

# **Gesture Controlled Magnetic Levitation Module**

Team Name

'Magnium Leviosa'

Team Members

Aditya Narayan

Pranav Sankhe

Ritik Madan

Pramey Singh

Introduction To The Project

A comprehensive method to use Magnetic levitation technology with gesture control to move an object around in 3D space using hand movements.

Details and Implementation\*

We propose to use 2 matrices of electromagnets kept vertically opposite to each other so as to induce floatation on a magnetic object using the magnetic field produced. The electromagnets in each of the matrix (imagine each electromagnet as an element

of the matrix) will have their fields manipulated by controlling the current in each of them.

To move the object horizontally we will calibrate the electromagnet's magnetic field and use the horizontal component of the magnetic field to exert a horizontal force on the object. If this doesn't work as a backup plan then we will add vertical grids of electromagnets to our system to have a horizontal force.

The amount of current to be drawn by each electromagnet will be improvised using MPU shield with Arduino to replicate the motion of hand. The initial position of the object will be predetermined and always kept at a particular coordinate.

Arduino modules are used to interface between the accelerometer and the magnetic array.

## Mechanical System

Two independent electromagnetic grids are placed one on top of the other.

## Plan Of Action\*

Week 1

Acquiring the components required for implementation and reading up for the same.

Learning how to manipulate the magnetic fields.(i.e. Changing the magnetic field and calibrating the same.)(for a single mesh consisting of 9 electromagnets.)

## Week 2

Executing the magnetic levitation.(without using gesture control for it) and moving the object around manually.

## Week 3

Reading up on gesture control implementations and working towards incorporating this into our existing module.

## Week 4

This week will also be used for the same purpose(Incorporation of Gesture Control) as calibration of Magnetic Fields will be a time consuming process.

## Week 5 and Week 6

This will be the time to tackle any debugs or emergencies that might present itself unexpectedly.

## Components\*

Arduino

Accelerometer

Electromagnets

Estimated Cost.

~10,000

{

-Arduino Mega =800

-15 electromagnets

-Miscellaneous

-Accelerometer (MPU)

}