Project Features list:

1. Website for users to request the numbers
    - This will allow the user to request and receive the random numbers in form view. Likely made using bootstrap, HTML, and SQL.
2. Generate sets of random numbers
    - Allow users to request a certain number of random numbers (binary, 0-9, ASCII, etc.) and deliver them as a set to users.
3. Input and read each image file
    - Loops through a directory and holds the photos data in a matrix.
4. Determine most volatile spot from the initial frame
    - Through analyzing pixel matrix, determine a range of positions where it has the largest range in RGB values. Use this spot to track throughout each frame there after.
5. Track and calculate the direction of wind currents using visual processing
    - This will have to be done using a series of images. Use image processing package to determine direction of vortices.
6. Compact and deliver results to user
    - These numbers should be “random” due to its unpredictability.

Requirements:

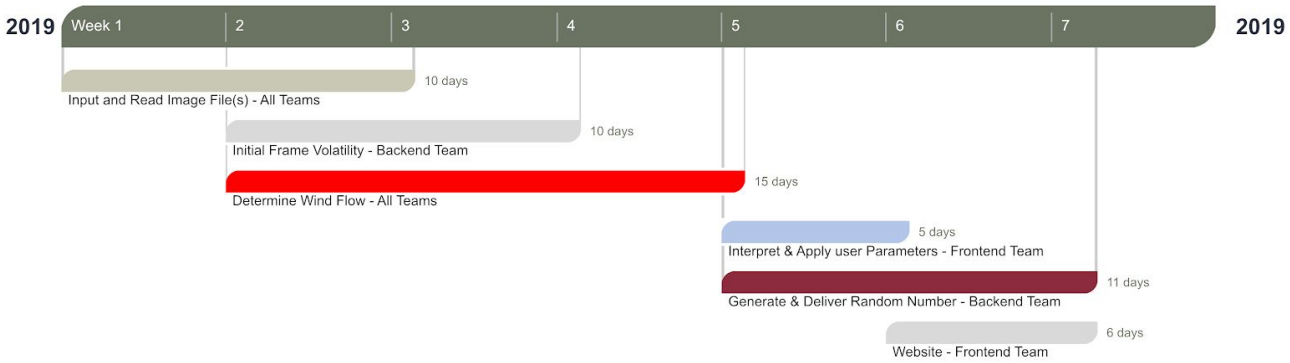
1. Website for users to request the numbers
    a. Functional Requirements
        i. Software provides a random string upon request
        ii. Will not return the same random string to different users
        iii. Ability to store random strings on users local device for later use or reference
    b. Non-functional Requirements
        i. Requests will be queued as not to return the same string for different users
        ii. Allowing the user to store the random strings will allow for future testing
2. Determine random number parameters from form for user
    a. Functional
        i. Choice in length and type of character returned
    b. Non-functional
        i. Not all use cases will be the same so allowing the user to choose the type of random string they want allows for more users
3. Input and read each image file
    a. Functional
        i. Each image is looked at, the data extracted is stored in a matrix.

    b. Non-functional
        i. Each image matrix will be size 1080X1920 so that the resolution of each image is of high quality but not too large so that processing time does not grow to large.
4. Determine most volatile spot from the initial frame
    a. Functional
        i. Look at each pixel and the surrounding 3x3 array to determine the most drastic difference between each pixel. The one deemed the most volatile is used as the pixel for each frame after that.
    b. Non-functional
        i. Choosing the most volatile pixel in the initial frame does two things
            1. It gives us a single reference point for extracting a random string
            2. Using what is the most volatile in the initial frame should provide a wide varying of data
5. Process image by determining flow from image processing
    a. Functional
        i. Calculate the change in fluid motion between each frame by analyzing matrix value
    b. Non-functional
        i. Pass image series to OpenCV to determine movement direction of wind
        ii. Return value to our backend
6. Deliver random number based on previous functions to user
    a. Functional
        i. Random number is returned to user
    b. Non-functional
        i. From value returned via OpenCV, calculate random number
        ii. (Optional) Use user parameters to calculate random number

Project Plan:

- Project Management: Gantt

Wind RNG Timeline



Week 1 starts 10/20/2019