Activity Recognition System

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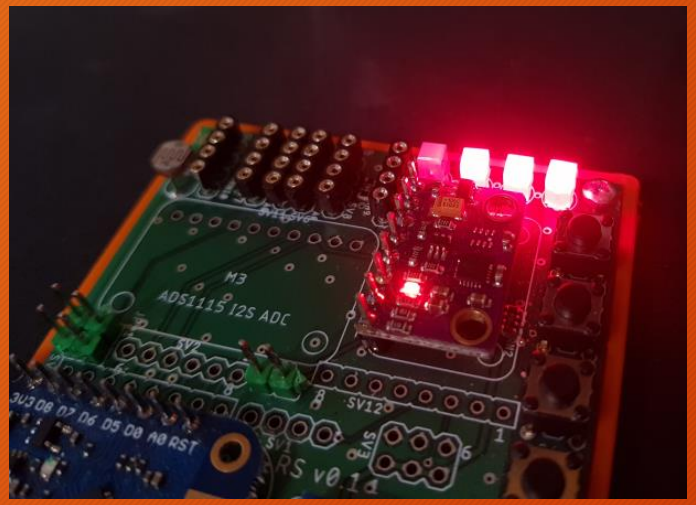
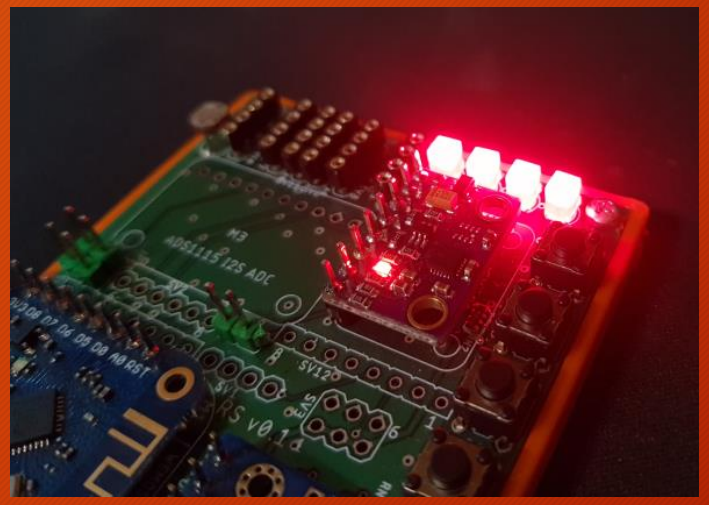
Overview

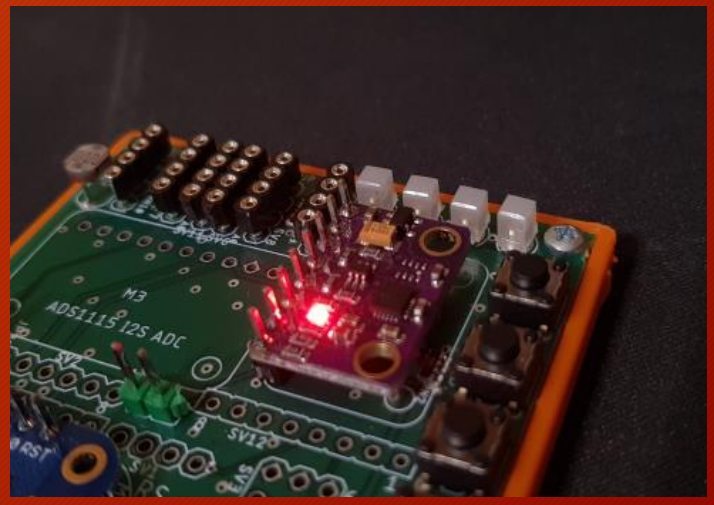
- 3 types of activities: None, Walking, Jumping
- Accelerometer and gyroscope
- Complementary filter, standard deviation
- HTTP server to display results

Calibration

- 3 seconds (300 samples)
- Board must be completely still and horizontally aligned
- Ready when LEDs stop blinking



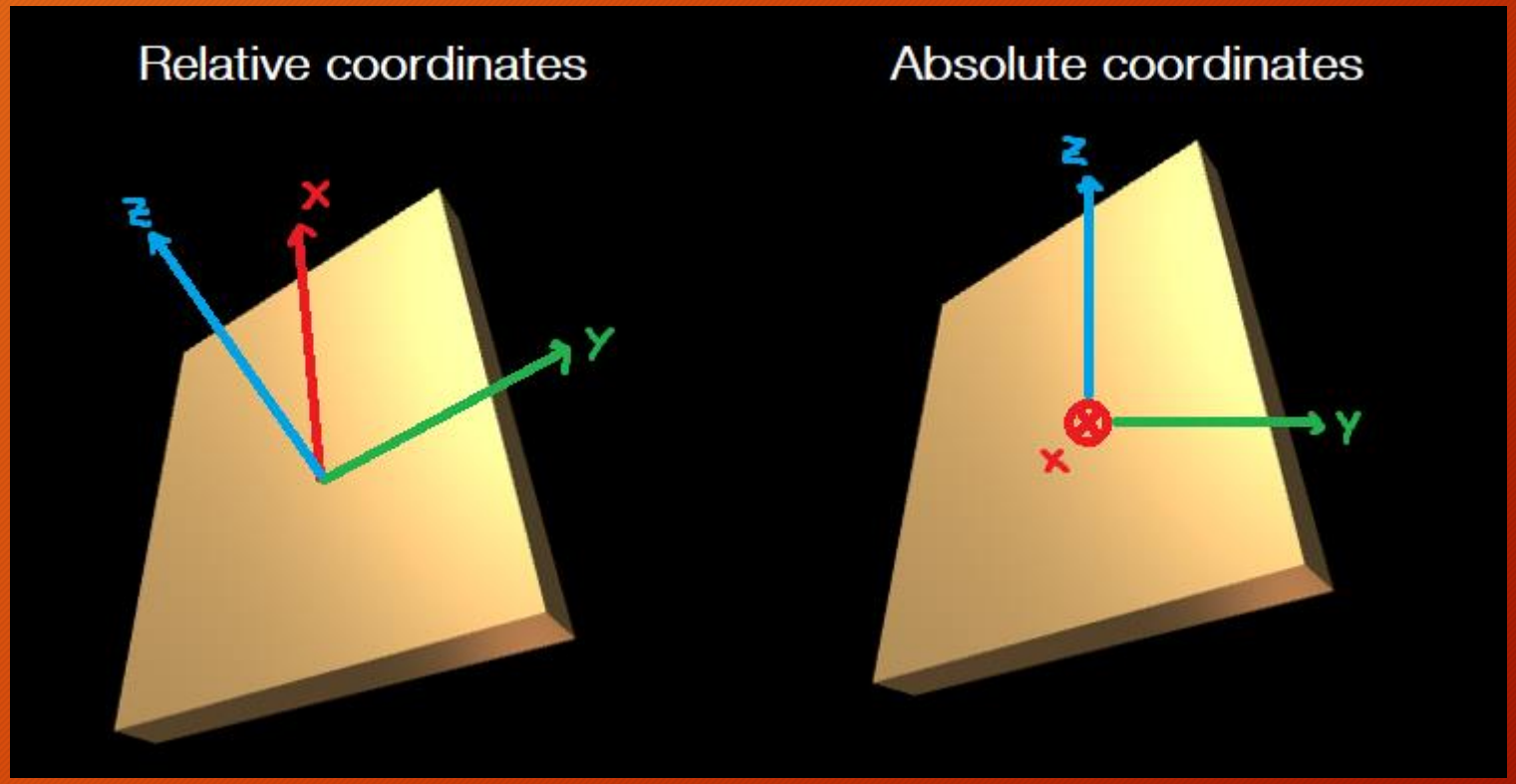




Main loop

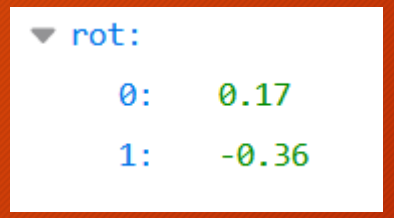
1. Read accelerometer and gyroscope data
2. Apply complementary filter → roll and pitch
   - Low-pass filter on accelerometer data
   - High-pass filter on gyroscope data

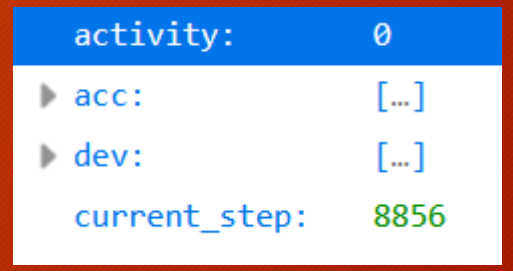
3. Extract vertical and horizontal components of acceleration
4. Compute standard deviation
5. Detect activity

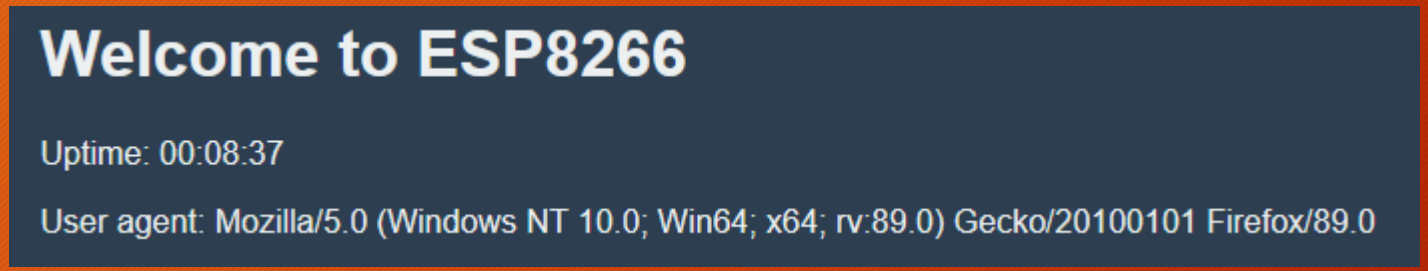


Server

- / - Home page
- /script.js - Frontend JavaScript code
- /data - Orientation data
- /history - Acceleration data

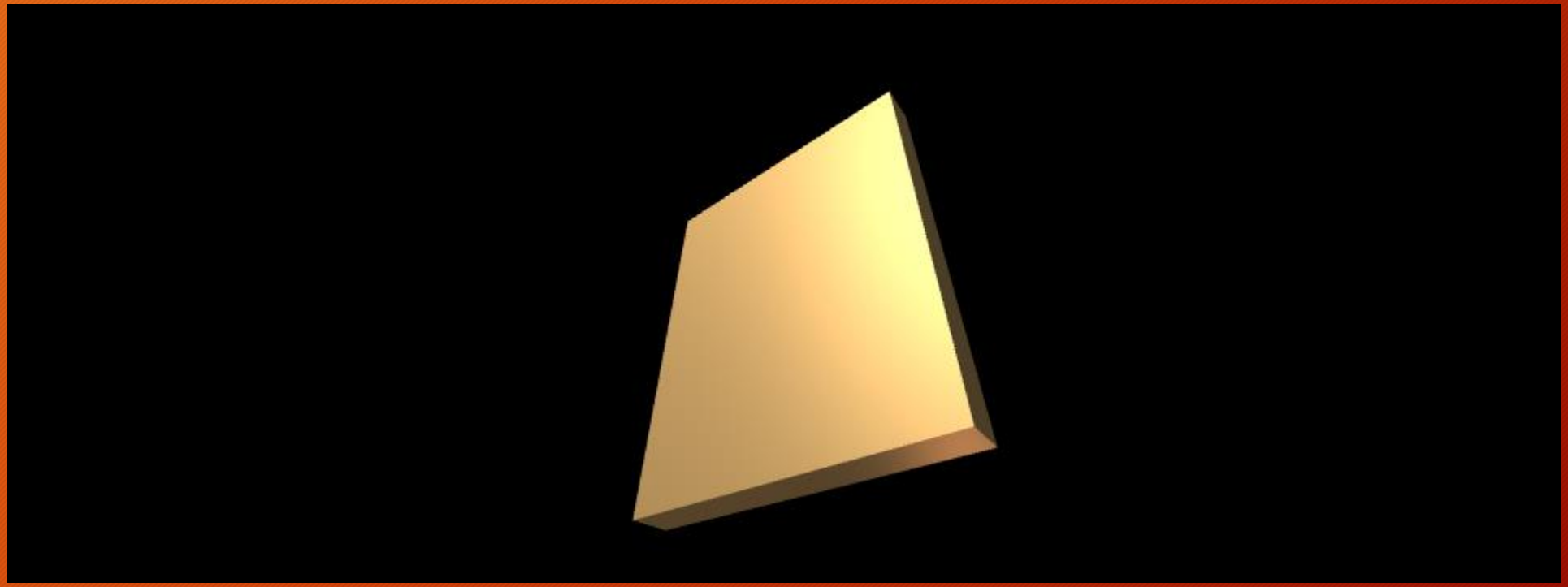




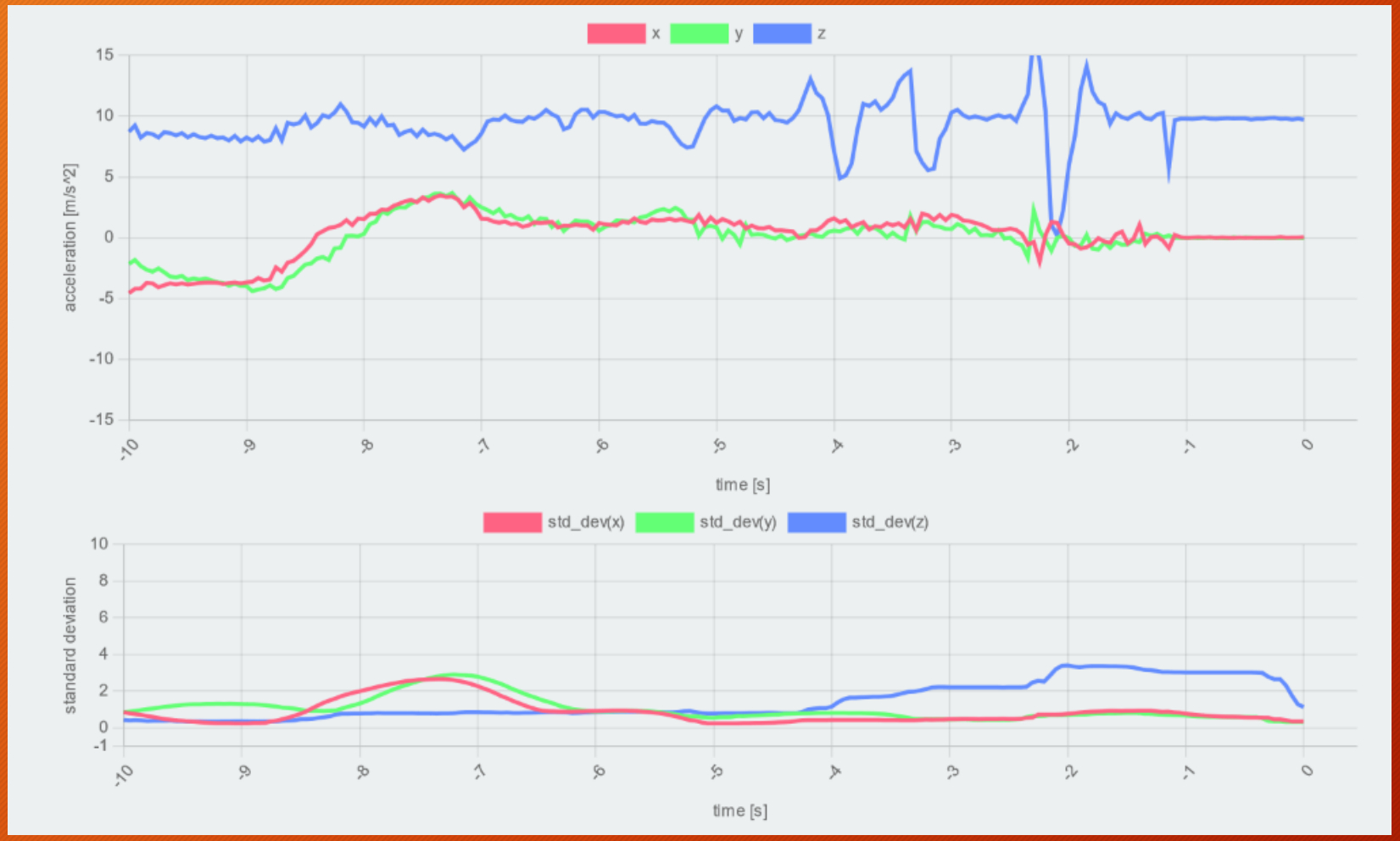


Frontend

- WebGL – Visualize board orientation



- Chart.js – Plot acceleration data graph



Activity:
None

Activity:
Walking

Activity:
Jumping

Demonstration

http://192.168.100.33/