Project II - Datascience I

Nathan Bunch

In this project, I worked on reading the heartbeat of Professor Yates, as well as determining the area of the apple-shaped cutting board. This documentation shows the steps I took working on this project with a class-mate.

In the first project, I had started with taking the given source from Yates and continued to modify it. I didn't do much with it until John suggested to graph it. Once I had graphed it, I noticed sharp peaks that formed where the heart beats occurred (I only graphed the red color in the video frames by the way). I worked with John more on this project and he created a snippet of code that allowed us to smooth the points in the graph. This would allow us to potentially count the points. The first method we thought of originally was by taking either a derivative or integral to determine where the zeros occurred. We would then count the zeros and that would be the heart rate over a short period of time. This idea was then disregarded when we discovered the "all-powerful" (cue heavenly music) "findPeaks" function. It took a long time to implement this, as there was a discrepancy on the internet as to what package to use. Eventually, I found the correct page by accidentally searching with such a horribly formed sentence (it seemed as if I couldn't English for a second in my life). We used the "findPeaks" function to count the heart beats over a period of ten seconds. We multiplied this value by six to get the total heartbeats over a period of a minute (the total BPM). We found the professor to be quite healthy at 66 beats per minute.

In the second part of the project, I took the code from the first part of the project and changed it to analyze a single image. I had then proceeded to sum the different colors and compare the red versus the blue color data (since in theory the orange contained red and white contained blue). This resulted in a percent difference (which can be used to find the percent difference in the area between the cutting board and paper). I discovered this to be completely wrong, since I had too much scattered data (that being the read and blue were scattered throughout the image). I then proceeded to crop the excess data (which happened to be the background around the paper). This is where I cleaned the data. I then ran the image through the algorithm I developed. That also did not work, because there was still a scattering of the colors in the image. So John, because he had photoshop, took the image and enhanced the colors. He made the apple cutting board 100% red and the white paper 100% blue. This allowed my algorithm to work perfectly. Then, I was able to correctly calculate the percent difference in color and therefore calculate the difference in area (square inches).