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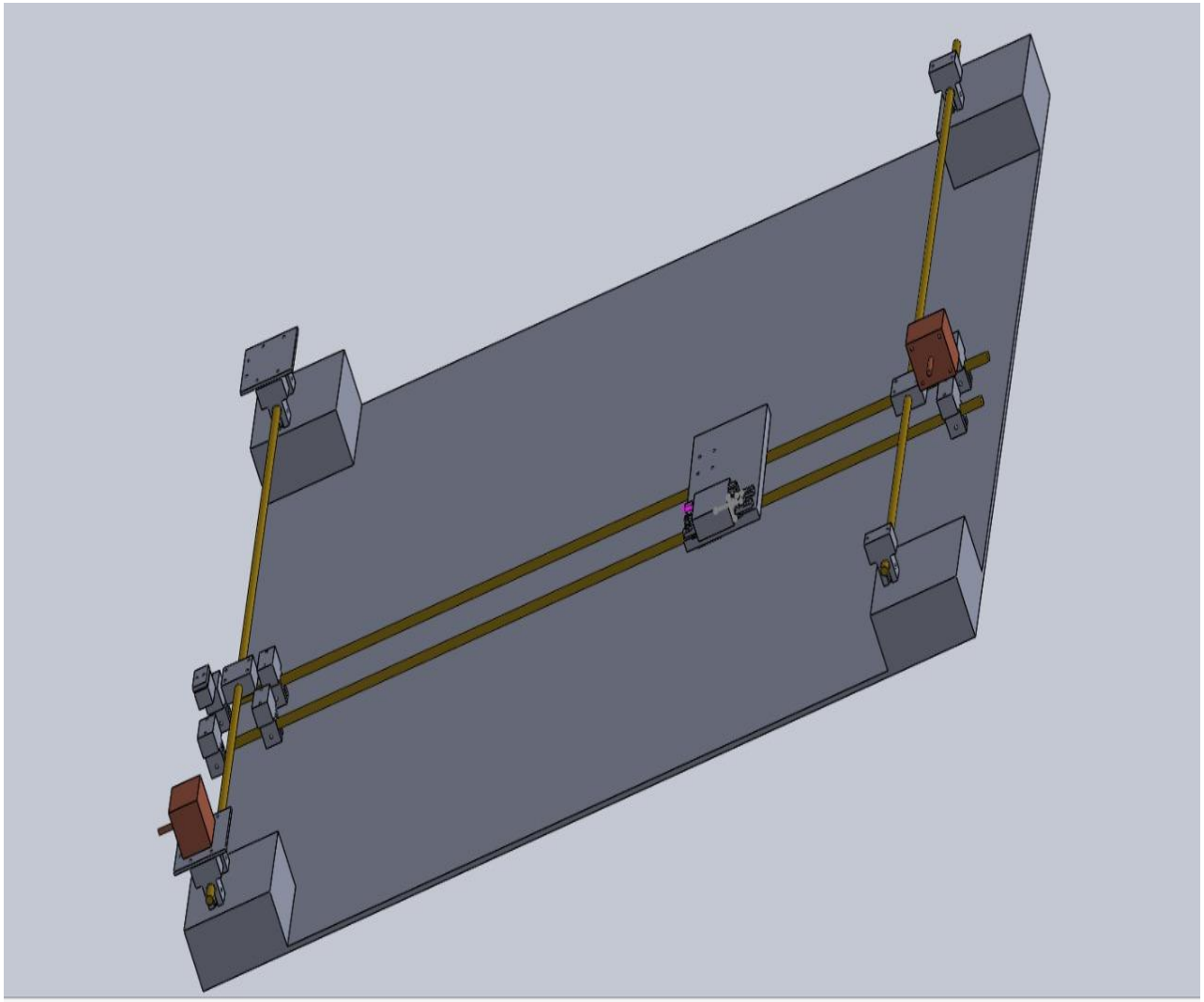
Solidworks Model



Overview:

We have developed a bot which can draw a neat and clear structure of any image in sand with maximum accuracy. We just need to give input of an image, after that it will be converted into pixelated image by python code and the same image on sand will be drawn with the help of a stick connected to the servo motor plate.

Project Motivation:

Even in this fast and busy world beaches are full of crowd. People write their names or other things on sand near the seashore and take pictures of those. Considering their interest in sand drawings we decided to make a bot which can easily draw a given image on sand. And also it is very convinient to handle, as we can take it in a suitecase to wherever we want.

Workflow:

User gives an image, python code converts image to pixelated image such that only two pixel values will be stored for the image ,one stepper motor moves the shaft vertically with the given time gap and another stepper motor makes the servo motor slide on the shaft, servo motor turns the stick up and down according to the given pixels of the image, with the lines drawn by the stick required image is drawn.

Mechanical Aspects:

1. The bot itself doesn't move but the shaft of the bot moves vertically.
For this we are using a stepper motor which inturn is connected Arduino which is powered by a 12v dc motor or an adapter.

2. We use 2 steppers in this bot ,one to move the shaft and the another to move the servo motor on the shaft.

This servo motor is connected to a stick in such a way that if servo motor rotates by certain angle then the stick turns upside down.

3. For the stability of the bot we use cardboard pieces on the bottom.
Actually stepper motor moves along the shaft, shaft is still

4. We use a big cardboard for the sand and there are 3d prints to hold the shaft tightly

5. We use timing belts and pulleys for the movement of motors.

Electronic aspects of the design:

Micro controller :

Arduino mega is used.It is one of the most important compnents used to make sand drawing robot.Arduino code in this micro controller helps the servo motor rotate according to the pixels of the pixelated image.It also helps the stepper motor to move the shaft vertically and to slide the servo motor horizontally on the shaft. Basically this gives main connection to the pixelated image and the mechanical motors. The power supply for this board is given by 12v battery or an adapter.

Actuators :

1 stepper motor moves on the shaft horizontally.
Another stepper motor is is used to move the servo motor horizontally on the shaft'
1 servo motor is used to turn the stick up and down to draw lines on the sand.
1 L2983D motor driver is also used.

Power :
12v battery or an adapter is used to power the arduino, the main component of the project.

Cost structure

COMPONENTS	COST(INR)
2 timing belt and pulleys	910
4 linear bearings	948
wooden cardboard	200
8mm brass rod	640
Nuts, Bolts and Jumpers	250
Miscellanous	200
Total	3148

Applications:

Beaches - on sand we can draw one's picture.

In any malls or tourism places - we can draw pictures on sand instead of paper

Limitations:

Time taken to draw a picture is very high
A lot of wires are there which may cause problem while using

Future Improvements:

We can use more servo motors to draw a given picture so that the time taken will be less.
We can also increase the roatation of servo motor and decrease the delay to speeden the drawing.