AI4Science Individual Report

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1   Overview

The Time-Series team continued its work from the summer on Temporal Fusion Transformer models by implementing Sensitivity Analysis based on age groups in order to advance the interpretable AI. As the age sensitivity paper had previously been submitted we mostly worked on code reproduction, paper reworking, and then created a website to display the analysis. During the semester we also took part in paper readings to increase our knowledge of the field in general.

2   Rivanna

Code reproduction was done on the UVA Rivanna servers. The models and related code were in python and these programs were called on the Rivanna system through the use of slurm scripts which could use shell commands to take a series of actions. This was done to ensure that the runtime environment would be consistently set up the same for all members of the group and for each run. Using the rivanna_slurm.sh script we could use singularity to initialize the correct runtime and then run the correct model.

3   Paper Reading

At the beginning of the summer I led a paper reading on the TFT for Interpretable Multi-Horizon paper. This paper was important to our project at it was a precursor to the Temporal Fusion Transformer model that was used in the gpce-covid project. Its main benefit over other machine learning architectures is the high degree of interpretability possible with this type of model. The Sensitivity Analysis project's focus on understanding the sensitivity of COVID-19 infection rates to various age groups aligns well with the TFT's ability to handle multiple inputs and provide interpretability. The TFT's variable selection networks and attention-based mechanisms can be instrumental in identifying which age groups are most influential in predicting infection rates. Furthermore, the interpretability aspects of the TFT can aid in visualizing and understanding how these age groups influence the model's forecasts over time, thereby offering

valuable insights for public health policy and decision-making. Therefore, after reading this paper I thought it made sense as a paper to present in our group meeting.

4 Website

To display the findings of the paper in a public way I created a website on the project repository's gh-pages branch. The website was created using Jekyll for the structure and theme as well as markdown for the individual pages. The theme and link structure of the website is set up in the _config.yml file and the website content is in the markdown pages, which also contain the tags to link to the next page. The website contains the README document and sections based on the paper. Below is the beginning of the README page for reference.
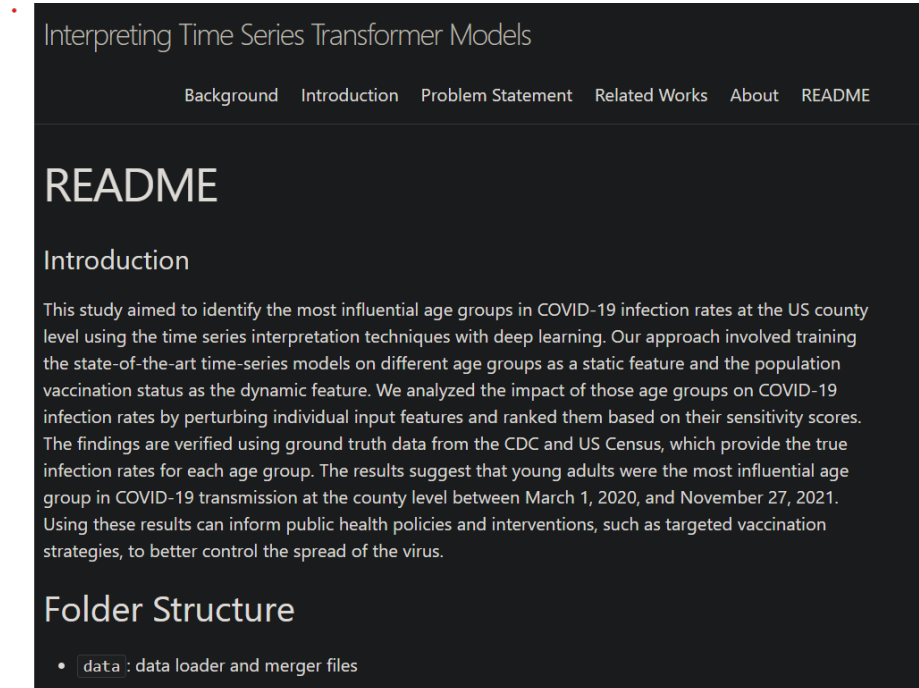
5 Github

The team used a github repository as a codebase, website host, and project management system. The majority of my commits were related to the website. Below is the image of the teams commits to the main branch of the repository so it may be missing work performed in other branches such as tft, khairul, or gh-pages.