EE / CprE / SE 491 – sdmay19-01

Athlete Motion Tracking

Week 1 Report

1/24/19 – 1/31/19
Client: Nathan Johnson
Faculty Advisor: Phillip Jones

Team Members:

Nathan Mazarelo –– *Weekly Reporter/Software Developer*
Monte Friestad –– *Spokesperson/Software Developer*
Madeline Rogers –– *Meeting Facilitator/Hardware* Maintainer
Ryan Hansen – *Scribe/Hardware Maintainer*

Weekly Summary

This week our team began looking for the accelerometer and pressure sensors that would be needed for the project. Research was completed looking for the ones that would best fit our needs. On the software side, work was completed on the recreation of the camera footage via data points and single display view with multiple sessions for the web application.

Past Week Accomplishments

- Accelerometer Research – Ryan
    - MbientLab – Wearable Bluetooth Sensors
        - Pros
            - Many wearable options available including adhesives that stick to the skin, Velcro bands, wristbands, belt clips-ons, wall-mounts and more
            - Relatively inexpensive (~$300 for 2 sensors and data hub)
        - Cons
            - All data is transmitted though their metadata app, this requires us to somehow integrate their app into our database
            - Provides additional sensors readings that we don't need (humidity, temperature, atmospheric temperature

- Pressure Sensor Research – Maddie
    - GP Cycle
        - Company that does bike fitting professionally using pressure sensors
        - Did not have anything listed for sensors that could be bought separately but did have a demonstration of the wiring that is used for top of the line sensors
    - TekScan
        - Offers high end sensors for medical, industrial, and athletic purposes
            - Sensors matched the ranges needed to withstand weight, biking mechanics, and bike dimension

        - Wireless connectivity was an option
    - Consulted with sales rep and found that the entire system would be very pricy
- Force sensor resistor
    - Film sensors that change resistance based on force applied
        - Potential usage with Arduino is possible
        - Arduino can be capitalized on as way to supply power to the sensor
    - Analog readings
        - The force sensors use analog which means they dive back one number even though there is a range of force over that sensor
        - If a range of readings was desired, it would be necessary to use multiple pressure sensors.

- Worked on recreating the camera footage via the data points from Ipi - Nathan
    - Started using python libraries Matplotlib and NumPy to plot the XYZ data points frame by frame
    - Created a program to parse the text file Ipi exports after recording
        - A lot of information in the text file isn't needed so finding the XYZ data is important
    - The major bones can be seen in the animation as round data points to easily determine the points of motion
        - The full body can be recreated but still stutters when next frame of displayed

- Updates to web application – Monte
    - Timeline
        - Finish multiple session display (2 weeks)
        - Testing with mock data (2 weeks)
        - Preparation for integration (2 weeks)
    - Continued to work on getting the single display for multiple sessions working
    - Most of the design is together, just need to get the cards working properly

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Ryan Hansen	Completed research for accelerometers. Found that MbientLab – wearable Bluetooth sensors could be an option for the project.	7	75
Madeline Rogers	Completed research for pressure sensors. Looked at GP cycle, TekScan, and force sensor resistors as possible options for the project.	8	79
Nathan Mazarelo	Worked on recreating the camera footage via the data points exported from Ipi. Created	9	79

	visual objects for the major bones of the body to be easily recognized when viewing the animation.		
Monte Friestad	Continued work on single display for multiple sessions on the web application.	7	75

Plans for Coming Week

- Ryan
  - Finalize the accelerometer with client and get them ordered to begin testing
- Maddie
  - Finalize the pressure sensors with client and get them ordered to begin testing
- Nathan
  - Continue working on recreating the camera footage and get the animation to run more smoothly when transitioning from frame to frame
- Monte
  - Continue working on multiple session display for web application