ECE Senior Design Weekly Report

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Team Name: Globe Trotters Lab Section: TH

Week’s Task: Research different methods for levitation and rotation. Look for ways to obtain information needed for display.

Results:

Methods for Levitation and Rotation and/or Projection

Levitation

* <http://www.instructables.com/id/DIY-Electro-Magnetic-Levitation/>
* Use of Hall Effect sensor to detect field strength, control circuit to vary electromagnet
* Ferrous material nears a magnetic field, force increases exponentially
* Intensity1/Intensity2 = Distance1/Distance2
* Propagate magnetic field to adjust an object to desired position

Rotation

* <https://www.youtube.com/watch?v=uW7Rd6Nn2-Y>
* Hollow globe, tilted motor on base to spin globe
* Motor powered using inductive coupling

Projection

* <http://eclecti.cc/computergraphics/snow-globe-part-one-cheap-diy-spherical-projection>
* 180 degree fisheye lens at the base of an acrylic sphere
* Images must be altered from equirectangular to azimuthal equidistant
* Rotate image or projector

Displaying Information

API

* Weather API for real time weather reports: <http://www.apixu.com/api.aspx>
* Photos and basic information about cities: <https://developers.teleport.org/api/>
* Information about countries (population, size, etc): <https://restcountries.eu/>
* Wikipedia API to pull summary of location: <https://en.wikipedia.org/w/api.php>
* Implies we need a module to connect to WiFi to make API calls

Using these APIs can obtain up-to-date information about specific locations. We can parse the response and pull the information we want to use.

Another method I found of displaying a map on a sphere was the use of an LED array while rotating the sphere very quickly to take advantage of persistence of vision, but given the stabilization issues with levitation this might not be a viable option. (Similar to spinning LED displays).

Persistence of vision: https://www.youtube.com/watch?v=uTtCkGuGmzQ