San Francisco 311 Call Analysis

The Flatiron School Capstone

By Jaklyn Soler

Objective

The objective of this project was to carry out time forecasting analysis to determine if human resources can be better utilized in a time of crisis (COVID-19).

Data

Over 3 million rows of San Francisco 311 call data pulled from the local government's API.

Forecasted future 2020 calls during the COVID-19 crisis.

Narrowing Data

After using the API, the data was sectioned into dataframes that were 2015 to 2019 and one that was 2020 to show actual calls.

Strategic Approach

Find out what the forecasted human need would have been with and without COVID-19. Then, find the difference to determine changes in calls.

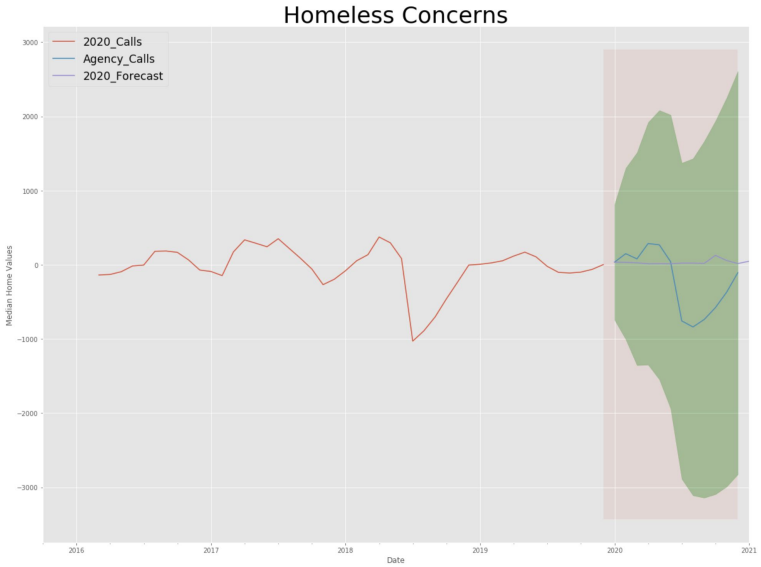
Modeling

Time Series Model

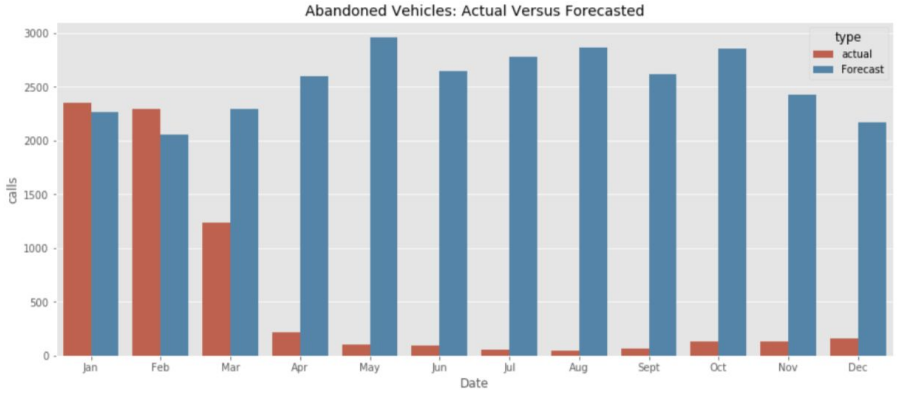
SARIMAX

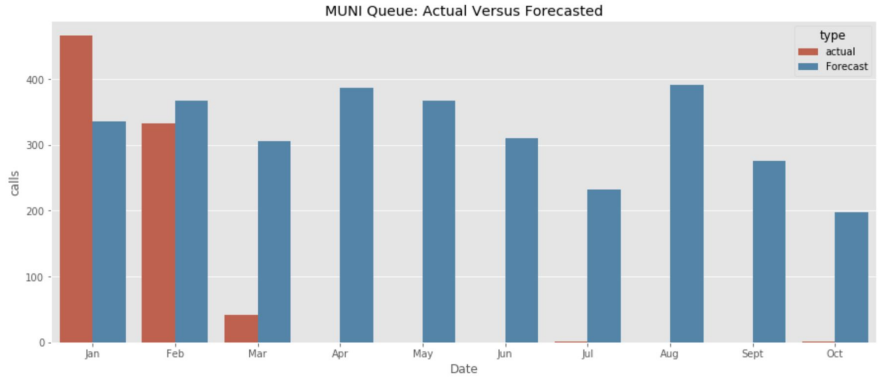
Calculating Difference: Forecast - Actual 2020 calls

Calculating Difference: Forecast - Actual 2020 calls



Surplus of Employees: Abandoned Vehicles and MUNI (Municipal) Queue



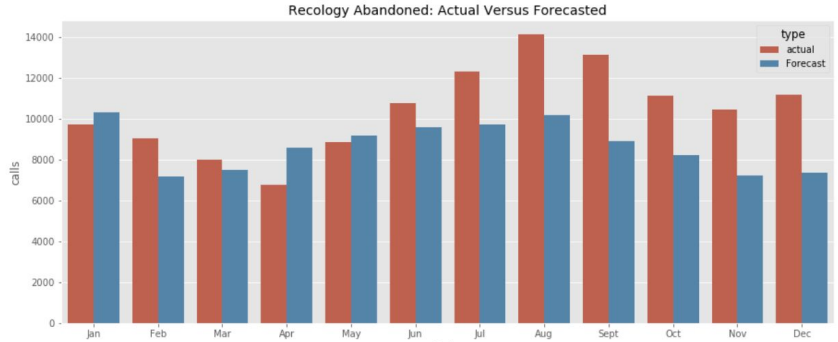


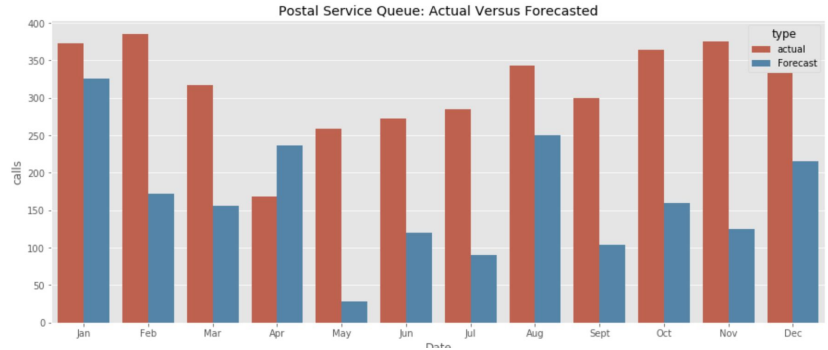
SF government should repurpose their underutilized employees from these sectors to avoid firing and minimize internal chaos.

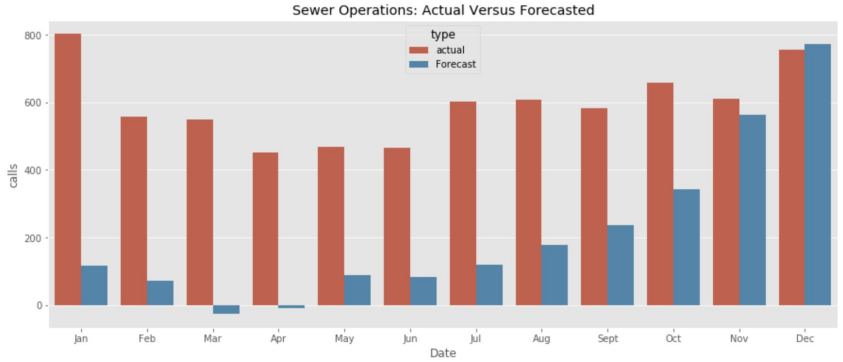
Employees Needed: Recology, Sewer Ops, Abandoned & Postal Service Queue

SF government should repurpose their underutilized employees into these sectors to avoid firing and minimize internal chaos.

Recology Abandoned is abandoned trash.





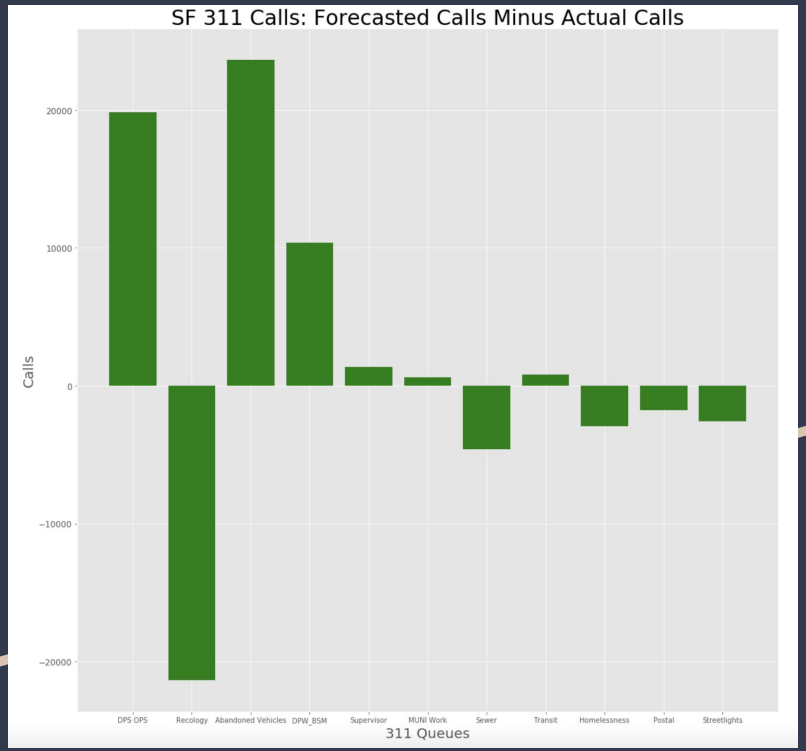


Conclusion

Some queues have experienced more calls than forecasted (Recology Abandoned and Postal Queue) while some have seen much less (MUNI Queue and Abandoned Vehicles).

	index	forecast_minus_actual
0	DPW Ops Queue	19853.0
1	Recology_Abandoned	-21373.0
3	DPT Abandoned Vehicles Work Queue	23640.0
4	DPW BSM Queue	10354.0
7	311 Supervisor Queue	1377.0
9	MUNI Work Queue	597.0
10	PUC Sewer Ops	-4578.0
12	Clear Channel - Transit Queue	804.0
13	Police - Homeless Concerns Queue	-2925.0
14	US Postal Service Maintenance Queue	-1790.0
18	PUC Streetlights Queue	-2553.0

Recommendation



Reallocate human resources to fill holes in their workforce.

Employees are being underutilized in the MUNI Queue and the Abandoned Vehicles Queue. It would be more expensive to hire and fire than it would be to relocate them into Recology Abandoned, Sewer Ops, and the Postal Queue where calls are above the previously forecasted amount.

Recommendation

Reallocate human resources to fill holes in their workforce.

Employees are being underutilized in:

- MUNI Queue
- Abandoned Vehicles Queue.

They are needed in:

- Recology Abandoned
- Sewer Ops
- Postal Queue

Recommendation: Other Actionable Steps

- Freeze hiring for incorrect high forecasts.
- Coordinating what overextended v. underextended queues are most similar to help with remote training.
- Identifying if the job is feasible for someone to transition into
  - Physical Capability
  - Technicality
  - Safety in a Pandemic
- Continue forecasting to understand human resource needs.
- Use internal metrics to determine if a smooth employee transition has occurred between queues. Then develop and replicate.

Future Work

- In the future I could dig deeper into the data in order to gain access to the new queues that lacked enough history for modeling: HSOC, Recology Overflowing, Duplicate Queue, Meter Bike Queue, BSSR Queue, Parking Enforcement, Parking Review, Signshop Queue, Water Queue.
- Change params on SARIMAX model.
- Understand the function of each agency on a deeper level to develop a more strategic course of action.
- Address complications with stationarity of DPW Ops.

Thank You

Jaklyn Soler

Please connect with me:

LinkedIn

Medium

GitHub

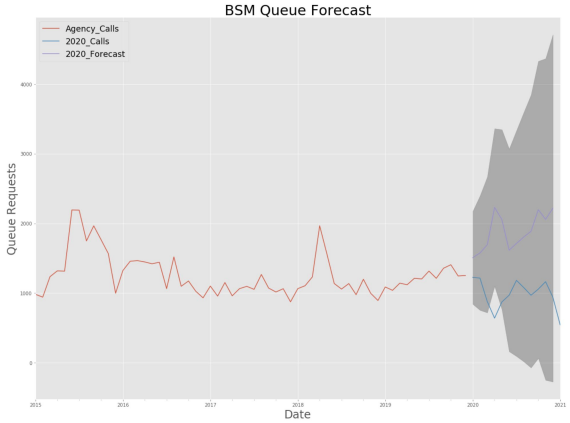
Email Me

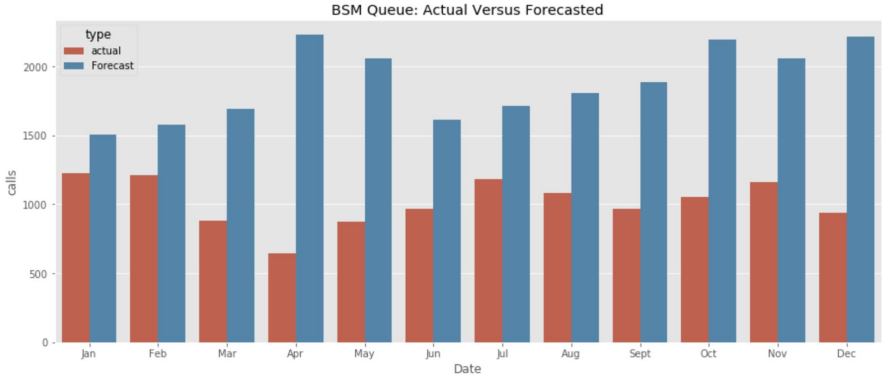
Appendix

Appendix of other queue forecasts to follow.

BSM Queue Forecast

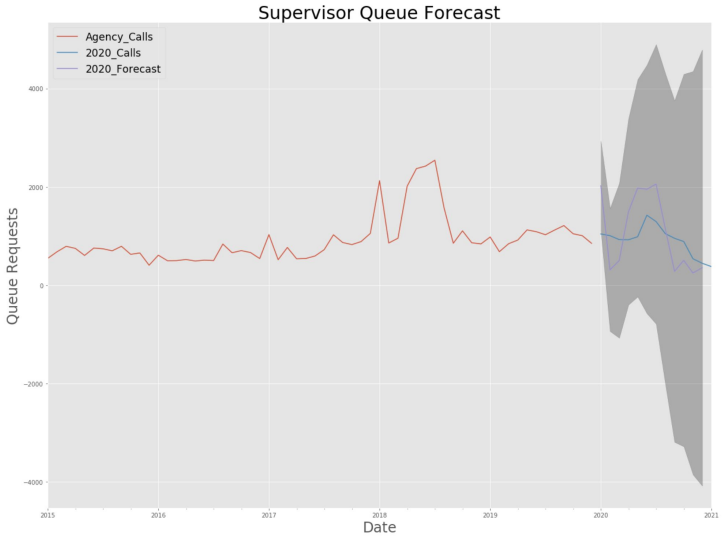
Forecast - Actual = 10,354

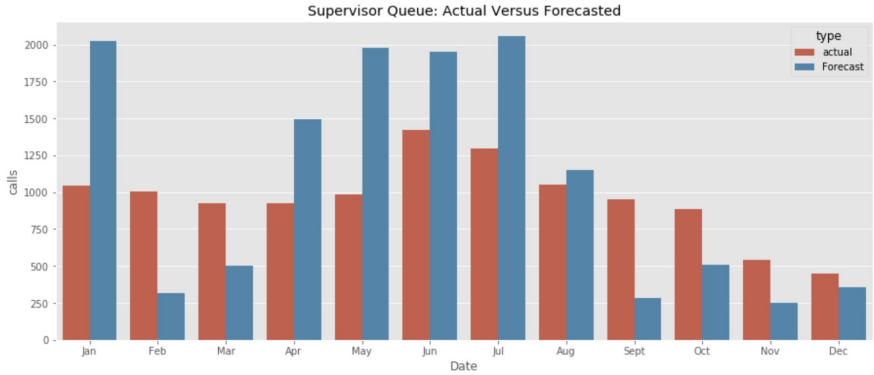




Supervisor Queue Forecast

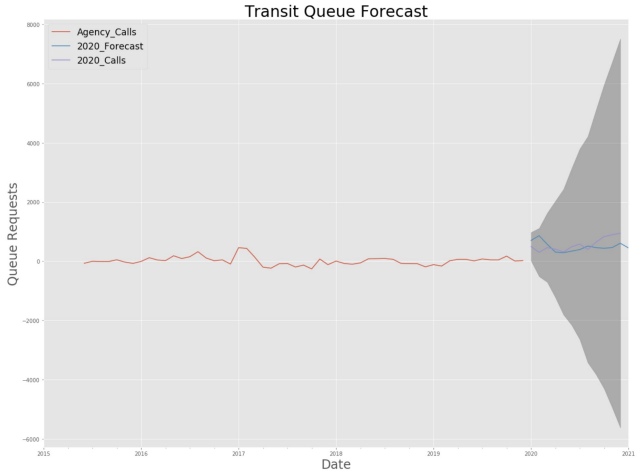
Forecast – Actual = 1,377

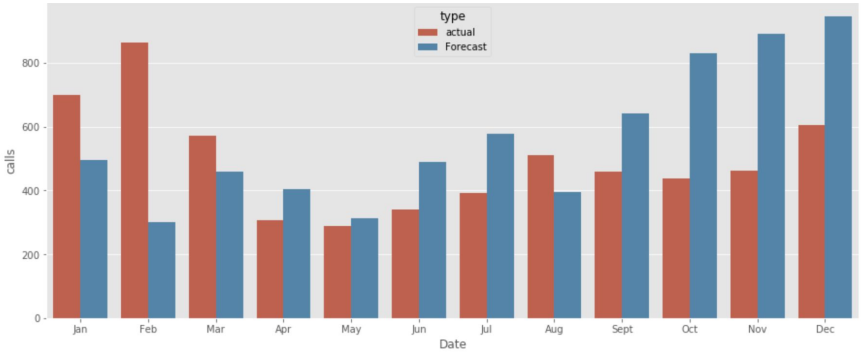




Transit Queue Forecast

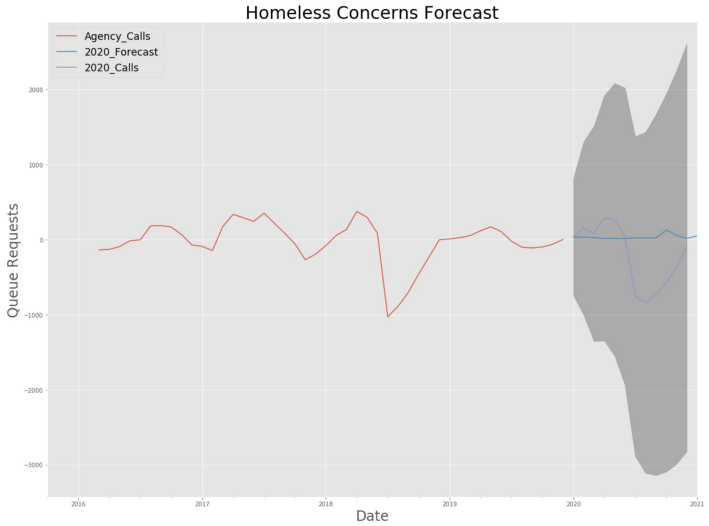
Forecast - Actual = 804

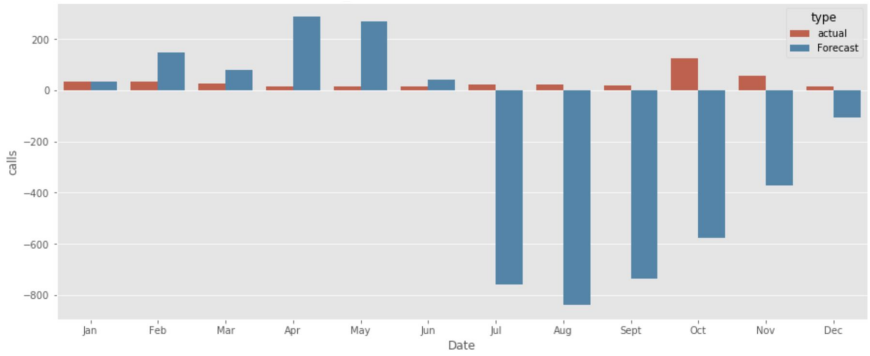




Homeless Concerns Forecast

Forecast - Actual = -2,925





Streetlights Forecast

Forecast - Actual = -2,553