Testing

Team BrightGoal
Project Status

Project Recap:
- Training tool for athletes to help with their footwork
- Demo will be an application of our tool an interactive form

Where we are:
- More part ordered and arrived
- Currently have basic communication working between foot module and computer
- Began testing for Zigbee latency
Test Case #1 - Xbee Throughput

- Requirement Tested
  - Low latency
  - Throughput
- Use case
  - Xbee communication during normal use
- Metric
  - Bits/second
- Test Sequence
  - C program to send packets from one Zigbee to another
- Deployment Issues
  - Reproducibility - Dropped packets
Test Case #2 - IMU Accuracy

- **Requirement**
  - Accurate Motion Tracking (no more than 1% error)

- **Use Case**
  - Foot tracking during normal use

- **Metric**
  - Distance in meters (3 dimensions)
  - Orientation in degrees (3 dimensions)

- **Test Sequence**
  - zero the foot module
  - move the foot module a defined distance in a defined direction
  - measure the difference between the distance reported and the actual distance

- **Deployment Issues**
  - Cannot get motion tracking accurate enough for actual play
Test Case #3 - Battery Life

- **Requirement**
  - Battery life lasts at least 1 hour of continuous use

- **Use Case**
  - Battery duration during normal use

- **Metric**
  - Time - duration of how long the battery will last

- **Test Sequence**
  - Fully charge battery
  - Turn on system
  - Have system continuously active until battery dies
  - Use timer to determine how long the battery lasted
Test Case #4 - Hardware Durability

- **Requirement**
  - Rugged Hardware

- **Use Case**
  - Ensuring hardware durability

- **Metric**
  - If the system still works after our test

- **Test Sequence**
  - Strap device to shoe
  - Run around violently
  - Check to see if system is still tracking the foot module
Test Case #5 - Total System Latency

- **Requirement**
  - Low Latency (time from foot movement to haptic feedback)

- **Use Case**
  - Kicking a ball

- **Metric**
  - Time (milliseconds)

- **Test Sequence**
  - Turn on system
  - Attempt to kick a virtual ball using the system
  - Feel for delay between kick and haptic feedback
Test Case #1 - Experiment

- **Hypothesis**
  - To test the throughput of the Zigbee wireless connection
- **Test setup**
  - 2 Zigbee Xbee modules, 1 Zigbee explorer dongle, Wireshark
- **Metrics**
  - Bits read in per second.
- **Workload**
  -
- **Parameters**
  - Baud rate
- **Test run**
  - Keep packet length constant
- **Experiment**
Xbee Throughput

Throughput vs. Baud Rate
For Long Sequential Write Test

Throughput (Bits/Second)

Baud Rate