Project Proposal

Device Description

The proposal for the semester project requirement centers around the creation of a Stewart Platform that is automatically stabilized when being given varying inputs with 6 degrees of freedom. Similar systems to this have been used for motion stabilization and isolation devices for a litany of different industries. The device will be constructed with six actuators and the appropriate linkages, as well as a base and an effector platform, as is the usual construction of a Stewart Platform. Other, more specific components will be selected as the project matures.

Device Purpose

The purpose of this device is two fold. Firstly, the device is an excellent combination of both mechanical, and electrical systems that require robust software to merge their abilities into something functional. Secondly, the project will permit the exploration of some control theory and how it can be implemented in actual code running on physical hardware. Higher level applications of this project, time permitting, could be explored, but are not documented in this proposal and would not fall within the scope of this project

Budget Estimation

The budget for this project is relatively minor. The project will require at least one inertial measurement unit (IMU), 6 servo motors and appropriate linkages, a microcontroller (MCU) to coordinate it all, and the physical hardware to mount all these components.

The physical hardware can be fabricated by myself, either through 3D printed parts, or via machined aluminum plate. I currently have plenty of scrap on hand, so there is no anticipated additional cost for this, just time.

The servos and other components must be purchased, but can be found for very inexpensive prices. For a relatively robust implementation (using powerful servos and larger linkages and physical hardware) I would estimate a project cost of no more than $150. Many parts are also currently on hand, so this value has the potential to decrease.

Project Team

For this project, I have opted to forego membership in a team for its completion. I have chosen this route due to strange work patterns potentially making scheduling difficult, but also in that this has been a novel idea of mine that I have floated for some time, and there is, admittedly, an

element of selfishness involved. Even so, based on some preliminary plans, I believe this project to be doable within the time allotted over the course of this semester.

Resources

Stewart Platform on Wikipedia

Higher-end Industrial Platform Examples