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Period: 3
09/26/19

Journal #4

Throughout this past week, I improved my next-frame prediction Machine Learning (ML) model and conducted research to find more robust and quantifiable car crash statistics. I enhanced my next-frame prediction model by experimenting with various loss functions and changing the construction of my training dataset. Specifically, based on the results of many trials, I determined that using the Mean Squared Error (MSE) loss function as opposed to the Binary Cross Entropy (BCE) loss function decreases the convergence time of the model. With respect to dataset construction, previously, I was simply pairing consecutive frames as (x, y) pairs for the training dataset. Now, however, I am making (x, y) pairs by pairing frames with 10 frames of separation, so for example, I would pair the 1st frame with the 11th frame in the training dataset. In doing so, my model "recognizes" a starker contrast in the (x, y) pairs it receives, enabling it to make more definitive next-frame predictions. The main problem with my current algorithm is that it outputs very blurry and distorted images. Consequently, it is difficult to verify whether my prediction is accurate. To resolve this problem, I will explore using computer vision vehicle identification to determine whether the position of the vehicles has changed between the actual and predicted frames.

After meeting with you last week to go over my car crash research, you instructed me to look into more quantified information. During class on Tuesday, I researched statistics involving the frequency of crashes in the U.S. and what types of crashes occur the most often. Although I was unable to find an explicit breakdown of crash types, I was able to locate more quantified information regarding the frequency of crashes and their respective injuries. On average, approximately 6 million crashes occur every year in the U.S. and of those around 2 million results in permanent injuries to the driver. In the coming weeks, I will do more research into the frequencies of crash types in order to build off of this information and further solidify the validity of my project. In summary, during this week, I was able to make meaningful progress towards establishing my project by experimenting with the specifications of my next-frame prediction algorithm and exploring car crash statistics.