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Cube Visualizer

Project Test Plan

Requirements Testing

The system shall read rotational acceleration data from the IMU

The system shall process acceleration data into ~~(x,y,z) and~~ (i,j,k) values

To test these requirements, I will use a protractor so that I can rotate the IMU in precise amounts. I will test rotation in all 3 axis and with all combinations of small, slow, big, and fast motions. Using this testing I should be able to figure out the resolution that should be possible with the IMU.

The system shall read translational acceleration data from the IMU

The system shall process acceleration data into (x,y,z) ~~and (i,j,k)~~ values

To test these requirements, I will use a ruler so that I can translate the IMU in precise amounts. I will test translation in all 3 axis and with all combinations of small, slow, big, and fast motions. Using this testing I should be able to figure out the resolution that should be possible with the IMU.

The system shall transmit that data over BLE to a receiver

To test this requirement, I will use known data transmitted over BLE at various speeds. Using this testing I should be able to determine the optimal data rate to transmit the data and the error rate at those speeds.

The receiver shall use that data to display a cube with the matching rotation and translation as the cube

To test this requirement, I will simulate data being received (manually injecting it into the visualizer) and make sure that the cube in the visualizer rotates and translates as expected.

The system should go into low power mode when not being moved for 30 seconds

To test this requirement, I will use a power monitor to measure the current draw and at what point it drops indicating it entered low power mode. I will note the amount of current the system draws in its low power mode.

The system should wake up from low power mode when moved (a few degrees or a few centimetres)

To test this requirement, I will again use a power monitor to measure the current draw of the system and test various movements to see at what point the system wakes up.

The system should transmit values "in sync" with reality (ex. only drift by a few degrees for rotation, only drift by a few units for translation)

To test this requirement, I will both test rotation and translation of specific amounts as well as leaving the cube stationary and make sure the results match what is expected

Test Equipment

- Laptop with BLE support
- Protractor
- Ruler
- Power monitor (multimeter)
- ADALM2000
- Visualizer program written in Godot