

Hospital Emergency Preparedness

For the Next Pandemic - Sprint 2

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A dark blue diagonal gradient bar that starts from the bottom left corner and extends towards the top right corner, covering the lower half of the slide.

Problem Statement

How can we predict a hospital staffing shortage given past COVID data?

Solution

Employ different machine learning models to find accurate staffing predictions per U.S. region

Impact



13%

Odds of patient dying¹

4370

Lives saved in NY²

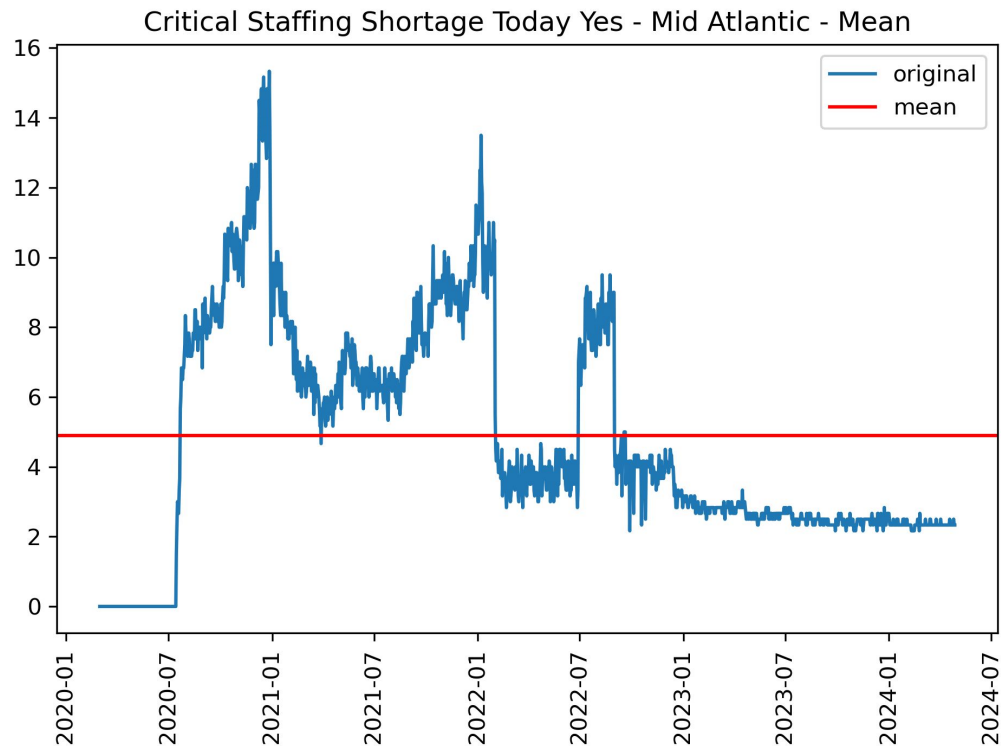
2X

Cost saved due to
readmission and
length of stay > than
hiring additional
nurses³

Mid Atlantic Case Study

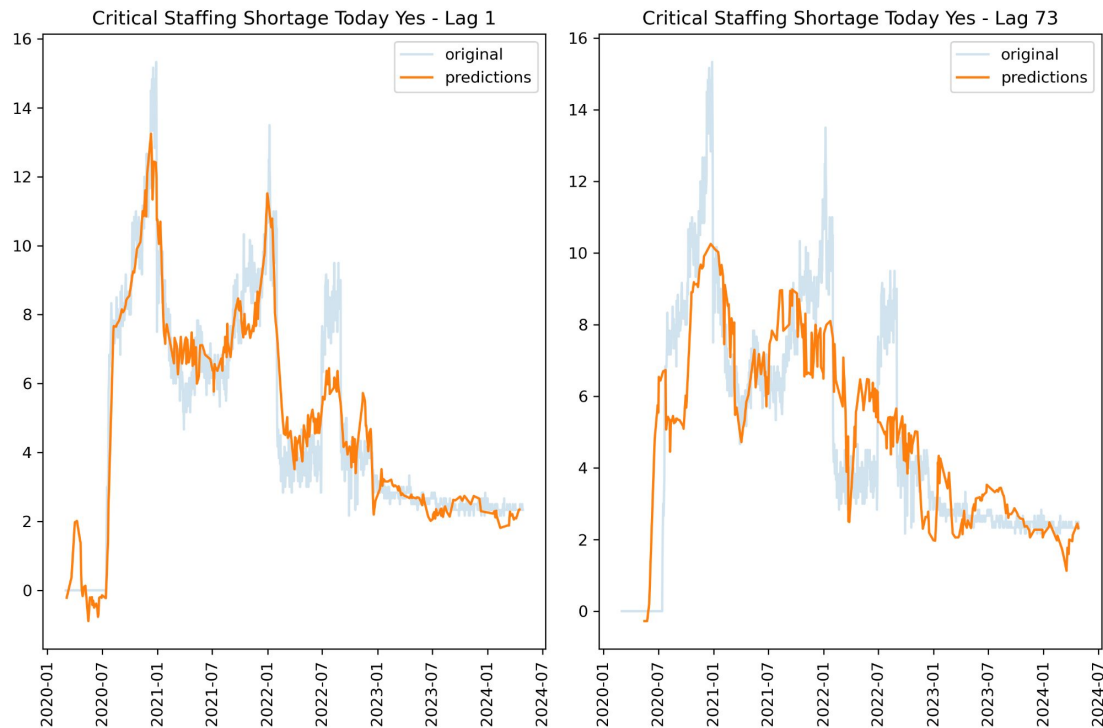
- Same dataset ~80,000 rows and 135 columns
- Grouped by region
- Regional features selected with Lasso regression
- Analyzed various lags of selected features for each model

Baseline Model – Mean



Linear Regression vs XGBoost vs Neural Network

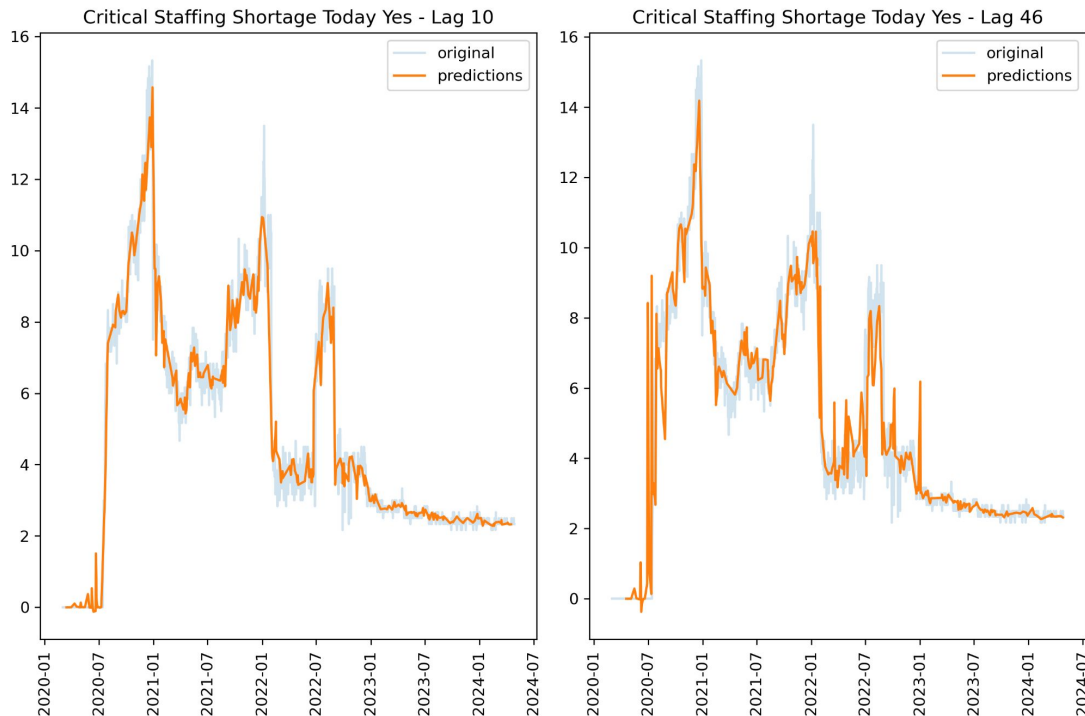
Linear Regression - Mid Atlantic



Lag	R ²
1	92%
73	56%

Linear Regression vs XGBoost vs Neural Network

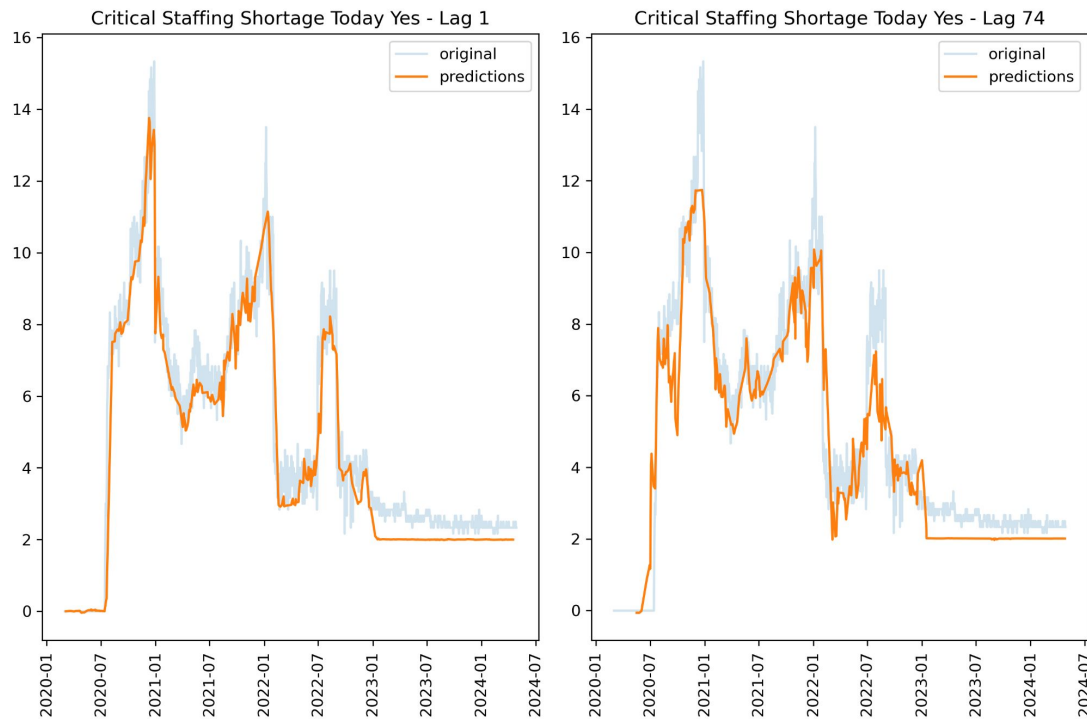
XGBoost - Mid Atlantic



Lag	R^2
10	97%
46	85%

Linear Regression vs XGBoost vs Neural Network

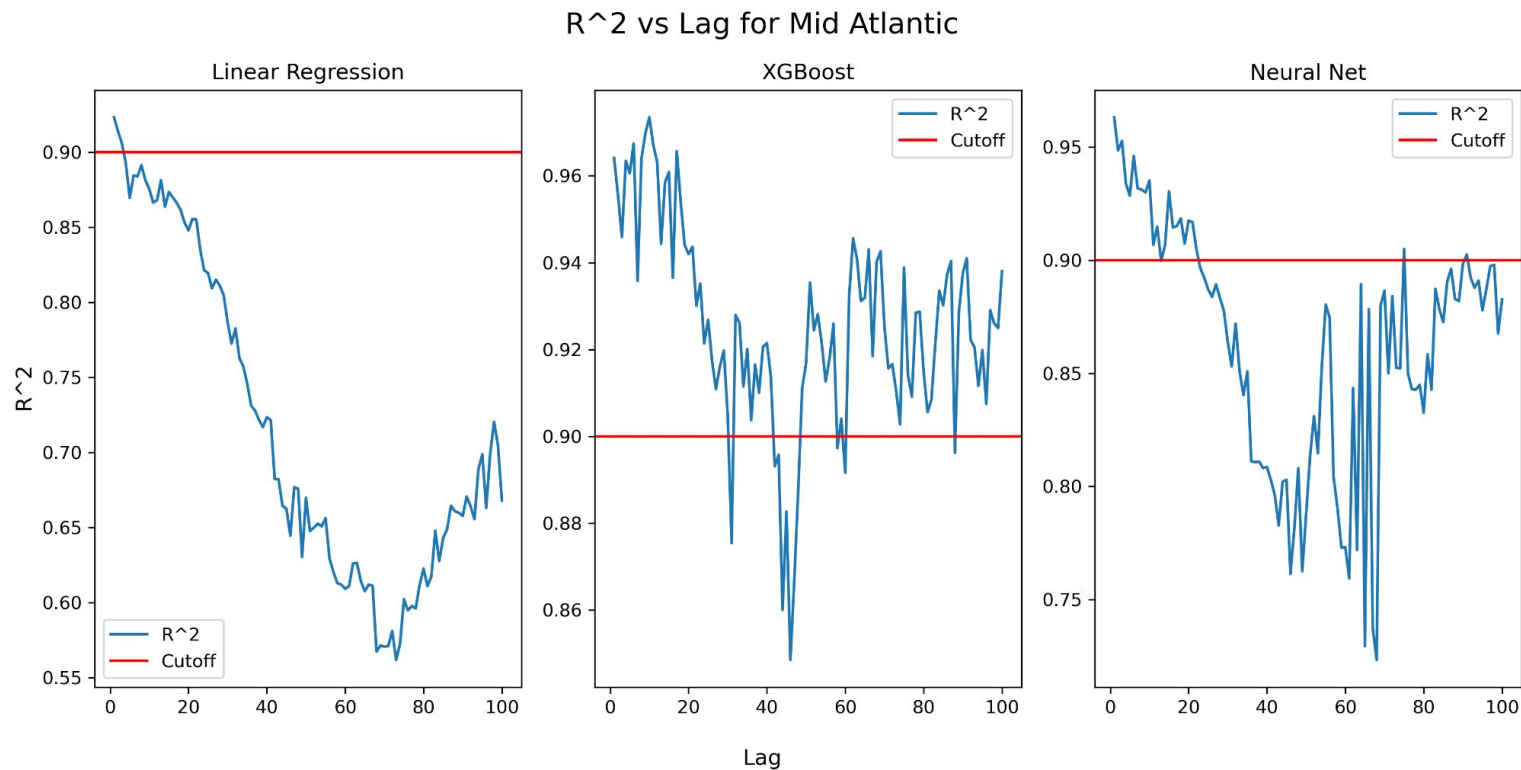
Neural Net - Mid Atlantic



Lag	R ²
1	96%
74	85%

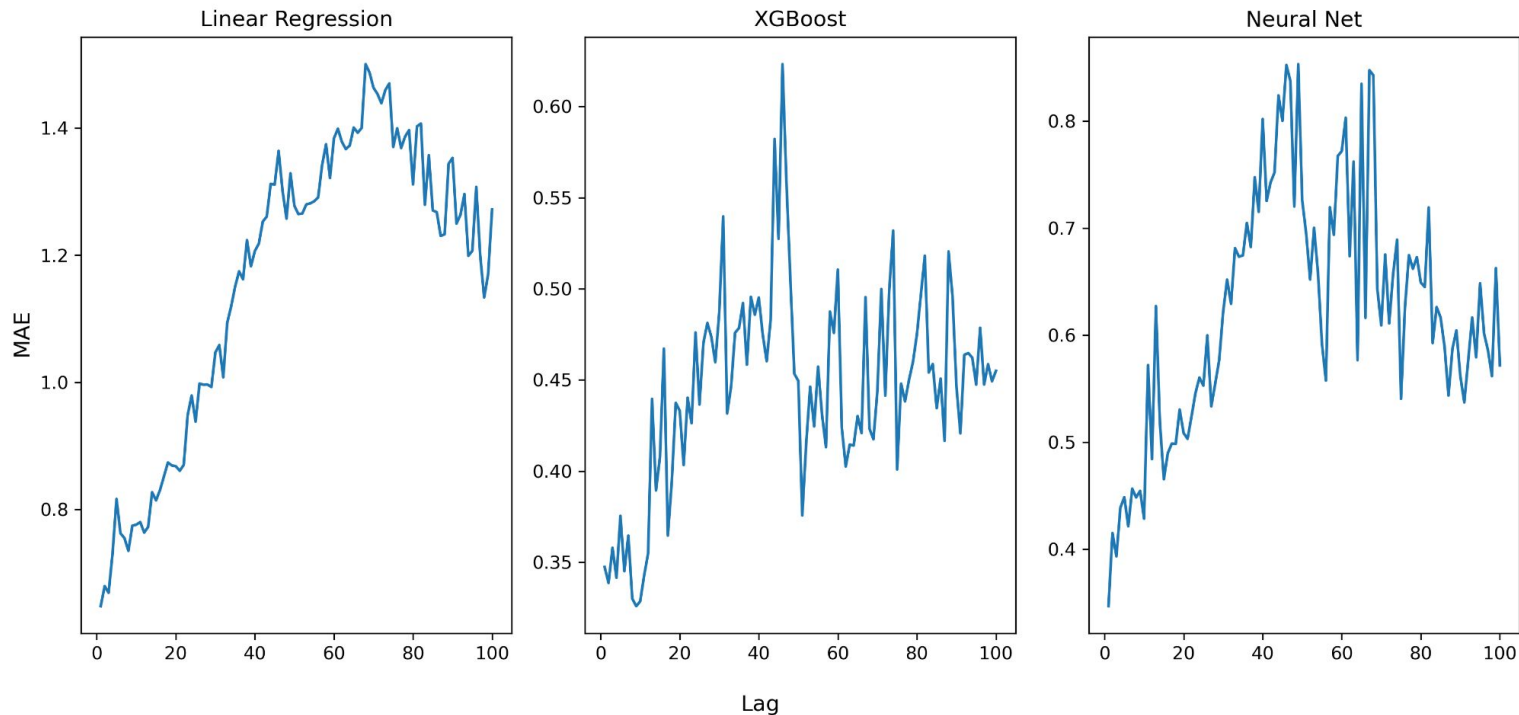
Linear Regression vs XGBoost vs Neural Network

R^2



Linear Regression vs XGBoost vs Neural Network Mean Absolute Error

Mean Absolute Error vs Lag for Mid Atlantic



Next Steps

- Summarize findings
- Streamlit app
- Expand project post bootcamp