Ferrofluid Music Visualizer

Group 5

18-549
Adu, Dan, Kunal, Moni
Project Vision

- Ferrofluid consists iron filings suspended in a liquid. It reacts to magnetic fields.
- Make an audio visualizer using this stuff
- Use FFT data and electromagnets to make it dance.
- Can be applied to any signal generating input
  (Cool ideas welcome!)
Competitive Analysis

- No comparable commercially available product.
- A group of students at Purdue had a similar project
  - Insufficient magnet strength, poor set up.
- Another group from the University of Southern Denmark also did a similar project.
- We will have much better packaging and more degrees of freedom for movement than either product.
- Ferrofluid Demo
Requirements

1. Ferrofluid responds to music.
2. Visually appealing display.
3. Compact packaging (small hardware footprint).
Technical Specifications

- Processor (Arduino)
- Ferrofluid
- Magnets (metal pieces of desired shape)
- Plastic casing
- Copper wire
- Fourier Transform Module
- Digital Variable Gain Amplifiers
- AC-to-DC converter (from wall outlet)
- Two-way audio jack and splitter
Architecture

Audio Input Device → Split → FFT → Arduino → AC2DC

Electro-Magnets → VGAs

Speaker System → Wall Power

Ferro-fluid
Anticipated Risks

- Suspension fluid and ferrofluid interacting in unexpected ways.
- Packaging is going to be biggest challenge.
- Optimal positioning of the magnets on the packaging. (ex. not obstructing display)
- Kids drinking the fluid.