BME Practicum Three

By: Joaquin

Fear and Heart Response

Introduction:
In this section of the lab, we used a PPG to measure Heart Rate while the person was in a fearful situation. This was done to see if a simple sensor such as the PPG finger sensor, could detect something more complex like Fear. This could be applied in instances where a person is not able to be seen by another, but measuring their fear is paramount for their safety since the worker requires a calm and clear head. This could be in dangerous undersea work, dangerous space work, or just dangerous work in general. If we had a simple way of detecting the fear level of the person, we can pull them out of a potentially dangerous situation before it escalates too far.

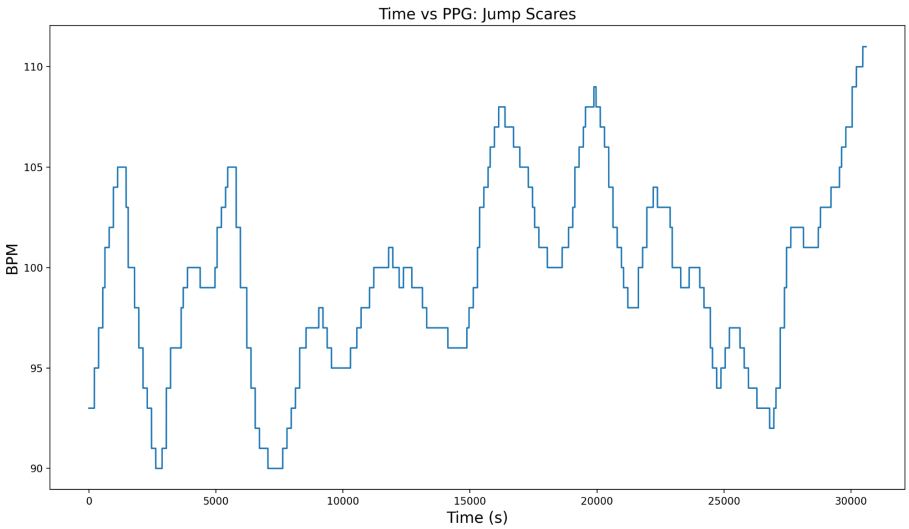
Method:
We put the sensor on our index finger in order to measure the heart rate. The sensor measured changes to the color of the finger, which indicated blood flow. By graphing these changes in color, the program was able to measure the peaks and calculate a heart rate.

While measuring the heart rate, we watched scary videos, horror films, and jumpscare compilations. We then graphed this information and analyzed it to see if there were major changes in the heart rate while watching these videos and experiencing fear.

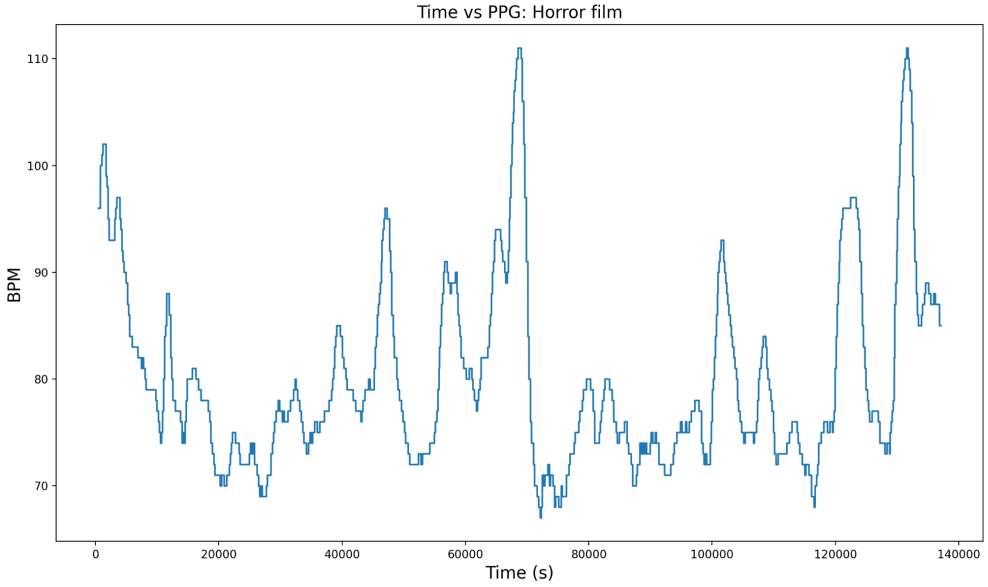
Jumpscare video:
https://www.youtube.com/watch?v=sQt5V9JduRA&ab_channel=LerchMediaGroup

Horror Movie Video:
https://www.youtube.com/watch?v=H4dGpz6cnHo&t=319s&ab_channel=KanePixels

Graphs, Figures, and Measured Values:
PPG during jumpscares:



PPG during horror films:



Analysis:

In both graphs, we can see that the heart rate rose from a resting heart rate less than 100 BPM to a heart rate above 100 BPM throughout the experience. However the heart rate is very sporadic, which may be the larger indicator of stress. Usually one has a more steady heart rhythm, but it, seemingly randomly, rises and falls as the video is played.

Based on this, I'd say that we can in fact use a simple PPG sensor to detect fear levels in people. However this is a rough guess since I do not have enough information to draw a more accurate conclusion.

In hindsight, a better test would have had a baseline test that should have been made with no fear or even calming experiences, so that it could've been compared

with these horror tests. This would allow us to better understand the data we are looking at since we can compare it to something that is normal.

This is stated with the understanding that our lab 3 was rushed because of limited time. Having lost a whole lab section block, we had to finish two labs in one lab section.

Future Work:

If I were to explore this topic more I would conduct another test with the baseline as stated above. Using this data, I would compare the two and hope to create a better conclusion and prove or disprove my hypothesis.

If this hypothesis was proved, I would do more research and explore more detailed applications of this type of test and the fields it could be applied in.