

SELF STABILISING PLATFORM

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DESCRIPTION

A self-balancing platform consists of platform which is balanced by movement of three motors in opposite direction to the movement of the platform.

MOTIVATION

We were fascinated with the futuristic scope that self-balancing devices hold, be it flying cars or compact car modules on two wheels, be it self-stabilized and Bluetooth controlled cameras or be it a simple self-stabilizing skateboard, controlled by your gestures.

SKILLS REQUIRED AND LEARNT

As of delving deep into vast knowledge pool of self-controlled and stabilized devices, the team feels that it should get firsthand knowledge of various control mechanisms, IMUs, filters, robust mechanical system, and henceforth, conclude to engineer a manually controlled-cum-self stabilizing platform with three axis of freedom. We will also require a workshop on PID as it will be an important part of our project.

At the end of the project we expect to:

- Understand the working of IMU (Inertial Measurement Unit)
- Learn coding in Arduino Uno

- Understand the usage of various algorithms and filtering process to work on precise movements and accurate control of platforms.

COMPONENTS REQUIRED

- Arduino Uno
- IMU (Accelerometer and Gyroscope modules)
- 3 DC powered high torque servo motors
- 6V battery
- Aluminum plates

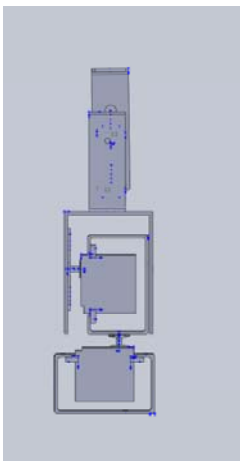
TIMELINE

Week 1

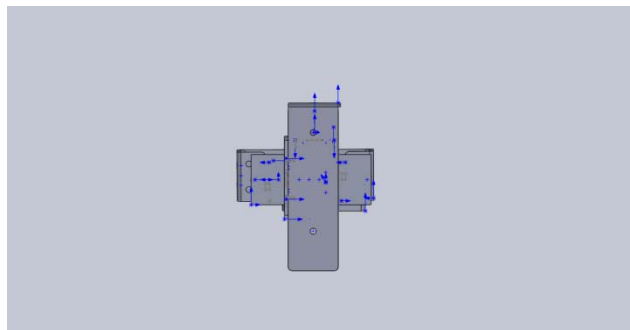
Make the mechanical parts and join them. The virtual model is already made on Solidworks, we just need to make a physical model now.

Also learn about PID and other coding related skills like understanding IMU , basic Arduino Uno coding.

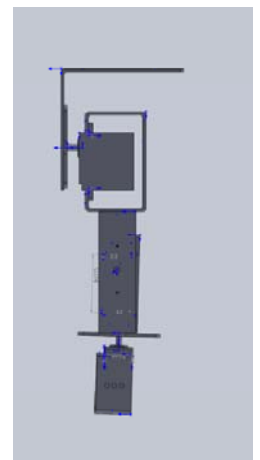
Front view



Top view



Side view



Week 2

We plan to code in Arduino Uno to process the tilt angles obtained from IMU and give instruction to the respective servo motors to rotate by certain angle depending on its previous position to balance or control the platform.

Week 3

We plan to check the code and mechanical setup and try to make the time delay lesser than it is and improve calibration.

Week 4 and Week 5

Testing the platform and repeatedly improving the calibration.

ESTIMATED COST

The approximate cost of our project will be INR 6000 – 7000.