EE / CprE / SE 491 – sdmay19-01

Athlete Motion Tracking

Week 2 Report

9/6/18 – 9/13/18
Client: Nathan Johnson
Faculty Advisor: Craig Rupp

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 researched various options for the data collection and data presentation portion of our project. For the data collection aspect, we looked at different types of motion tracking cameras and the software that would be compatible with such cameras. For the data presentation aspect, we looked at different libraries that could analyze the data that would come from the cameras.

Past Week Accomplishments

- Data Collection Research – Ryan
    - Compiled a list of different motion tracking cameras that suit the project specifications
        - Sony Cyber-Shot DSC-Rx100 IV
            - Three 1080p @60fps cameras with tripods to support a 360 view
            - Recommended software would be Dartfish, video analytics software compatible with everyday cameras
        - Gears Sport
            - 8 cameras @8640 frames per capture
            - The 8 different cameras cover all positions making the capture environment very precise
            - Uses Opti track cameras that already have their own software
        - iPi Motion Capture
            - 6 cheap cameras operating at low resolution and fps
            - Does not require the athlete to wear anything tracking related
            - Data can be exported to excel and MATLAB

- Data Collection Research – Maddie
  - Compiled a list of different motion tracking cameras that suit the project specifications
    - OptiTrack
      - Buy the listed cameras based on the specifications desired
      - Would have to buy the required software to use with camera
    - Microsoft Kinect
      - Has support for processing libraries and programs like MatLab and C++
      - Would need to have the Kinect standalone with power supply
- Data Presentation Research – Nathan
  - Compiled a list of different software and libraries to analyze the data given by the cameras
    - Matplotlib
      - Open source library in python used for plotting data plots
      - Able to plot in a 3D plane
      - Has support for real-time plotting but rendering must be done by the user
      - Generates graphs, plots, error charts
      - Has support in web application settings
    - Vpython
      - Generates fluid real time 3D animations due to built in rendering
      - Has support for interactive events like mouse and keyboard
      - Can create a variety of 3D objects easily
- Data Presentation Research – Monte
  - Compiled a list of different software and libraries to analyze the data given by the cameras
    - Numpy/SciPy
      - Library for data analytics and scientific computing
      - Support for linear algebra, optimization, integrations, and statistics
    - Pandas
      - Library that grants access to data structures and related functions
    - StatsModels
      - Useful functionality for statistical analysis, estimation, and testing
  - Options for Web development
    - Django
      - Very popular and well supported library for web development in python
      - Easy to use and learn

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Ryan Hansen	Researched multiple options for motion tracking cameras and software. Looked into software that the Kinect would need.	6	10

Madeline Rogers	Researched options for camera and software for motion tracking. Checked if the department had a Kinect available.	6	10
Nathan Mazarelo	Researched options for libraries that could analyze and plot data. Started to build an environment for python development and testing.	6	10
Monte Friestad	Researched various ways we could analyze data and ways to make websites. Began looking into website design.	6	10

Plans for Coming Week

- Ryan
    - Learn more about motion tracking and how to pull data from motion capture software programs
- Maddie
    - Find a Kinect within the department that we can use for testing
    - Learn more about software that the Kinect uses

- Nathan
    - Learn more about how to use python in the web development area
    - Get functional code with one of the data analytical libraries
- Monte
    - Learn more about python and try to make a template for a website

Gitlab Activity Summary
Nothing to report.