Technical Report Proposal

Steven Paustian
spaustia@nmt.edu

New Mexico Institute of Mining and Technology
801 Leroy Place
Socorro, NM 87801

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1 Project Summary

The purpose of this report will be to recommend a sensor fusion technique to increase the accuracy movement detection in mobile devices. To accomplish this, three sensor fusion algorithms will be implemented on my cellular phone and data gathered on the accuracy of phone movement. The report will then analyze and recommend an algorithm.

Most modern mobile devices contain a variety of sensors, including a gyroscope, accelerometer, magnetometer (compass) and camera. These sensors take measurements in discrete intervals, and changes in values between readings are not reported. This means that no single sensor can accurately convey a device's movement through space. In order to gain a better understanding of a phone's movement, sensors must be "fused" together.

TODO: expand

2 Tentative Outline

- Introduction
- Sensors
  - Accelerometer
    - Limitations
  - Gyroscope
    - Limitations
  - Magnetometer
    - Limitations
  - Camera
    - Limitations
- Sensor Fusion
  - Complementary Filter
    - Implementation
  - Kaulman Filter
    - Implementation
  - TODO: find 3rd method
    - Implementation
- Results
- Discussion
- Conclusion

3 Outcome

The report will use the Association for Computing Machinery (ACM) SIGS style guide for both the report and references. This is very similar to IEEE format.

4 Primary Research Strategies

Primary research for this report will be based on experimental measurements. Three algorithms for fusing sensor measurements will be implemented, and their accuracy measured and analyzed.

The primary experiment will consist of the phone being attached to a drill, then spun for various numbers of rotations. The phone will then display the number of rotations it perceived, which will be recorded and analyzed. [**?**]

5 Secondary Research Strategies

asdfa

6 Timeline

TODO

7 Questions and Concerns

TODO

References