

Individual Weekly Report

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Team: PowerGlove

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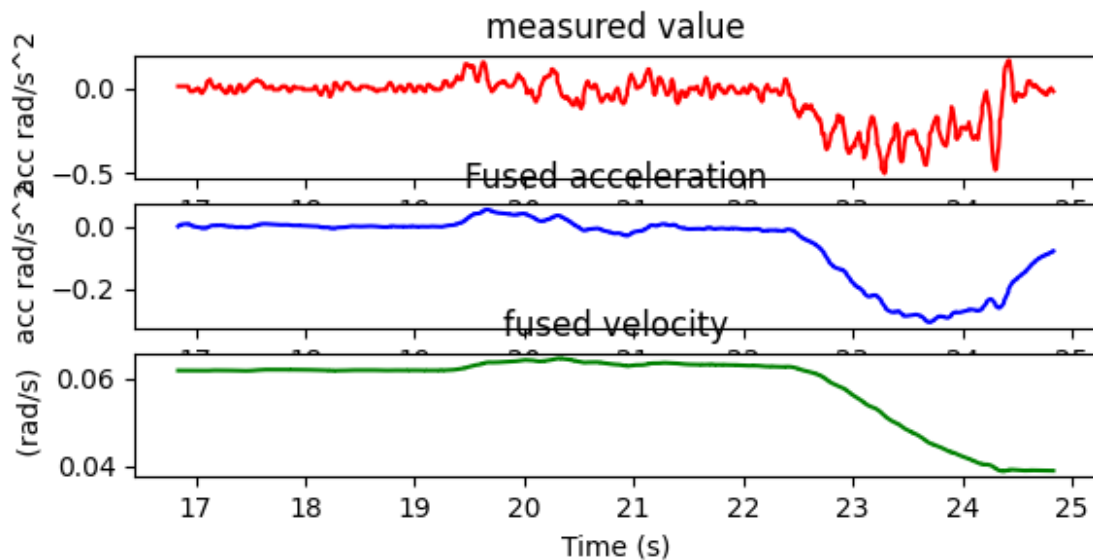
Current Status

1. What did you **personally** work on this past week?

Task	Status	Time Spent
Implemented an extended Kalman filter to Process data from IMU	finished	4 days
Designed the circuit for the laser pointer	finished	2 hours
Did some planning for gesture features	finished	2 hours

Include **screenshots/graphics** to illustrate what you did this past week:

Gyroscope Filtered Data vs measurements:



Arduino C code of Kalman Filter Implementation

```
keyboardtest.ino  tinyekf.h  tinyekf_custom.h
124 float gz = 0.01+ gyro.gyro.z;
125
126
127 const float z[EKF_M] = {gy, gz};
128
129 const float F[EKF_N*EKF_N] = {
130     1, dt, 0, 0,
131     0, 1, 0, 0,
132     0, 0, 1, dt,
133     0, 0, 0, 1
134 };
135 // Process model is f(x) = x
136 const float fx[EKF_N] = { _ekf.x[0] + dt*_ekf.x[1], _ekf.x[1], _ekf.x[2] + dt*_ekf.x[3], _ekf.x[3] }; // velocity y , velocity
137
138 // Run the prediction step of the DKF
139 ekf_predict(&_ekf, fx, F, Q);
140
141
142 const float hx[EKF_M] = { _ekf.x[1], _ekf.x[3] };
143 // hx[2] = .9987 * this->x[1] + .001;
144
145 //const float hx[EKF_M] = { _ekf.x[0], _ekf.x[1] };
146
147 // Run the update step
148 ekf_update(&_ekf, z, hx, H, R);
149
150
151 // If (abs(mu) > 0.05 || abs(gz) > 0.8) {
```

2. What problems did you run into? What is your plan for them?

We were having trouble with jitter when translating our sensor data into mouse control. To solve this I implemented a kalman filter to smooth the data in real-time for better mouse control.

One problem I still need to solve is getting the glove to keep track of its location in space so it can stay locked onto the mouse without much calibration. I will explore different strategies with the magnetometer to track its initial starting point and motion so that it stays with the mouse.

3. What is the current overall project status from your perspective?

We are slightly behind. We plan to get all current hardware into the glove by the end of this week and start testing the full product.

4. How is your team functioning from your perspective?

We are doing good. We all have defined roles for this week and should be in position to finish up base requirements and move into some stretch goals.

5. What new ideas did you have or skills did you develop this week?

I learned a lot about kalman filters and extended kalman filters. I got some more experience using matlab to test math before putting it into code.

6. Who was your most awesome team member this week and why?

Grant was good this week. He did some good work with coding the buttons.

Plans for Next Week

What are you going to work on this next week?

- Moving parts into the glove
- Tuning the cursor movement so that it accurately stays with the mouse even when the glove's angular acceleration takes it off-screen.
- Design 3d printed housing to put both accelerometer and laser on the finger.
- Tune mouse movement so that it accounts for both accelerometer movement and gyroscope movement.