

Weekly Meeting #1 – 01/23/15

Agenda

- Budget questions.
- General questions about project.

Minutes

- Do we have access to the traffic controller?
 - No, but we may want to conceptually address this.
- Look at the IEEE Spectrum article over possible technologies.
- Assess one technology from the article.
 - Find something that can work in areas larger than Moscow crosswalks.
- Want to communicate back to the pedestrian.
- Give support for multiple users.
- Think about how weather might affect our chosen option.

Weekly Meeting #2 – 01/30/15

Agenda

- More clarification on budget.
- Considered technology options
 - Costs, type, limitations – come up with a preferred option.
- General questions.

Minutes

- Budget has been approved around \$1,200.
- Consider using a Zyboboard interface.
- Consider looking into Matlab image processing.
- FreeScale Sensor Fusion, ‘fusing’ data from multiple sensors.
- Could look into using the Q-track over wifi.
- We need to schedule a formal client interview.
- From this interview figure out our initial specifications.

Weekly Meeting #3 – 02/13/15

Agenda

- Get verification of our client interview, project timeline and initial specifications.
- Talk about ordering the FreeScale Sensor Fusion development kit

Minutes

- Client interview, project timeline and initial specifications are all verified as being reasonable.
- Got the go ahead to order, make sure not to pay sales tax.
- We need to be able to sense if there is low accuracy for any reason and take that into account.
 - May be able to figure out some sort of error correction.
 - May just sense the error and not provide assistance in such conditions

Weekly Meeting #4 – 02/20/15

Agenda

- Sensor Fusion has been ordered, we are still waiting for it to arrive.
- We are entering the device and equipment learning/research phase of our project timeline.

Minutes

- Not much to talk about, just waiting for the Sensor Fusion to arrive

Weekly Meeting #5 – 02/27/15

Agenda

- The board is in, let's take a look.

Minutes

- The board was examined, next steps were discussed.
 - We need to install software and start to learn how to use it in conjunction with the Sensor Fusion.
 - Start small. Blinking LED test or something of that nature

Weekly Meeting #6 - 03/06/15

Agenda

- Explain the Kinetis IDE to be able to code and program the device.
- Questions on specifics/deliverables for snapshot day
- Redefine the project summary for the Expo

Minutes

- Expo summary was redefined and can be used as a project definition for our portfolio
- Specifics on the poster
 - Diagram of the board/sensors. Including a block schematic of the board.
 - A title page, team members, methods, specifications.
- There is no way to pinpoint a starting location of the pedestrian.
 - Start at the crosswalk button to get a point of reference and use the acceleration data to predict the pedestrian's path.
- Dr. Frenzel has a book of math libraries for coding in C.

Weekly Meeting #7 - 03/13/15

Agenda

- We learned how to program the board!
 - Used a pre-compiled program that sets LED color to red and blinks it once per second.
- Are working on how to use the Kinetis IDE to build a program.
 - Are currently having problems including the necessary libraries.
- Have spent most of the last week working on snapshot day.

Minutes

- Got the numerical recipes book in C from Dr. Frenzel, will examine it for possible solutions for our use.
- Want to be able to normalize the xyz axis so we don't have to worry about the orientation of the device when examining the data.

Weekly Meeting #8 - 04/06/15

Agenda

- We need to schedule a design review.
- We have found functions needed to acquire information.
- We need to figure out how the information will be presented to us.
- Kinetis IDE has labs to demonstrate how to use it.

Minutes

- We are provided with an RTOS to use.
- We are provided with a function that uses a 9-axis system (accelerometer, gyroscope, magnetometer). It can take acceleration data from the orientation of the device and fit it to the Earth's frame of reference. Given in North, East and Up.
- Design review needs to be power point format. Make sure to pay specific attention to aesthetics.
- NIATT may be interested in our project. They may want us to give a short presentation the day before Expo.

Weekly Meeting #9 - 04/10/15

Agenda

- We followed the lab steps for the Kinetis IDE but can't build a binary file.
- Are going to try to use Codewarrior IDE instead of Kinetis.

Minutes

- Design review will be Friday, April 17, 2015 at 2:30 in GJL 218.
- We can still drag and drop the provided binary file onto into the sensor fusion drive and the board will work. The problem seems to be in the IDE.

Weekly Meeting #10 - 04/24/15

Agenda

- We have been in touch with the Freescale community.
- Have been working on preparing for the Expo.

Minutes

- We have contacted the Freescale community and have someone trying to help us with the Kinetis IDE. Haven't gotten an answer yet, but communication is ongoing.
- Expo poster
 - Elaborate a little. Why are we doing this?
 - Include a list of goals, almost a timeline.
 - First semester teams don't need a real poster.
- Add feasibility to objectives

Weekly Meeting #11 - 09/04/15

Agenda

- Not yet able to re-create what Tom got working in Pocatello.

Minutes

- Tom was able to program the Freescale device in Pocatello, but we haven't been able to do it here.
- Need to look into alternative ways of finding help from Freescale. Dr. Frenzel suggested email and phone call on top of our pursuits into the Freescale Community website.
- Grad student (Hari Challa) suggested a new sensor fusion device to look into if we can't get the Freescale device working.

Weekly Meeting #12 - 09/11/15

Agenda

- Freescale phone number is non-technical support only.
- Entered a new question on Freescale Community
- Backup device came in

Minutes

- Need a design review by the end of the month.
- Reached out to Freescale by email and discussion board.
 - Got a suggestion on the discussion board suggesting we flash the binary file instead of elf file.
- The backup plan arrived consisting of: an Arduino, 2 Wi-Fi chips, 9 DOF (degree of freedom) sensor board, micro USB.

Weekly Meeting #13 - 09/18/15

Agenda

- Building working binaries and completed both sample (Freescale) labs.
- Alternative is wired up, starting software testing.

Minutes

- After changing from UART0 to UART3 I was able to build a binary and successfully program the Freescale board!
 - Going to start implementing Freescale sensor fusion library.
- The backup plan is going well.
 - Checking frame of reference for linear acceleration data.
 - Found a Google presentation on sensor fusion that may be helpful.
- Design review by the end of the month.

Weekly Meeting #14 - 09/25/15

Agenda

- Have some new thoughts on implementing an algorithm.
- Backup components seem to be working.

Minutes

- We can use simple kinematics rather than extrapolation and integration to find our displacement from acceleration.
- Backup plan is working and wired up. Just need to write code to start getting data.

Weekly Meeting #15 - 10/09/15

Agenda

- Freescale:
 - Implemented reset button and toggled LED's based on logic.
 - Downloaded a newer Freescale library.
 - Waiting on response from Freescale for accessing sensor data
- Arduino:
 - Figured out sensor API, working on code

Minutes

- Having trouble accessing data from Freescale structures, waiting for a response from them.
- Arduino drivers are only written for orientation, not acceleration.
 - Must read data directly from device.
 - Frame of reference is of the device, not of Earth.

Weekly Meeting #16 - 10/16/15

Agenda

- Have read Freescale acceleration in North/East/Up orientation, just need to implement algorithm.
- Bought some supplies for Arduino

Minutes

- After including a couple .h files I am able to get acceleration data in North/East/Up orientation.
- Bought a button and serial cable for use with the Arduino.
- Arduino data is being saved into a csv and we have acceleration, velocity and displacement in the x, y, z direction of the device.

Weekly Meeting #16 - 10/16/15

Agenda

- Have read Freescale acceleration in North/East/Up orientation, just need to implement algorithm.
- Bought some supplies for Arduino.

Minutes

- After including a couple .h files I am able to get acceleration data in North/East/Up orientation.
- Bought a button and serial cable for use with the Arduino.
- Arduino data is being saved into a csv and we have acceleration, velocity and displacement in the x, y, z direction of the device.

Weekly Meeting #17 - 10/23/15

Agenda

- Algorithm isn't working.
 - Can't visually access Freescale data.
 - Serial connection isn't outputting data.
- Getting strange readings from the Arduino.

Minutes

- Need to check Putty settings for serial connection.
- Will see if changing directions will change the sign of acceleration readings.
- Arduino readings are too fast, getting very low velocities and almost no displacement.
- Might try multiplying by a factor to get larger numbers.
- Floating point might be too small to hold correct acceleration values.

Weekly Meeting #18 - 10/30/15

Agenda

- Took measurements with Freescale device using raw data.
 - Data doesn't look very accurate.
- Fixed a small error in Arduino code.

Minutes

- Freescale device thinks we moved 12 m in 5.8 seconds even though the board wasn't moving.
 - Will bring this up with Freescale.
- Also will check accelerometer documentation.
- Fixed a small software issue in Arduino code forgetting to have an output from a function.

Weekly Meeting #19 - 11/06/15

Agenda

- Freescale said accelerometers are rated to 30-50 mg's.
 - Are not suitable for finding displacement.
- Filtered acceleration is also not accurate.

Minutes

- Walking 7 meters reported a displacement of 20-30 meters.
- Device is meant for accurate orientation, not acceleration.
- Will check repeatability of this data.
- May need to report more heavily on alternatives.
- See if others are using sensor fusion for tracking purposes.

Weekly Meeting #20 - 11/13/15

Agenda

- Orientation of device didn't change sign of acceleration.
- Repeatability doesn't look great.

Minutes

- 0.04 seconds adds 10 m difference in distance.
- May use physics lab to test the acceleration with pseudo-frictionless cart track.
 - Drop weight attached to cart, acceleration should read 9.8 m/s^2 .
- Include in final report details about how we solved problems from the spring and if we solve more current problems.

Weekly Meeting #21 - 11/20/15

Agenda

- Did 1g acceleration experiment and results were not as expected.

Minutes

- We could try running this experiment in different environments.
- Look into how a drone uses accelerometers.
- Look further into alternatives.
- Look at how the device is calibrated.
- Document any tests we ran
- Document pedometer applications.
- We have a general session Tuesday, December 1st after break.