**Saturday 4/4/2020**

On this day, I had some speculation about the presentation. I knew I wanted a stats slide, and I researched the statistics related to the specific cost numbers (i.e. I wanted to figure out exactly how much cost was needed to repair global disasters. I only knew it increased 151% from previous research, but I wanted to know the exact numbers.) I searched around the internet for answers, but unfortunately no luck.

Then, giving logos, pathos, ethos came across my mind because all those components would be useful to persuade/inform (as I learned those aspects in my “Advanced Placement English Language and Composition Class.”) Logos was obviously present in my presentation because research is all about having a logical approach, and it is driven by tangible success. A large part of research is data, and data is in fact all about numbers, if we think about data on a philosophical level.) I might incorporate pathos by inserting images that can provoke some sadness/sympathy from the ruins of a disaster (e.g. I had a photo of a woman crying in the aftermath of a hurricane on my website streamlit2.sites.tjhsst.edu.) Later on, I realized ethos was probably not necessary; there is already trust since we are in a TJ environment.

Then, I thought about having a slide with multi. neural net. results. I knew it was going to be weird since it would present results in a different style from that of the results on the slide with the single-label neural network. However, given that I had no other option, I agreed to that idea anyway.

Even though there is uncertainty about the deadline (Dr. Gabor said “at least April 6”), I decided to give my best effort to complete the poster and the tjSTAR presentation by April 6th.

**Sunday 4/5/2020**

I began making stats. Slide. I finally got to find the numbers I needed by viewing the original source I got the 151% and realizing that that source was using another source, which had more detailed information, such as the specific cost numbers.)

I was able to find the actual cost numbers from a proper source. This source was actually the source that the source with the 151% stat referenced to. I was surprised I did not catch that reference the first time around. Anyhow, I was certainly glad to have found it at that point.

However, in the end, I did not end up displaying economic stats in the first place because costs were irrelevant to our solution/the specific area of disaster response I was interested in, which dealt more with deaths. So, I focused on death stats instead.

I also put in a graph showing the number of disasters each year from 2000 to 2019. I thought this would be a nice graph to put on display to demonstrate another source of relevancy to disaster response/first responders.

I changed the previous web application photo on the web app slide. I made sure the new screenshot included the multilabel results of a sample photo.

For the multilabel-CNN slide, I displayed the results from the last training epoch since that displayed two relevant statistics: the error and the fbeta score. I made sure to highlight those two stats by display two red circles around those stats.

Then I realized I needed to explain what the fbeta score was all about. Even I had not understood it completely at the time; from my initial research of it, all I understood was the motivation behind it (i.e. its reason of existence?), which was to account for problems dealing with imbalanced datasets (i.e. a dataset that represented each of its classes disproportionately.) In addition, I had also understood fbeta relied on both “precision” and “recall.” However, I did not understand those two concepts completely. Thus, I went ahead and researched fbeta again, and a couple of sources from “Towards Data Science” helped clarify what fbeta was precisely. Once I had a firm understanding of fbeta, I proceeded on to make the fbeta optimization slide. I made the slide by displaying a photo of the fbeta formula, and right under it displaying the formulas for “precision” and “recall.” I also inserted the confusion matrix presented on the single-label CNN results slide because I thought that would be the ideal example to explain “precision” and “recall” that was related towards my project. Of course, it would not be exactly related since “precision” and “recall” for multi-label classification works a little differently than for single-label classification. Once I looked up how “Precision” and “recall” worked for multi-label classification, I realized as long as one understood how “precision” and “recall” worked in a single-label classification setting, then it would not be so complicated to understand those two concepts in a multi-label classification setting. However, I thought explaining the two concepts just for a single-label setting would be sufficient just to explain how they worked in the first place.

I decided to make a “For Prospective Students” slide, since in earlier tjSTAR Sys Lab presentations, I saw a slide listing future avenues for students to take should they decide to further a TJ senior’s research idea for the Sys Lab. I thought the “For Prospective Students” slide would be necessary for me as well in order to address that I could not get to the severity rating system as I would have liked to, so I would hand the hat off to a future student to do so. I thought this slide would also be useful to promote disaster response further. During my time at TJ, AI seems to be a topic of popular interest. However, I have never seen any interest towards specifically disaster response, and I want to trace off an interest for disaster response as part of my legacy for TJ. I came up with other potential avenues such as working on the most efficient transportation routes for future, similar-type disasters that would affect the same location(s) that the CAP was investigating. I then made a bullet point stating that I may come up with more avenues later. The reason for this was that Dr. Gabor wanted us to explicitly mention anything that I may include in the final tjSTAR presentation product. What I was working on was a rough draft presentation for tjSTAR.

I also included “Well, what is being done to prevent less deaths?” slide between the stats slide and the slide where I introduced the Civil Air Patrol. I had always looked for a decent way to bring up the relevancy of the Civil Air Patrol, since in my progress presentation I had presented towards the end of January, I straight up started my presentation with the Civil Air Patrol.

**Monday 4/6/2020**

On this day, my partner and I worked on updating our poster by displaying our multilabel-CNN accuracy results, and clarified how the accuracy metric alone was not sufficient. We explained on the poster why the fbeta metric was more useful, as that metric is used for imbalanced classification problems (like our problem.) We also displayed diagrams to explain how “precision” and “recall” work, as they were essential to understand how “fbeta” worked.

Then, I refined the presentation by adding in more supplemental bullet points for the CNN slides. I decided to format them by having “purpose” bullet points (the purpose for each CNN) and then “means” bullet points (what steps/technologies I used to train the CNNs.) In addition, to make my presentation more technical, I added a slide to showcase sample code inside of Google Colab. I added another slide to showcase sample code inside of Director. The purposes of these slides were to demonstrate the software technologies I used in the process and make my audience better understand how I accomplished making the CNNs and the web application, respectively.

For the “Fbeta Explanation” slide, in order to break all the formulas down, I used different-colored circles and made a fade-in animation for each color so I could explain the elements inside of those circles and highlight repeated elements. This way, I could explain to my audience that what they saw on that slide was not complicated after all, and can be explained intuitively.

I then implemented a “Credits” slide to thank all the people who have been involved with my partner and I’s research project. I came up with our directors Mr. White and Dr. Gabor, my research partner: Connor Grimberg, “Remote Sensing for Crisis Response” for inspiration of my research idea, and other TJ peers involved (for giving feedback on my progress presentation and for giving me tips about improving my web application.) I also said on that slide that I may come up with more people to thank later (for the purpose of being a rough draft, once more.)

I returned to the poster, and decided to add in logos of the technologies we used: fast.ai, Google Colab, and Google Drive. I also duplicated the Civil Air Patrol logo so that the title area could look symmetrical, as a nice design effect. I then duplicated the Google Drive logo image and duplicated that so that the whole title area could look like a frame. I thought overall, it looked aesthetically pleasing, so I kept the title area just like that.

I then edited the “Methodology” slide to make sure that I mentioned the software technologies that I had used. Then, I worked on getting a diagram for explaining “precision” and “recall” to be put on the poster. Once I found one, then I made sure to readjust the image size as necessary.

I was finally relieved and happy after an exhausting amount of effort, meticulousness, and detail that went into the final poster and the updated tjSTAR slides. I honestly wanted to take a break, as I thought the time I put into both of those products the past two days totaled to as much time, if not more than, the time for a usual week of Sys Lab, which was one anchor day period (45 min.) plus two red day periods (180 min.)

**Wednesday 4/8/2020**

I was wondering why when I trained the multi-label neural network, why fast.ai maximized accuracy and not fbeta instead, which seems to be the more relevant metric. Then, I realized that it may have been because we set our meric as the accuracy instead of fbeta as one of our parameters of the CNN. I decided it is worth investigating either training an entirely new CNN based on maximizing fbeta as its parameter or training the current CNN, which already has a low error rate, to then maximize on its fbeta score instead each subsequent training session. I was not sure if the latter was possible since I had already set its parameter as to maximize accuracy instead, but I decided it would be well worth the time to investigate later.