NYC Homeless Population Forecasting

Presented by:
Dae Han

Predicting future demand improves service quality

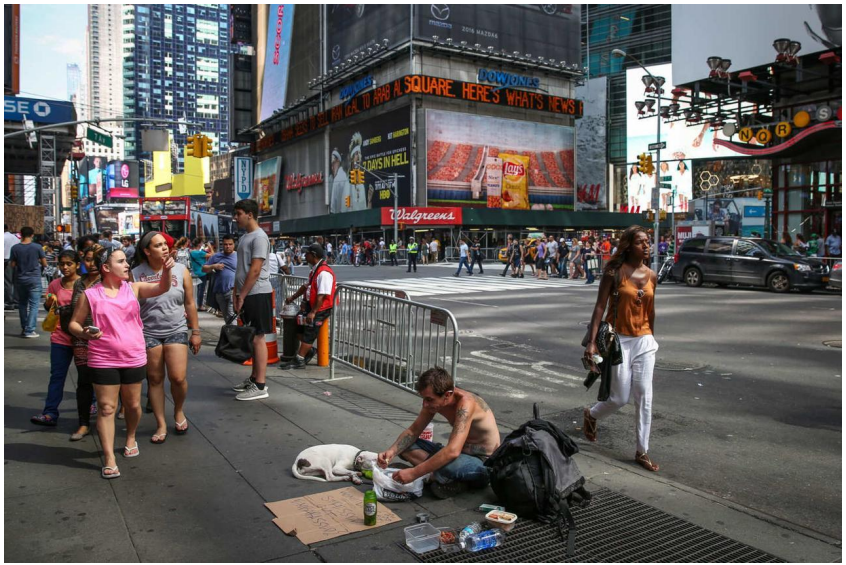
I used **Department of Homeless Service (DHS) daily report** to create **a time series model** that forecasts the number of individuals sheltered by DHS.

This is to predict the demand for shelter spaces in order to better **support homeless communities**.

Demand for shelter spaces is higher than it ever was

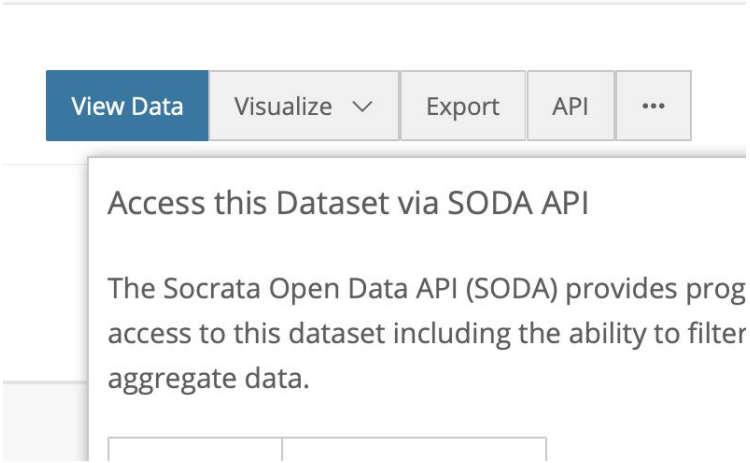
“Homelessness in New York City has reached the highest levels since the Great Depression in the 1930s”

- Coalition for the homeless



[https://www.nationalstate.com]
[https://www.coalitionforthehomelss.org]

DHS Daily Report is scraped using SODA API



DHS Daily Report

- Statistics about homelessness
- Daily updated from 2013
- Assessed through Socrata Open Data (SODA) API

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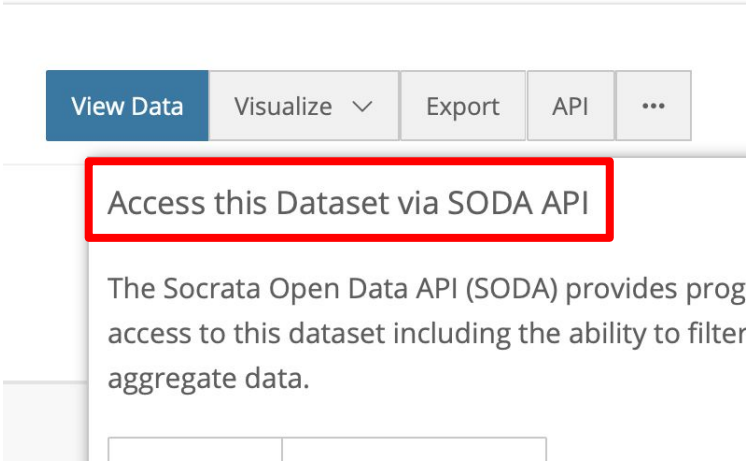

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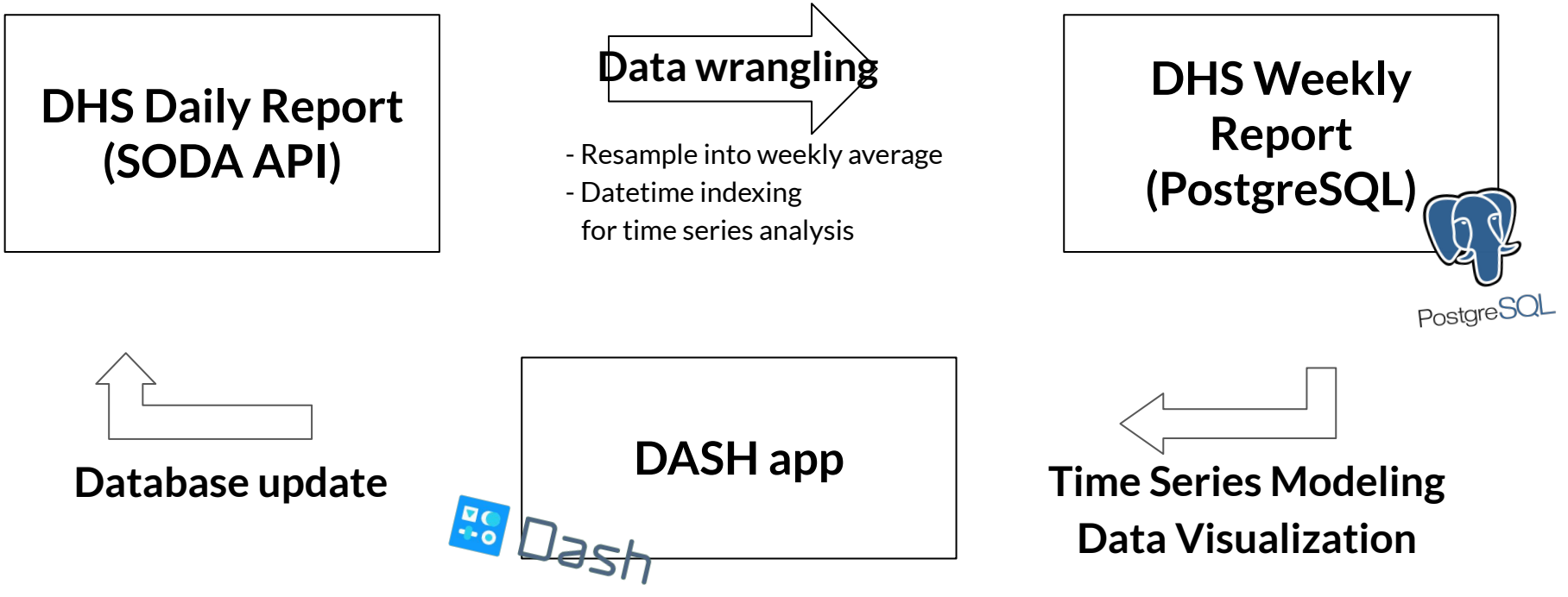
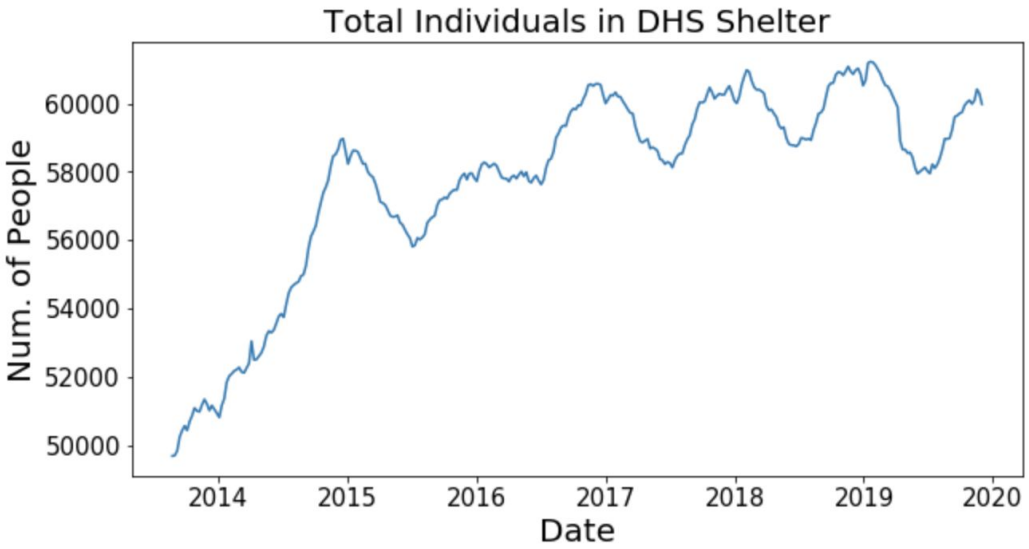
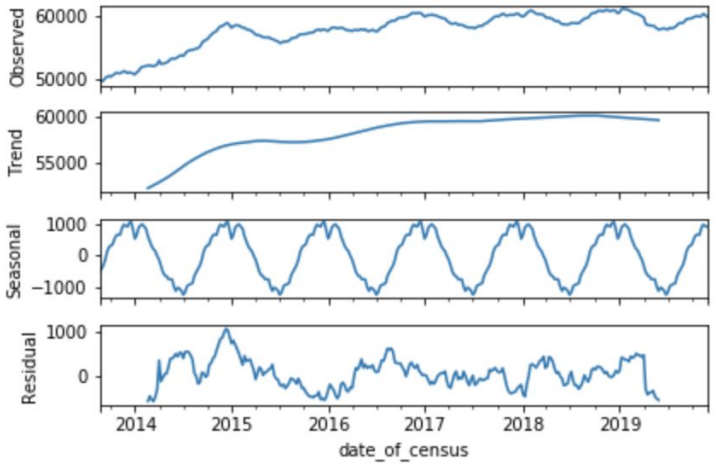
Final Product Flow Chart



Shelter population has an upward trend and seasonality





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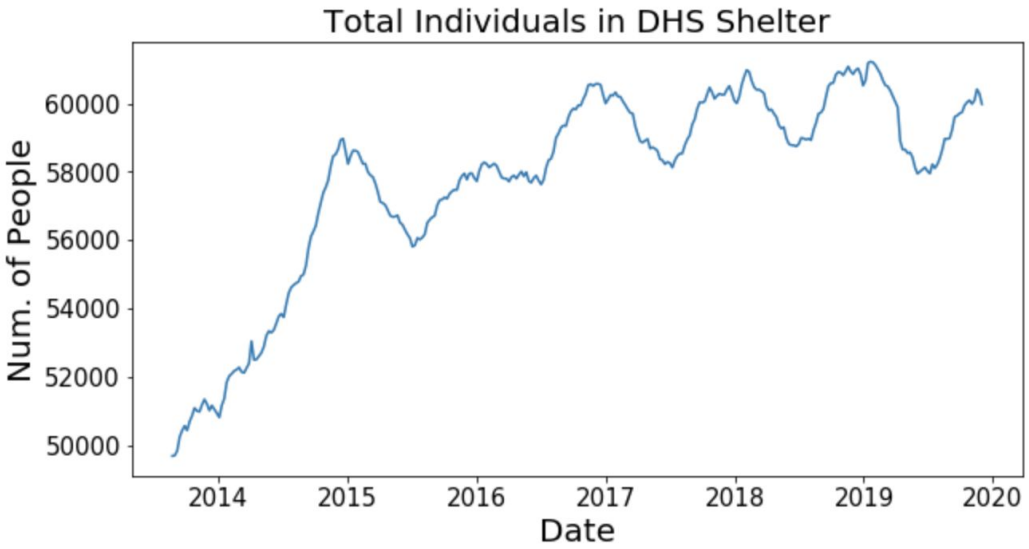

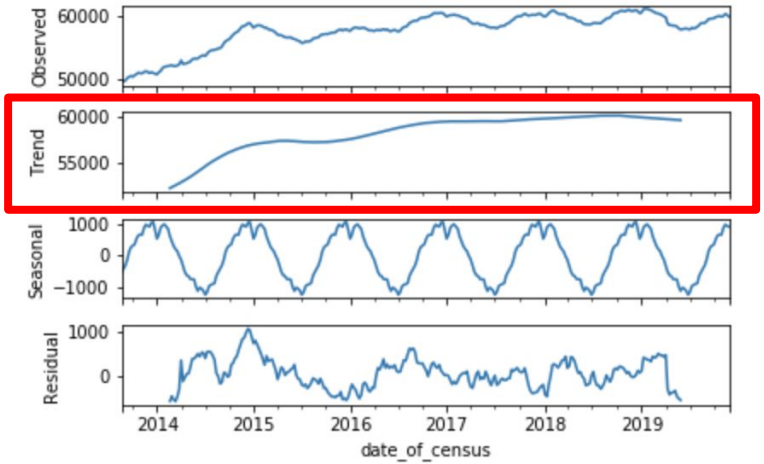

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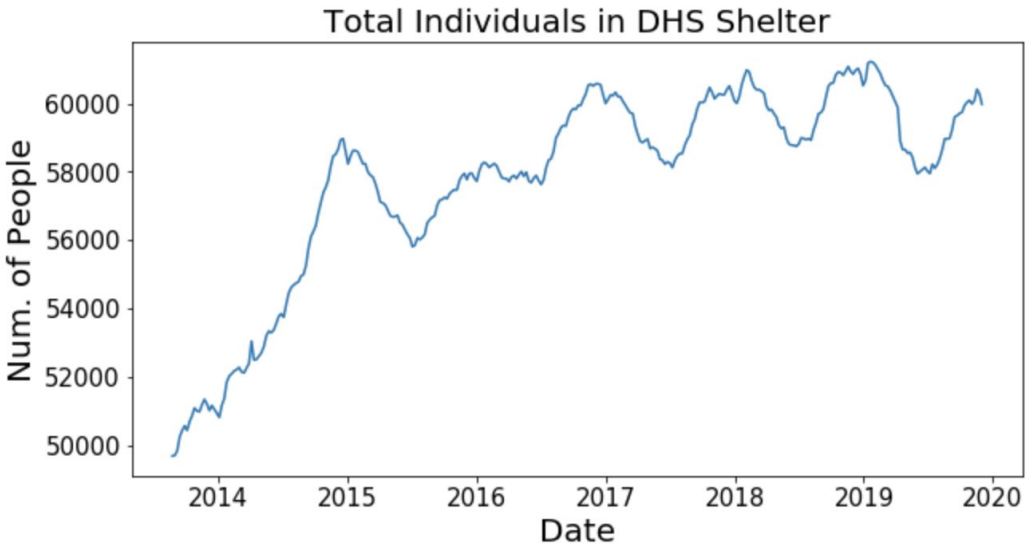
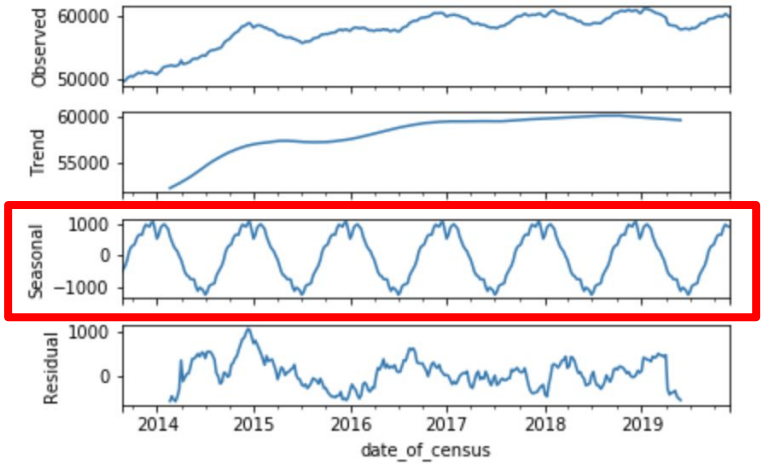
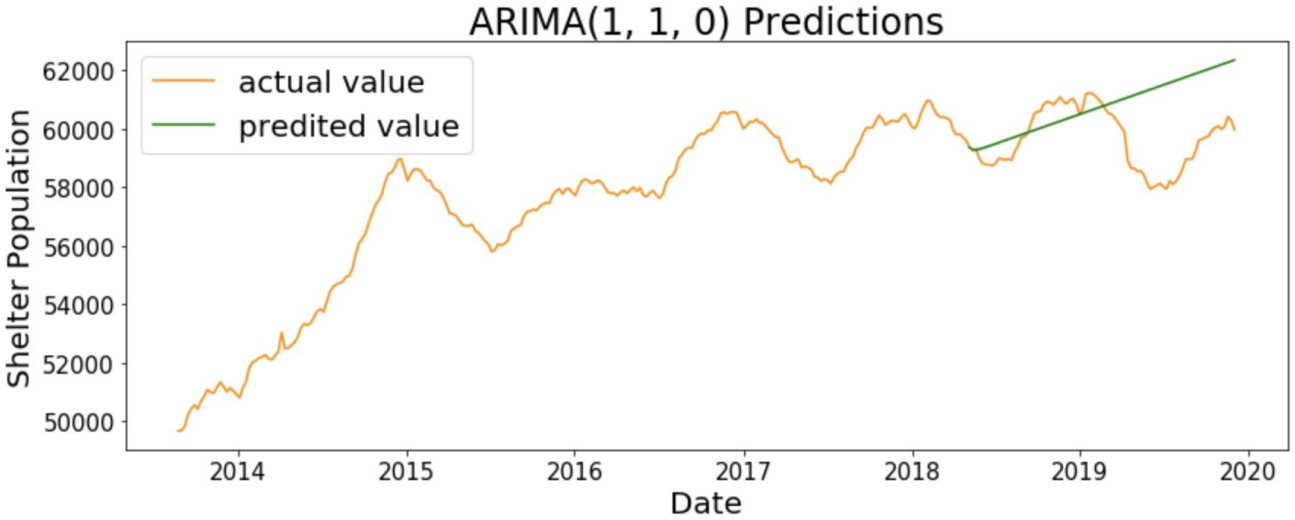




ARIMA model did not make meaningful prediction



Root mean square error: 1834

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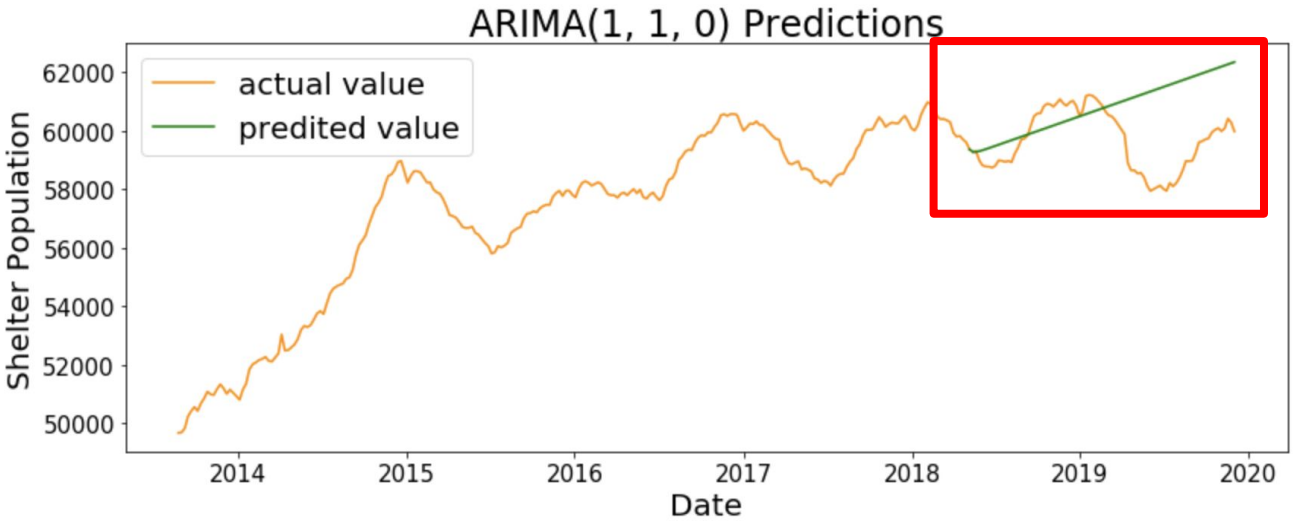

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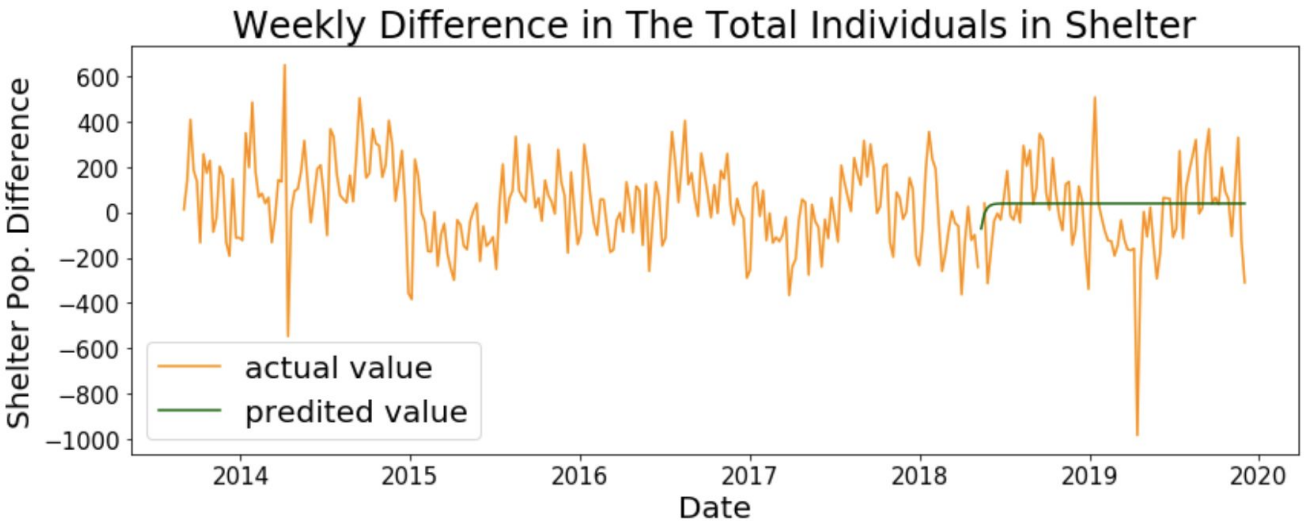

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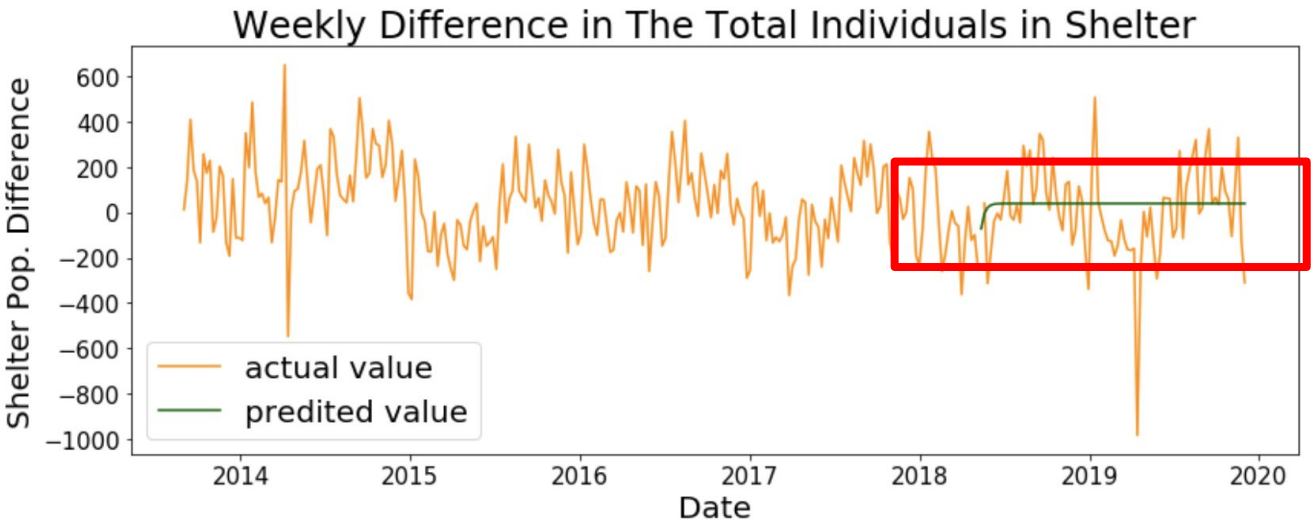

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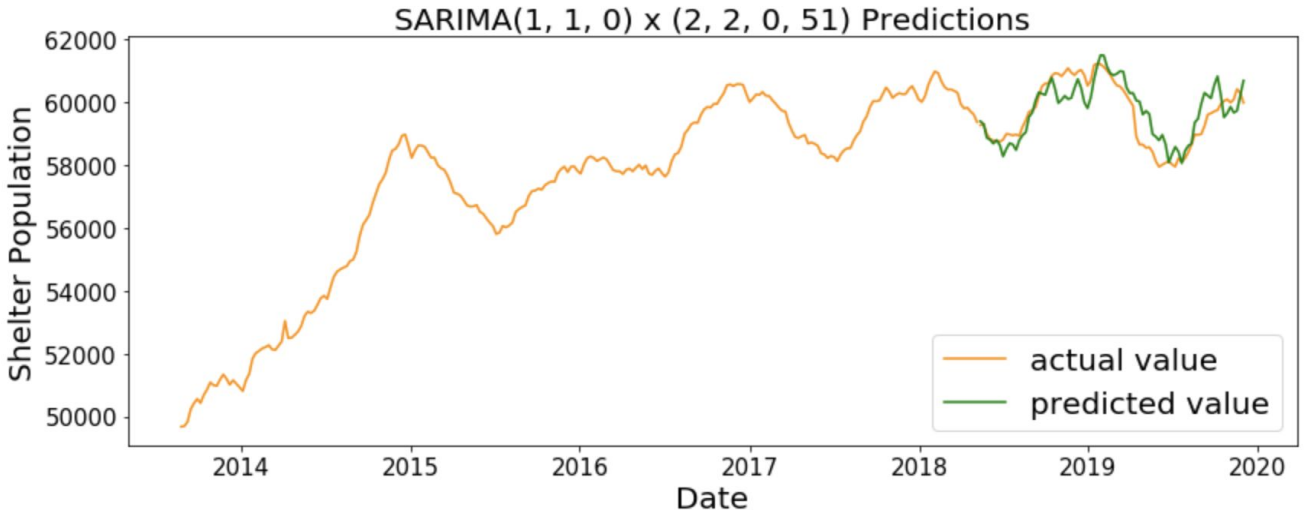
Seasonality terms significantly improves performance



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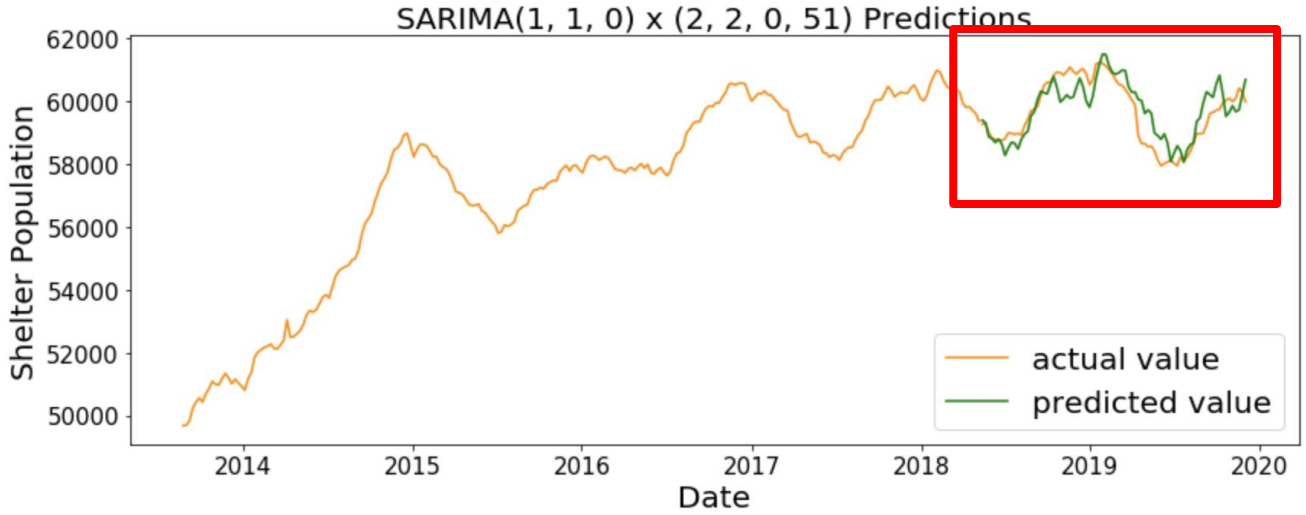

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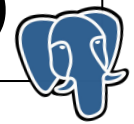
Final Product Flow Chart

DHS Daily Report (SODA API)

Data wrangling

- Resample into weekly average
- Datetime indexing for time series analysis

DHS Weekly Report (PostgreSQL)



PostgreSQL

Database update

DASH app

Dash

Time Series Modeling
Data Visualization

Conclusion

Next steps

- Forecast demographic breakdowns
- Try exogenous features / VAR
  - Housing affordability
  - Medical debt
  - HUD funding
  - Natural language analysis on social media posts discussing homelessness

Issue

- Model requires reliable data update

Solution

- Data scraper that automates web-scraping and make the scraper part of the app (Shell scripting)

Source

1. http://www.nationastate.com
2. https://www.coalitionforthehomeless.org