Professor Stallard

We wanted an individual with an engineering background to interview to gain the perspective from another engineer. We decided to interview Professor Stallard as not only is he an engineer, but he has also overseen countless Senior Design Projects in his career and would be able to give us insight on the feasibility of our current implementation and steer us away from pitfalls or mistakes that are common for students to make.

We asked Professor Stallard if he had any thoughts on the flow/process of how our helmet operated and if he saw any flaws and potential improvements we could make. Firstly, he pointed out that users should be able to know if the helmet is active or not. We felt that we could utilize the accelerometer on the helmet to detect whether the helmet is active. If there is consistent movement detected from the accelerometer, the helmet would be active. Professor Stallard also expanded on this idea and suggested that we have an "auto-off" feature where the helmet turns off/becomes inactive after a certain period of inactivity. This would prevent unnecessary battery drain.

On the software end, he also pointed a flaw in our concussion detection method. Previously, we thought of concussion detection as a value threshold. This means that there are values that are used as thresholds to determine if there could potentially be a concussion or how severe it is. However, collision between objects of different materials would result in different values. This would result in inconsistent results as values which we expect to be concussive might not actually result in any damage yet values that are lower than our threshold could potentially cause damage to the athlete due to the duration of the collision (whether the force is dealt instantaneously or over a longer period of time). With that, he suggested that we find a way to build a collection or profile of different collisions. This includes collisions between different materials, different forces, different angles, and different combinations of all 3. From there we can obtain the force of the collision over time and plot a graph to get the scalable waveform of the collision. From there, we can visually tell the different and recognize the pattern of each collision with their respective parameters (material, force, angle) and implement it into our software. This would create a library of reference for the software to be able to compare and more accurately detect what type of collision the player experienced and provide the relevant information and warnings. With the waveforms, we should be able to get a better degree of accuracy and repeatability.