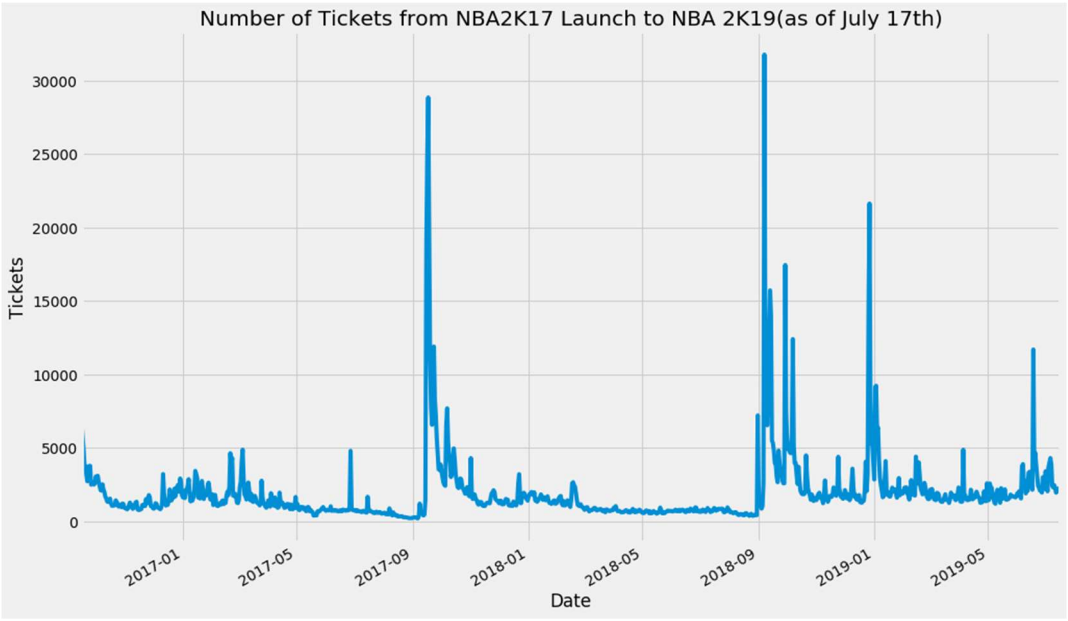
NBA 2K20 Customer Service Daily Number of Tickets Prediction

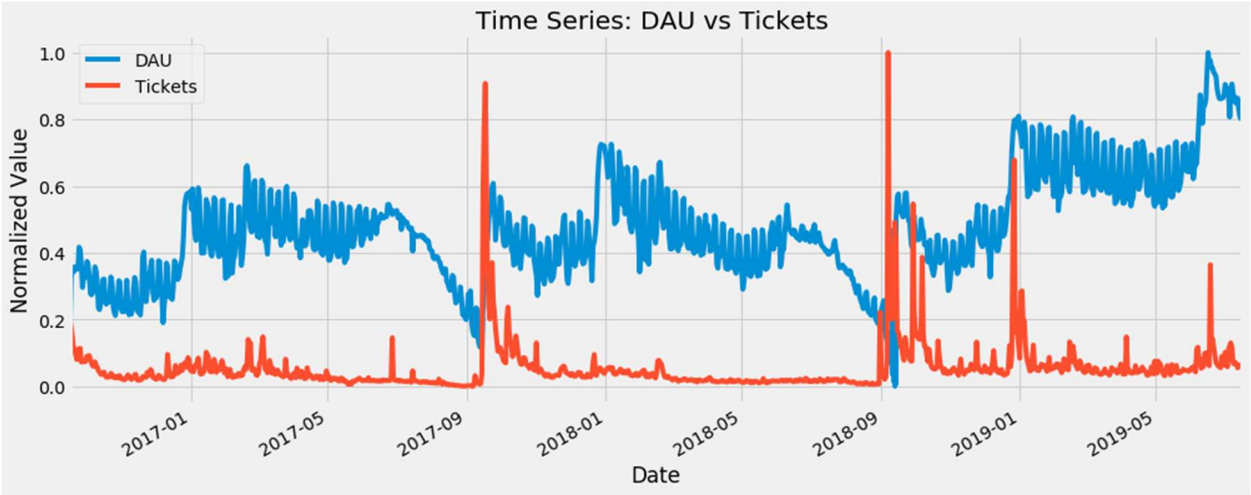
Goal Predict NBA 2K20 number of Tickets for Customer Service Team

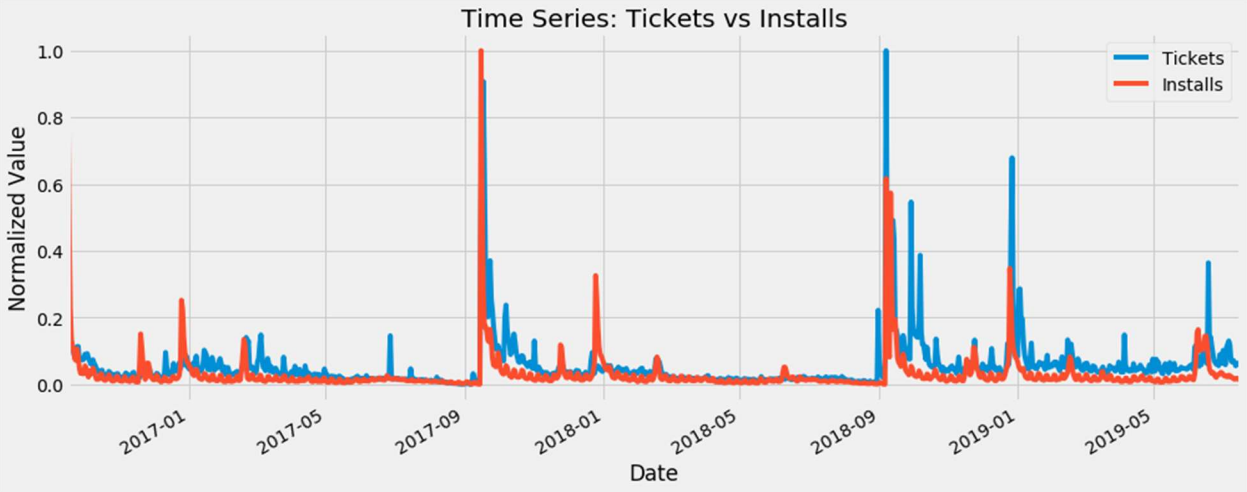
Data: NBA Ticket numbers from launch of 2K17 to 2K19(till July 16th, 2019), will be using NBA DAU and Installs number from 2K17, 2K18 and 2K19.

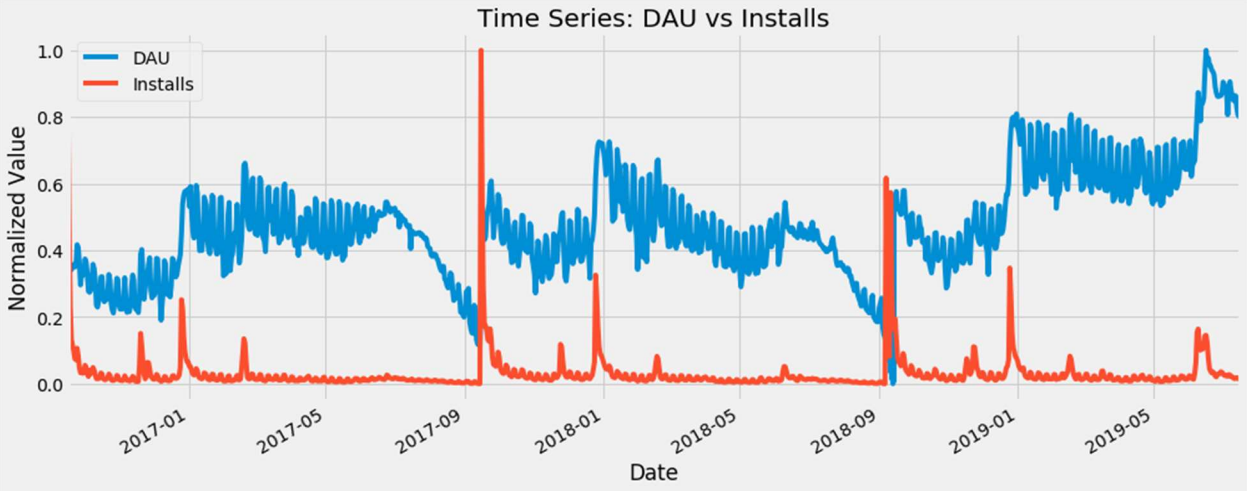
Exploratory Data Analysis



Looking at the initial data, we see that there are peaks at launch of each year title. In order to capture these peaks, we use corresponding numbers of DAU and Installs for NBA to see if there are any correlations that exists between tickets and these variables:







Takeaways

- There is a **small correlation** between DAU and number of tickets
- There is a **positive correlation** between installs and number of tickets
- There is a **high** correlation between DAU and installs

Pearson's Correlation	Tickets	DAU	Installs
Tickets		0.14	0.62
DAU	0.14		0.58
Installs	0.62	0.58	

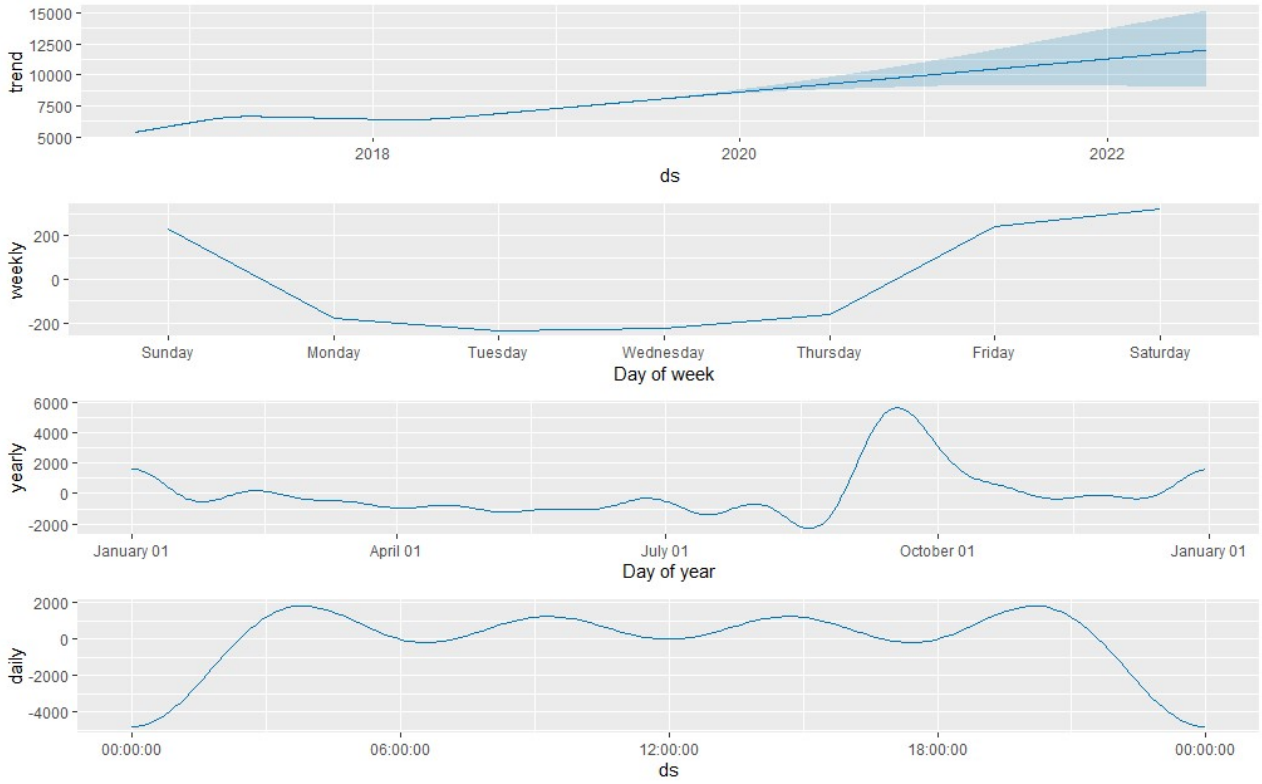
Outliers

For peaks in number of tickets (defined as more than 15,000 tickets per day), we have:

- 2017-09-15, 16, 17, 18: NBA 2K18 Launcher crashes
- 2018-09-07, 13, 29: NBA 2K19 My Career Glitch including VC loss, custom characters disappearing etc.
- 2018-12-27: NBA 2K19 New VC Glitch after Patch 7

Methodology using Prophet

Using Facebook's developed time series forecasting algorithm, Prophet, we are able to decompose the time series into trend, daily, weekly and yearly seasonality:



We can see that there is an increasing trend in number of tickets, with weekly seasonality during weekends and yearly seasonality during launch phase (September every year). We will use these trends and seasonality to add to our initial model using historical data from NBA Tickets given.

We will use data for NBA2K17 and NBA2K18 and train it to predict on NBA 2K19 daily ticket numbers. Then, we will use all data to predict for NBA2K20 daily ticket numbers.

Assumptions:

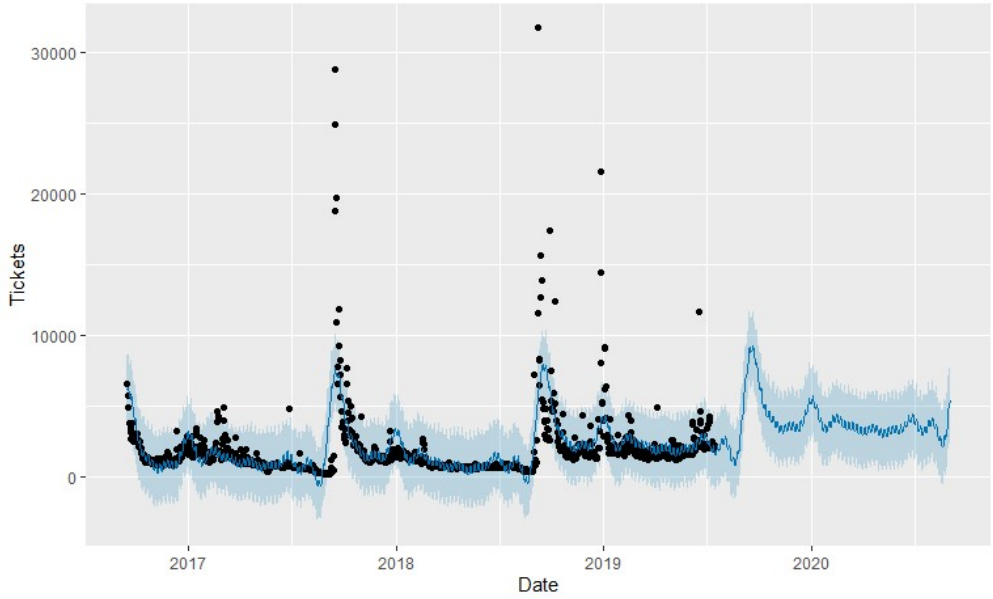
Based on our data from NBA2K17, NBA2K18 and NBA2K19, we forecasted:

- NBA2K20 Installs to have 15% growth rate YoY
- NBA2K20 DAU to have 10% growth rate YoY

We will use these numbers in order to predict the number of tickets for NBA2K20.

1st Model: Tickets without Regressors

Using this, we create our initial time series forecasting model with Prophet adjusted for seasonality and trend (Note that seasonality are estimated using a partial Fourier sum, the default Fourier order for seasonality is 10):

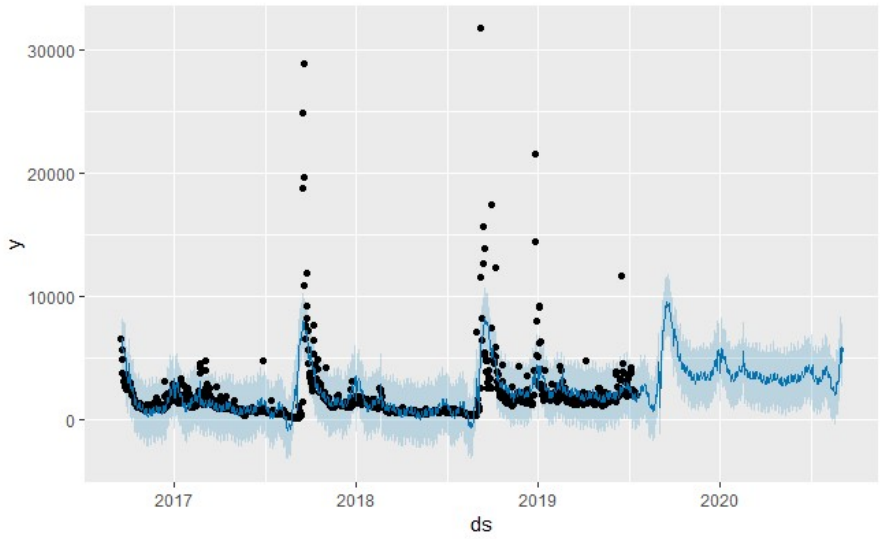


It did not quite catch the outliers and peaks at launch for NBA titles and the trend needs a bit of adjustments.

RMSE: 1895 MAPE: 0.38 MAE: 778

2nd Model: Tickets with Seasonality, Launch and Holiday Components

From the initial model, we clearly see that we need to add launch components since there is a spike in every title launch. We could also see during Christmas of 2019, there were some peaks in tickets, hence we should add these components to our model:

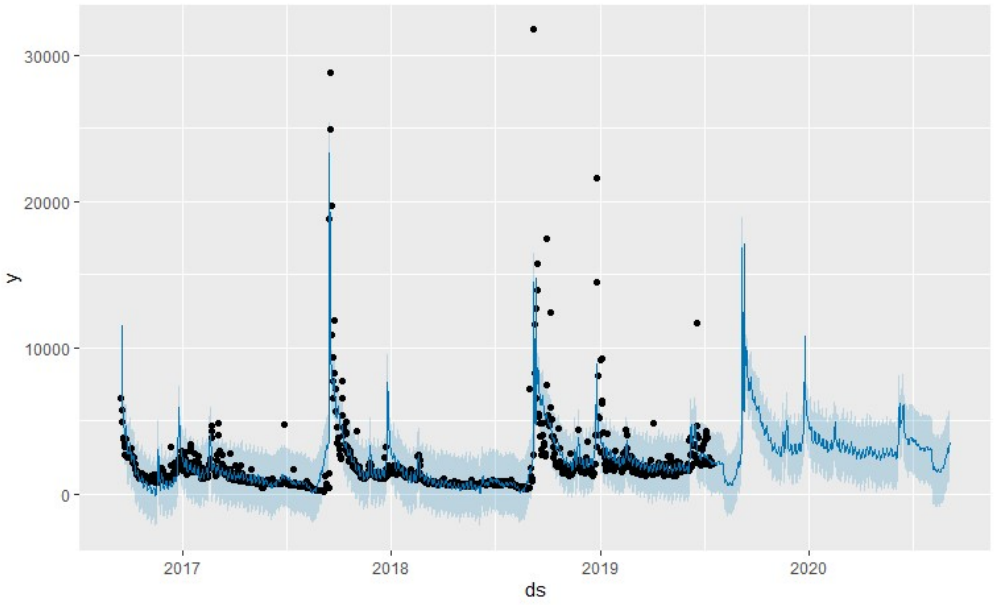


RMSE: 1887 MAPE: 0.38 MAE: 772

Although the numbers are lower for our evaluation metrics, we still need to capture the outliers that might exist during launch.

3rd Model: Tickets mixed with Installs, DAU and Launch adjusted

Using DAU and Installs number for NBA, we can create our 2nd model in addition to the seasonality components that were added in our previous model. We have also added launch period, defined as the month of September each year, in accordance to capture the outliers that exist in the initial model. The resulting forecast can be seen below:



RMSE: 1606 MAPE: 0.54 MAE: 673

We used DAU and Installs numbers from NBA 2K17 to 2K19 to predict for NBA 2K20 DAU and installs.

Although MAPE metric was reported higher in 2nd model, our RMSE and MAE values were smaller. The 2nd model was able to capture the outliers and peaks that exist during launch of NBA titles.

Conclusion

Attached will be the Excel file for daily forecasted number of tickets for NBA 2K20 from launch to end of period. This will include an 80% confidence interval with lower and upper limits.