Q4 Daily Chat Forecast

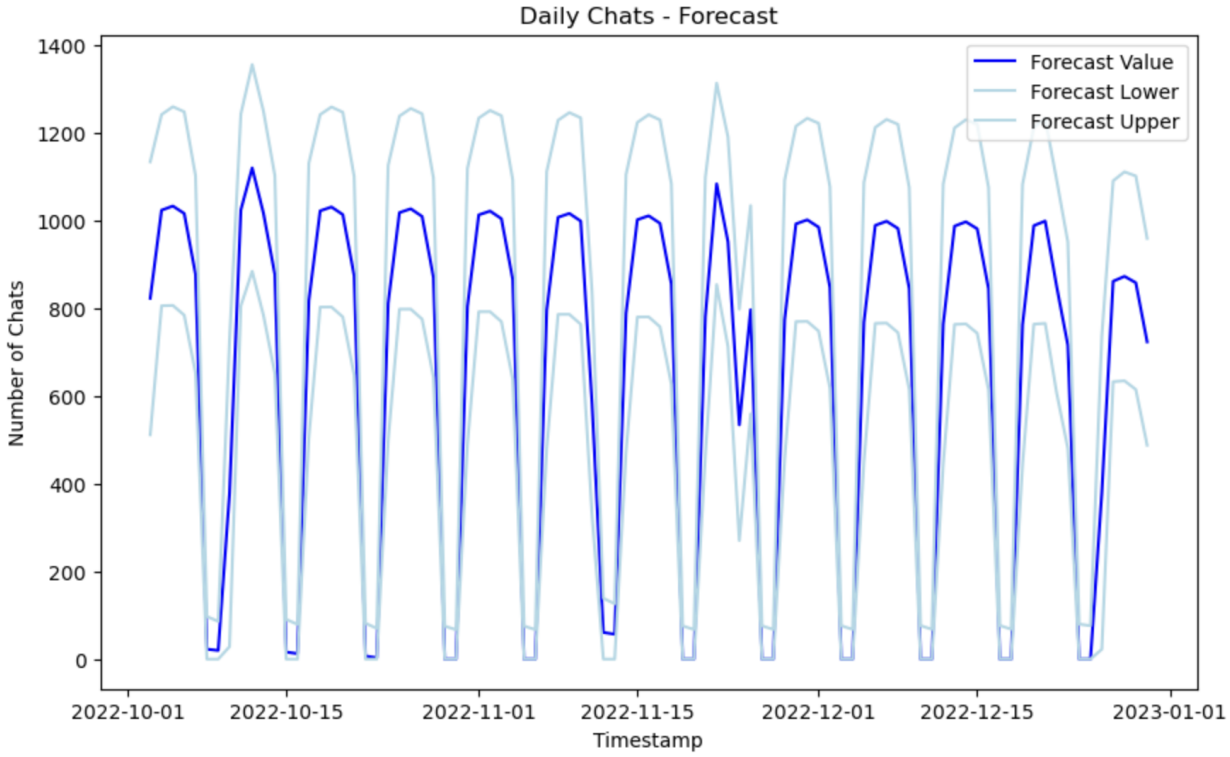
Summary

Below is our Q4 daily chat forecast. Forecasting methods captured the trend of increasing chat volume Klaviyo has been experiencing (Figure 2 in Appendix) as well as the various seasonal behaviors we experience such as yearly seasonality (Figure 3 in Appendix) and weekly seasonality (Figure 4 in the Appendix). Assuming business continues as usual, actual chats are expected to be within the forecasted upper and lower values in Figure 1 below.

The 90 day Q4 model predicts that:

- Volume will be consistent going into Nov and Dec
- Typical drop off in volume during Thanksgiving
- Lower drop in volume going into the New Year than in past years.

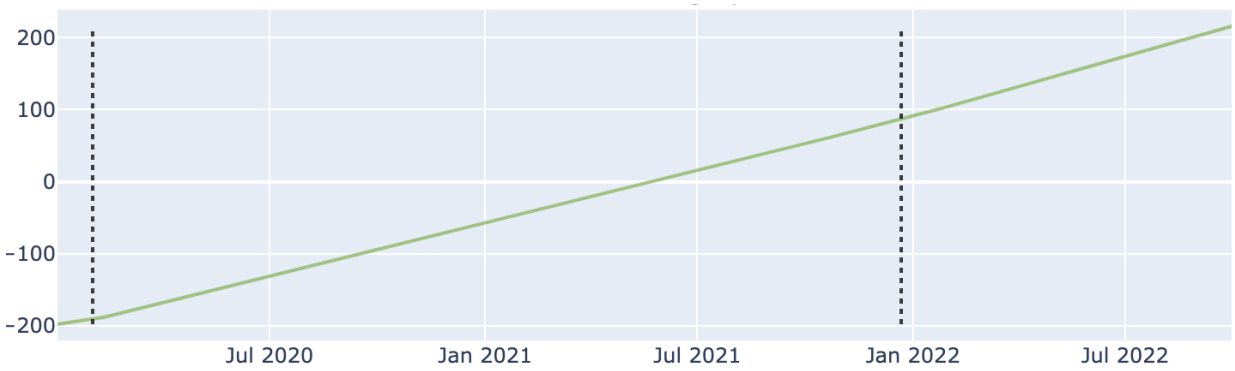
Figure 1. Q4 Daily Chat Forecast



Reminder, the forecast model only knows historical chat volumes. If behavior changes, (i.e. If Klaviyo brings on more new customers than normal or if we have a substantial new product release), we would expect to see actual results that deviate from the forecasted values.

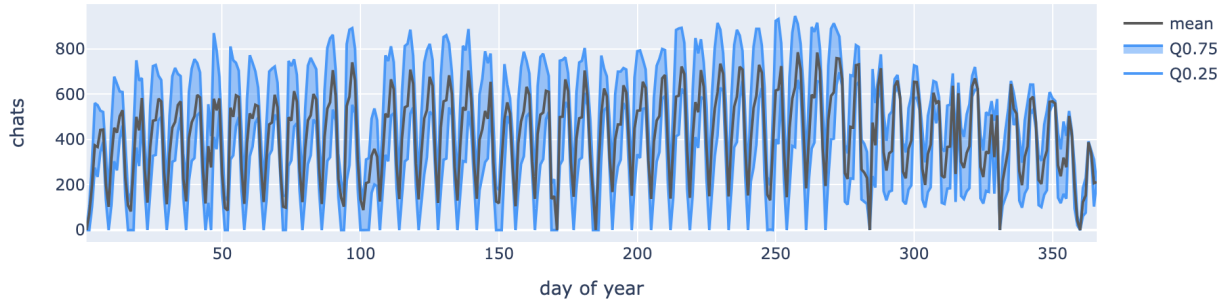
Appendix

Figure 2. Trend (green) and Change Points (vertical dotted line)



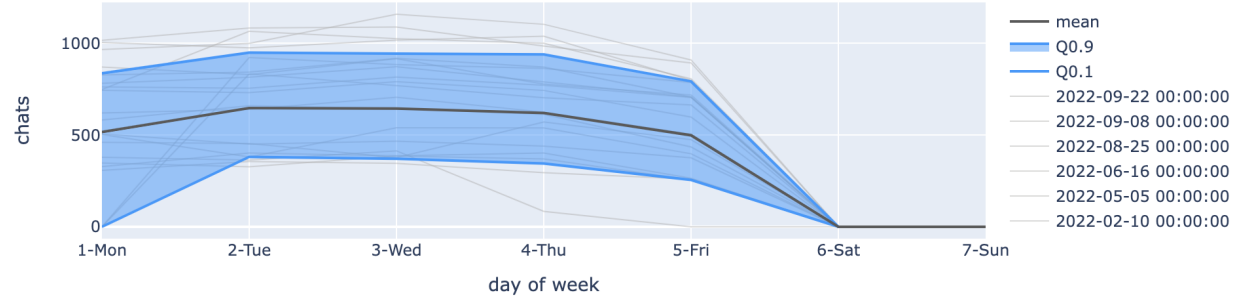
The trend is that chat volume is increasing over time. Additionally the model detected a change in chat volume behavior in late December 2021.

Figure 3. Yearly Seasonality



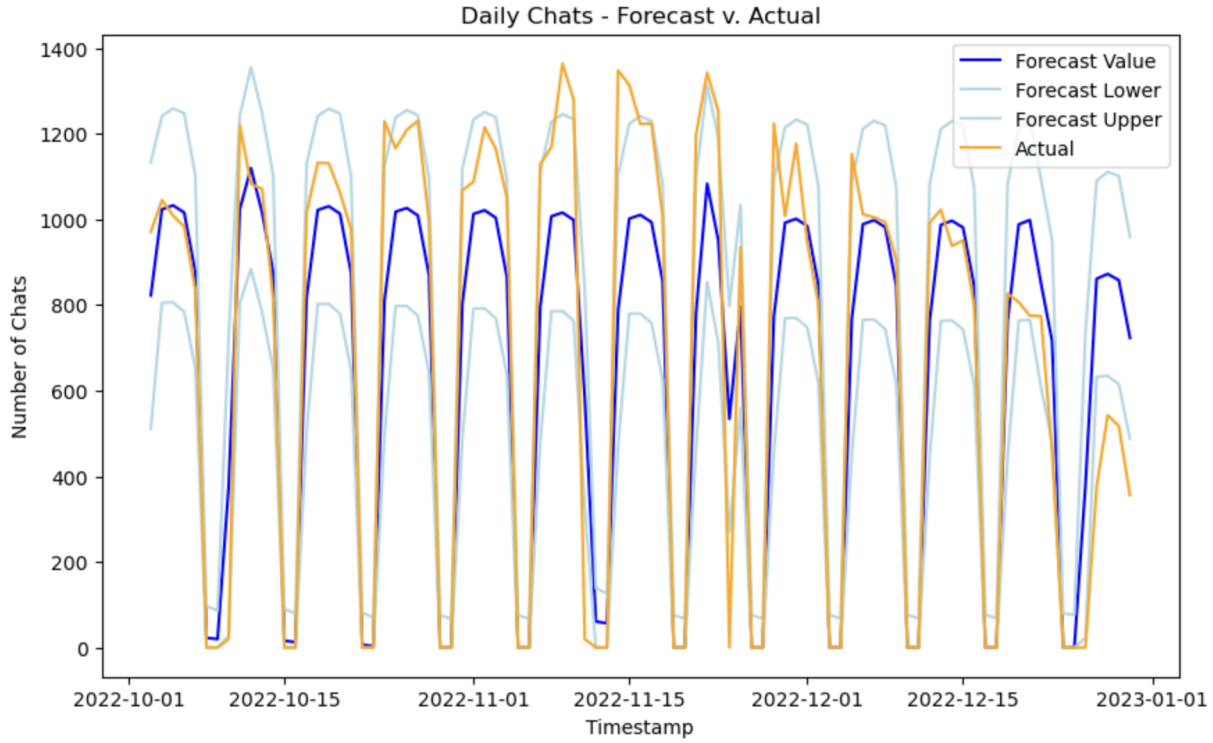
Chat volume is typically consistent throughout the year with volume dropping in the fall/holiday season. Notice that our support outage from April 2022 is visible around the 100 day mark on the graph.

Figure 4. Weekly Seasonality



Highest volume days are Tuesday, Wednesday, Thursdays with less volume on Mondays and Fridays. Almost no volume is seen on Saturdays and Sundays.

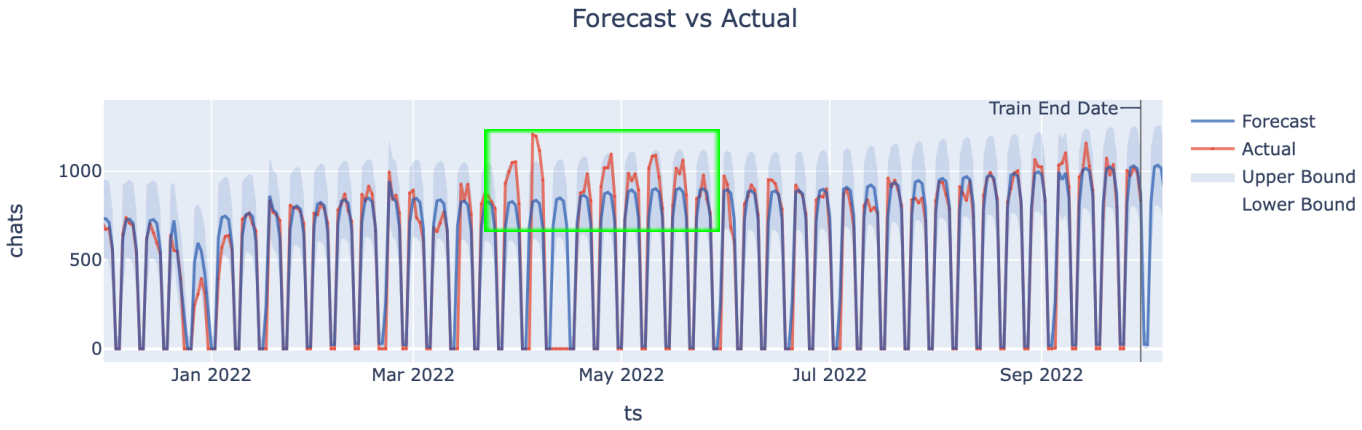
Post Analysis- Q4 Daily Chat Forecast



MAE: 144.25

Improvements

This analysis shows some of the limitations of univariate time series. In 2020 and 2021, we see a gradual drop from October to November. However, the test data shows an increase from this timespan in 2022. A univariate model will not be able to catch this; however, a time series model with regressors may be able to if we have business context.



For example, if we identify the cause of anomalies (see green box in above figure) is due to new product launches, and we know when subsequent product launches begin, we can incorporate this as an extra regressor into the SilverKite algorithm - the model would be able to account for more variability in the model leading to more accurate forecasts.