ML Process

1. Manually take both watch and phone data for each recording, align them using 1790 ns time
    a. Ensure that there are no gaps in data collection. Note that Laura Inoptimal has significant gaps towards the later part of the recording essentially halfling the amount of usable data
    b. The output is stored in Analysis/Raw usable data
2. Plot the graphs and screen record the graphs
    a. Use the notebooks in Analysis/Processing Notebooks
3. Split this data via data thresholds (manually set)
    a. Use the notebooks in Analysis/Processing Notebooks
    b. Splits are denoted by placing 100 consecutive zeros for each feature
    c. Data is outputted in Analysis/Data split into strokes
4. Accumulate the data split into strokes and output data ready for ML
    a. Use the notebooks in Analysis/Processing Notebooks
    b. Data is outputted in unflattened arrays
    c. Data outputted in Analysis/Trainable data
5. Train an svm
    a. Use the notebook in Analysis/models
    b. Firstly flatten the arrays
    c. Convert to numpy arrs
    d. Do 10 fold cross validation for validation
    e. Split into test/train sets with train:2 test:1 ratios
    f. Calculate true positive, true negative, false positive, false negative
    g. Calculate Precision, Recall, Accuracy, F1

File structure (For reference)

- Paddling Dec 11 - All data related to paddling testing on dec 11
    - Video - Video data
        - Anthony Optimal.mp4
        - Anthony Inoptimal.mp4
        - Laura Optimal.mp4
        - Laura Inoptimal.mp4
    - Sensor Data - Raw Sensor Data
        - Anthony Optimal
            - Phone
            - Watch
        - Anthony Inoptimal
            - Phone

        - Watch
    - Laura Optimal
        - Phone
        - Watch
    - Laura Inoptimal
        - Phone
        - Watch
- Data Plotted - Screen recordings of animated graphs
    - Laura Optimal
        - A bunch of screen recordings
- Analysis
    - Raw usable data - Phone and watch data lined up and ready to use
        - Anthony
            - Anthony Optimal Master
            - Anthony Inoptimal Master
        - Laura
            - Laura Optimal Master
            - Laura Optimal Master
    - Processing notebooks - Read data from raw usable data, process, create graphs, split it, write it back into ../data split into strokes
    - Trainable data - data split into arrays such that it can be used for learning
    - Models
        - model.py - First svm for Anthony