The Matrix

Shape Copying Bot

A bot which can change its shape according to the input given to it.

Institute Technical Summer Project

Shape Copying Bot

Basic structure-The bot can copy any shape according to the input provided to it.

Our plan for the design

1. Our bot will have a basic cubical framework which will have small blocks on the top surface which can move up or down because of the mechanism inside, they will pushed upwards by small cuboids/rods (will look like a chessboard in the top view).
2. These cuboids will be supported by slots made so that the cuboids have upward or downward movement only.
3. The rise of the blocks will be controlled by the stepper motors below the system.
4. The cuboidal blocks will rise according to the input given to it. Each block will be raised to a specified height which will then make the surface like a 3D shape of the input.
5. 2 more motors drive the stepper motor to every block on the system via a slider mechanism, while the stepper raises the necessary blocks according to their specified heights. This will be controlled by an arduino attached to this mechanism which will be coded according to different inputs given.

Our plan for implementation –

Week 1-2 -> Will learn the basic softwares like openCV, Microsoft visual C++, solidworks, microcontroller coding, matlab etc. and get all the basic equipments ready or work and design our bot in solidworks.

Week 3-4 -> We will start working on the mechanical part of our bot according to the decided design and we will make a small design to check our design. Also 2 members will work on the coding part.

Week 5 - After the small part works out we will fix the design and start upon working the electrical circuit of the bot.

Week 6 - We will work on how to input our image to it and try to complete it by the end of the week.

Week 7 – By this week we will complete the task and may be work on adding some extra features (if time permits) like pressure sensitivity (it will take the shape by sensing the amount of pressure applied e.g. if suppose we apply pressure on the chessboard shaped framework with our hand it will take the shape of our hand which can done with the help of piezo sensors.)

Equipments required

- Microcontroller ~ Rs. 700

- Small cubical blocks of dimension ~ 1cm.

- Sliders

- Stepper/servo motor ~ Rs. 1400

- Piezo sensors ~ Rs. 1800 each

- Metallic grid (for the basic framework)

- 2 motors to drive the stepper motor on sliders to every cube ~ Rs. 200 each

TEAM MEMBERS:

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