Name: Jason Zhou
Mentor: Dr. Dongjin Song
Status Report #: 23
Time Spent on Research This Week: 8
Cumulative Time Spent on Research: 176.75
Miles Traveled to/from Mentor This Week: 0
Cumulative Miles Traveled to/from Mentor: 0
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Monday, March 21st, 2022: (0.5 Hrs)

First, my mentor and I talked a little bit more about the chance for me to come to UConn and give a presentation about my ARM project. He has not given me the exact date yet, so I will be waiting until then.

Afterward, I showed him the diagram I showed in last week's status report for him to review because I planned to put it inside my research article. I also wanted to show him what my neural network looked like. We had always discussed it, but he had never seen the actual structure of it before. He said that it looked fine and did not have any problems, which is good.

Tuesday, March 22nd, 2022: (2 Hrs)

On this day, I thought about how I would structure the methods section of my research article. While doing so, I realized that in order for my methods to be good, they must allow someone to reproduce the experiment. At this time, my experiment was definitely reproducible. This is because the training process of my neural network requires some degree of randomization when shuffling the data. Thus, I worked on how I could reproduce the randomization of my experiment.

It turns out that when a computer randomizes something, the results are not truly random. It is just an abundance of convoluted math operations that output a seemingly random number. In addition, most of these functions have something called a seed, which dictates how a number is randomized. By putting in the same seed every time, the same order of math operations can be recalled to randomize the function, making the randomness reproducible.

All I had to do was input the same seed every time I randomized something, which allowed the training process to stay random and reproducible.

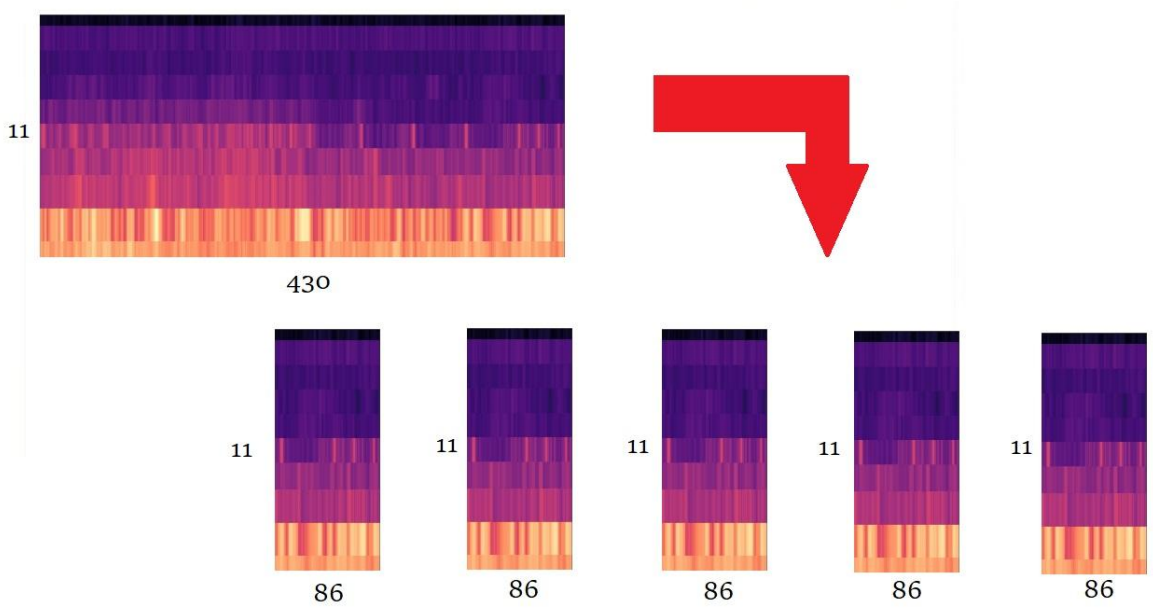
Wednesday, March 23rd, 2022: (0.5 Hrs)

Last week, I realized that I had accidentally trained my neural network on both the normal and anomalous data. As such, on this day, I took the time to separate each type of data into different folders on my computer.

Afterward, I took all of the normal audio data and used it to retrain my model. Overall, it did much better than I ever expected it to. It started at a loss of 29.5210 and ended at 3.0408, which is the best the model has ever done.

Friday, March 24th, 2022: (1 Hr)

On Friday, I began working on my research article and writing the methods section. Overall, the process that I first outlined changed a lot, so I ended up having to rewrite the entire section. This time I also wanted to add pictures to make my paper more comprehensible.



(A picture I made in order to show the process of window sliding, which breaks Mel spectrograms into smaller parts)

Saturday, March 25th, 2022: (3 Hrs)

After obtaining a great loss score after training my neural network earlier in the week, I wanted to test its overall accuracy with the evaluation data that came with the DCASE resources my mentor had given to me.

I spent this time taking the evaluation data, converting it into a time series, and transforming each one into a Mel spectrogram while also giving them a label (e.g normal or anomalous). In summary, I had to do a lot of preprocessing work. Then, I created the actual code that runs through the data, input it into the model, and test its accuracy.

Even though the neural network had done very well in training, its accuracy was incredibly low, only classifying about 50% of the data correctly. This was a little disappointing to see. I will have to look at what went wrong at a later time.

Sunday, March 26th, 2022: (1 Hrs)

I plan to go to the Reading and Writing center on Monday to get my research article checked. Thus, I dedicated today to finishing up the introduction and methods section of my paper (I had to substantially modify both of them). For my introduction, I worked on cutting down the complex and useless verbiage I was using to make it more understandable. Additionally, I added some more content to make the argument I was making stronger.

I did the same for my methods section, added some images, and gave it a final read. It looks ready for the Reading and Writing center to check.

References

How does one shuffle an array in numpy in a reproducable manner? (n.d.). Quora. Retrieved March 28, 2022, from https://www.quora.com/How-does-one-shuffle-an-array-in-numpy-in-a-reproducable-manner

Python random seed() method. (n.d.). W3 Schools. Retrieved March 28, 2022, from https://www.w3schools.com/python/ref_random_seed.asp