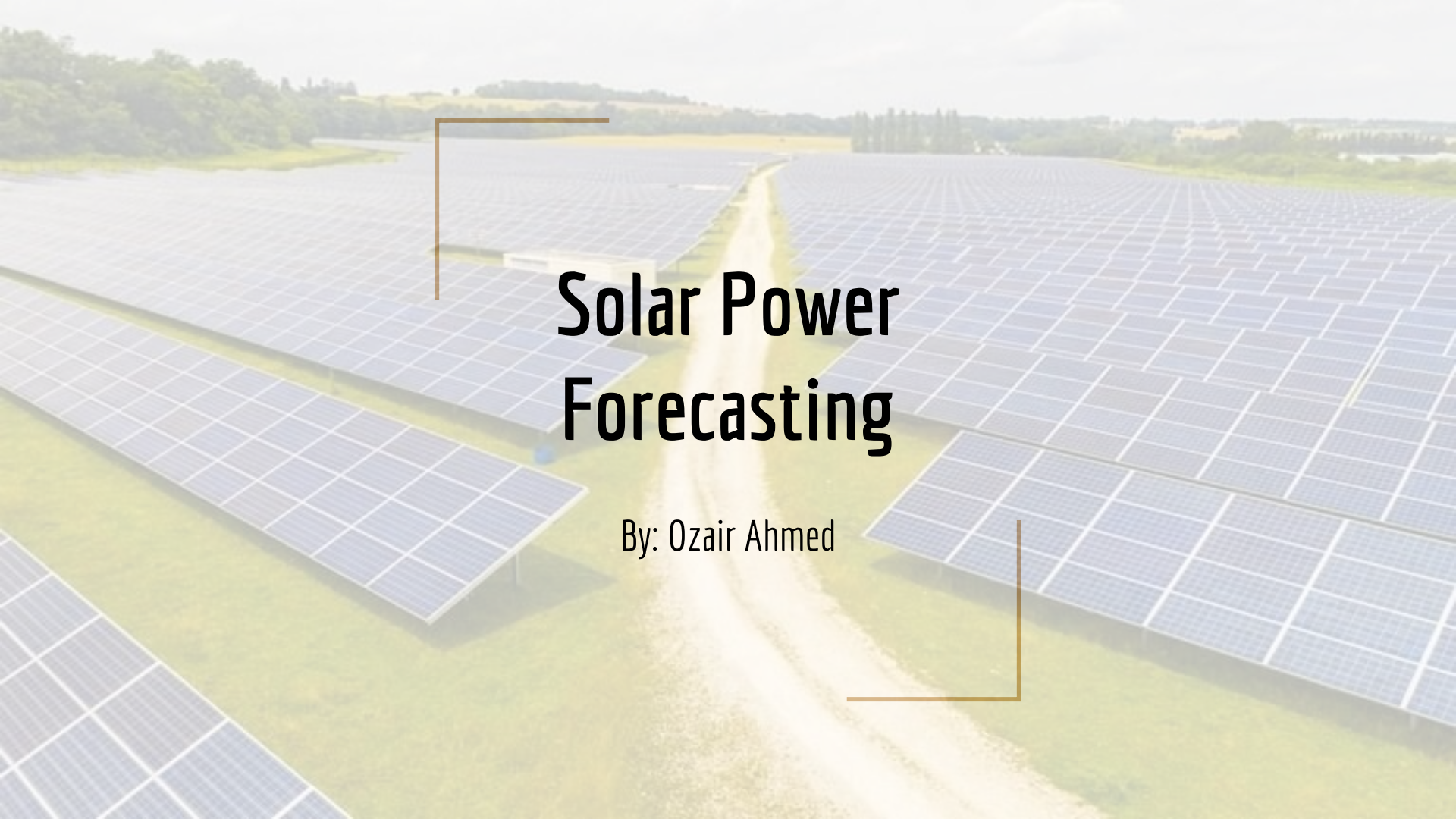


Solar Power Forecasting

By: Ozair Ahmed

About Project

- Help solar plants forecast output
- This will help grid operators manage supply and demand
- 2 Goals:

1

Forecast Solar Output

Two days out

Use weather forecast

2

Analyze Inverter Performance

DC → AC Conversion

Find inefficient inverters

About The Data

From Kaggle

Two Solar Power Plants:

- Nashik, India (1)
- Gandikota, India (2)

Includes:

- DC, AC, & Daily Yield (kW)
- Ambient & Module Temperatures

5/15/2020 - 6/17/2020 (34 days)

I. Forecasting Solar Output

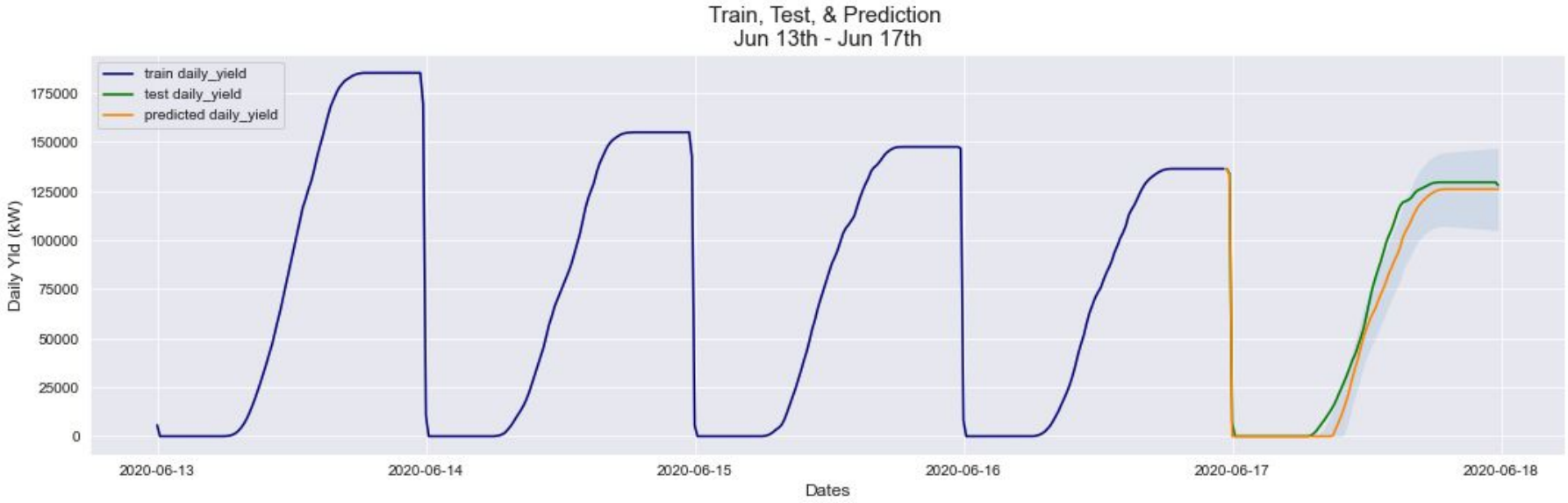
Models used:

- SARIMA
- Facebook Prophet
- SARIMAX (w/ ambient temperature)

5 days to train & test model: 6/13 to 6/17

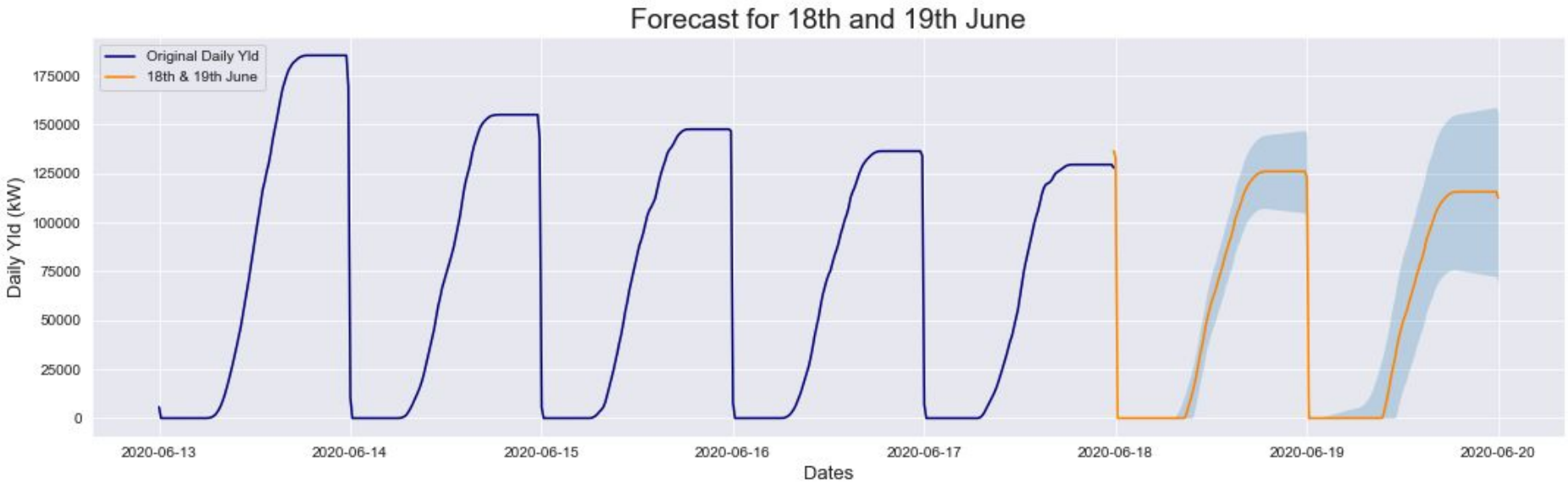
Forecast output for next 2 days: 6/18 & 6/19

SARIMA: Training & Testing



R^2 Score: 0.977Mean Absolute Error: 6148.57 RMSE: 8743.15

SARIMA: Two Day Forecast



<u>18th June</u>

Daily Yield: ~133,100 kW

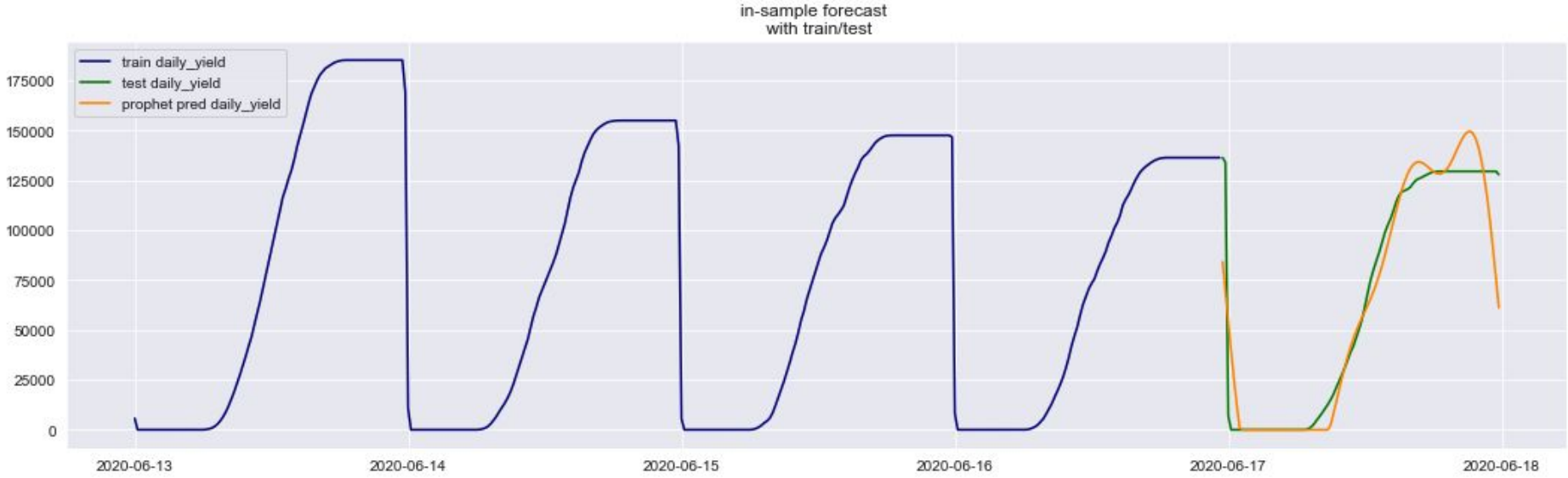
~23,350 households (in India)

<u>19th June</u>

Daily Yield: ~122,800 kW

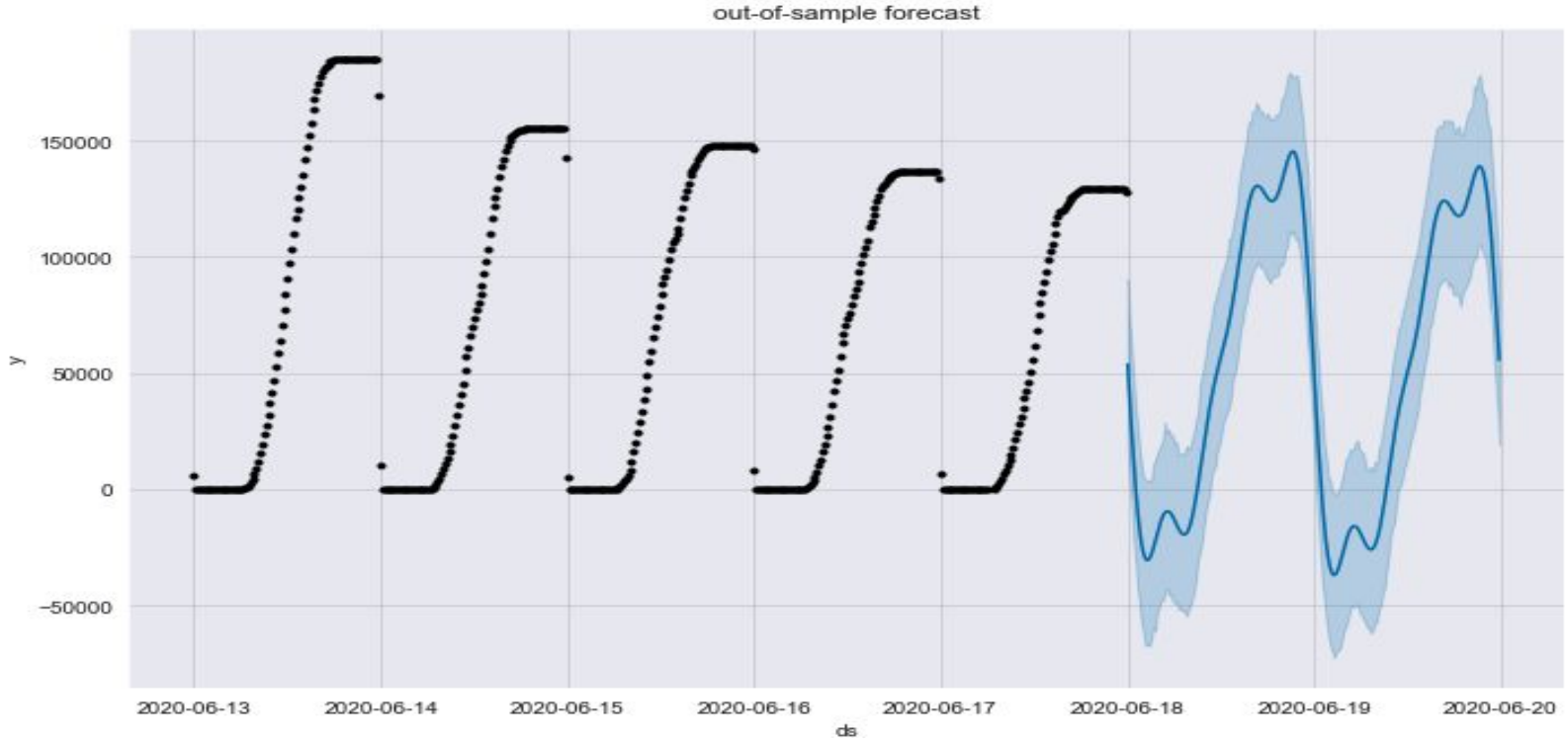
~21,500 households (in India)

FB Prophet: Training & Testing

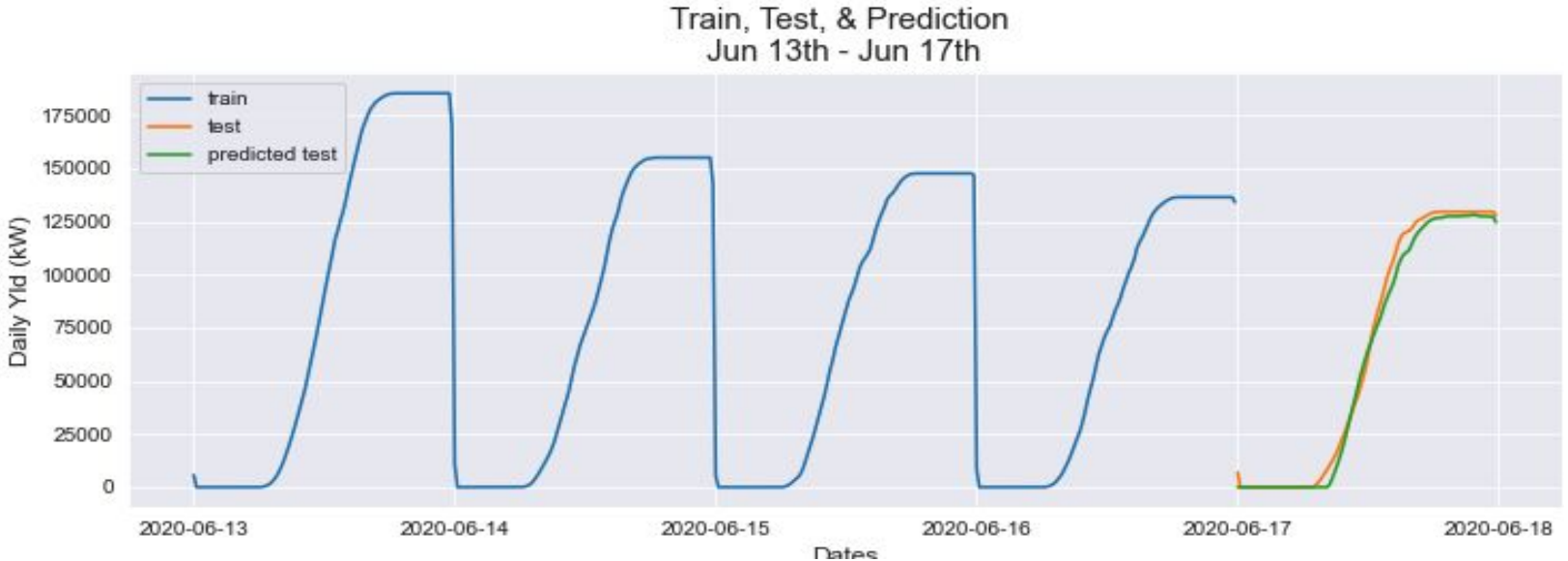


R^2 Score: 0.921 Mean Absolute Error: 8480.88 RMSE: 16160.54

FB Prophet: 2 Day Forecast

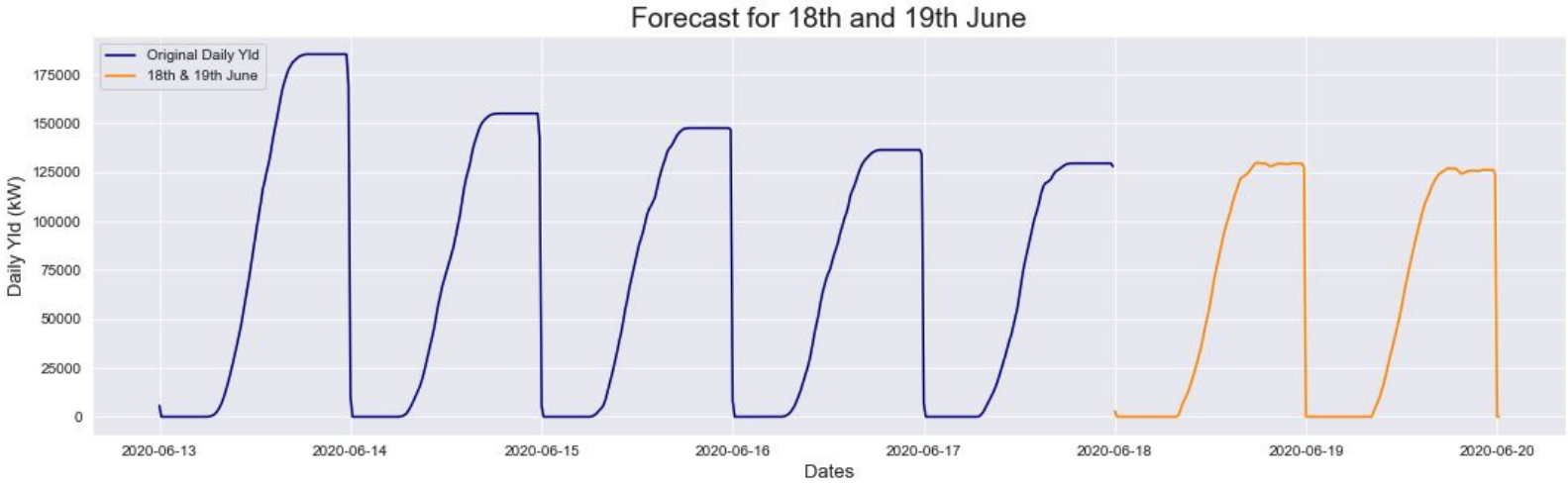


SARIMAX: Using Ambient Temp



R^2 Score: 0.993 RMSE (train): 7899.64 RMSE (test): 4629.70

SARIMAX: Two Day Forecast



18th June

Daily Yield: ~130,000 kW

~22,780 households (in India)

19th June

Daily Yield: ~127,000 kW

~22,283 households

Future Improvement Ideas:

- LSTM Neural Network performance
- Gather more weather data and see correlation with power output
- Extend analysis to wind farms
- Deploy my model online

Contact Info

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