**Journal Report 8**

**10/13/23**

I finished the video and these are the notes I garnered from the video below.

Mark Lesnick and his team at Old University demonstrated the practicality of synthetic data for predictive modeling in broadband networks. They used data collected from broadband network core nodes over 2016 and 2017, encompassing load measurements, content delivery outcomes, and traffic statistics. Using generative adversarial networks (GANs), they generated 100 sets of three-dimensional data, each with about 5000 data points. Their synthetic data exhibited almost perfect correlation with actual data, making it valuable for pre-training forecasting algorithms. They highlighted the limitations of relying solely on statistical comparisons and emphasized the difference between learned service performance from logged data distribution and real data behavior.

**10/16/23**

Unfortunately, my work computer would not let me log in so I sent an email to my NCNR director. I hope to get this problem fixed by next week. In the meantime, I am doing further research into multivariate anomaly detection models. I am currently using the Darts Library and have analyzed the different architectures available: <https://unit8.com/resources/darts-time-series-made-easy-in-python/>. The architecture seems to limit the length of the forecast by the number of past covariates and future covariates. I attribute this to the fact that I upsampled my data so the training consists of time series that are half the length of the original. I am thinking of trying another model, but I still have to find a model that works for my kind of multivariate time series. It might be better to combine the anomaly aggregator and forecast model together and just have one anomaly detection algorithm.

**10/18/23**

I am still awaiting a response from the NCNR. I did some more research regarding different models and the downsides of my current work that I did over the summer. In order to predict over a longer time sequence and on sequences that the model has never seen, I need to pick a different model. My current model doesn’t predict new sequences and only on trained sequences. I should be able to get another baseline by next Friday.