Predicting the Expected Waiting Time of Popular Attractions in Walt Disney World

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Abstract

Waiting lines are inevitable consequence of imbalance in service operations at modern theme parks. Because of that, parks have introduced different approaches to reduce standard waiting time; some of which are at no extra cost to guests whereas some others require a price premium. These approaches usually feature a variety of schemes by which guests can bypass the standard waiting line or enter an express lane featuring a minimal wait. Our current study primarily develops statistical learning models to analyze the empirical data gathered from "touringplans.com," which encompasses some of Walt Disney World's (WDW) popular attractions located in Orlando, Florida. Results from data analysis and visualization indicate that each of the four parks had similar patterns throughout the years of 2012 through 2018. The study also examines the time-temporal effect and found out which rides having more popularity is dependent upon the season (period) in the year. Empirical analytics are then conducted on each of the four parks using regression modeling (statistical learning) to predict the waiting times for a particular ride during a specific season. Overall, a sample of 13 rides (attractions) over 17 seasons are used to model the waiting times at each theme park, yielding a total of 13x17x4 = 884 possible combinations.

I. Introduction

Most would agree that we live in a society characterized by the desire for immediate gratification, in which our time is considered as valuable as money, and we are concerned about making the most of it. Whenever we feel that we do not have control over our time, we become frustrated, annoyed, and unhappy. We can escape routine activities by going to amusement parks, but some of the perceived inconveniences of making the most of our time even in those settings are inescapable, particularly when having to wait in lines for attractions.

The majority of visitors who visit theme parks are families with children. Families try to make the most of each trip and often plan their trip out ahead of time to make sure everyone gets to ride the rides they want, and everyone stays happy. That is why theme parks are built around the demands of tourist diversified entertainment and satisfaction. With Disney's parks leading the top five popular amusement parks in the United States, we can see that Disney exemplifies in managing people's expectations for the wait (Yarborough, 2016). Often Disney gives estimates for how long someone might spend standing in line for its amusements, and these waiting times are almost always over-estimated, according to Larson's previous research (Swanson, 2015).

This paper attempts to identify the influential factors based on a variety of characteristics at Disney World located in Orlando, Florida, and thereby shed some light on how to enhance the guest experience. In general, we consider the daily operations at each of the four theme parks on the premise. A critical key component of the study relates to the empirical data collected from the website "Touring Plans." The data collected from the website contains information about the waiting times of the 13 rides located throughout the four parks. The data also includes times of shows and firework shows, including the dates and weather of each day. Besides verifying the validity of the models, the data also provide several insights for developing schemes to manage day-to-day waiting times for the rides.

For this study, the obtained data sets capture the waiting times on each day between 2012-2018 for 13 rides (attractions) across the four parks. Then, SAS Enterprise Guide is utilized to obtain the comparative visualizations for additional insights on the average waiting times. The data visualization of the attraction waiting time patterns is organized into four different types - the hourly average in a month, weekday average in a month, daily average by month according to the years, and a time series based on the average daily wait time throughout the years.

The remainder of the paper is organized as follows. In the next section, we describe the site organization of WDW as well as those data sets associated with our analysis. Specifically, we outline the characteristics pertinent to the waiting times of each of the attractions within the period 2012- 2018. Section 3 contains an exploratory analysis on average waiting times with respect to a variety of horizon attributes. The section also includes the results of our data collection and detailed analysis. Visualization of data according to different panels and time-temporal arrangements are also provided. In Section 4, we focus on implementing schemes of influencing tourist transition patterns for the rides. Finally, in Section 5, we conclude our study and discuss possible extensions in future work.

II. Data Description

Disney World in Orlando Florida is made up of four theme parks, namely, Magic Kingdom, Epcot, Hollywood Studios, and Animal Kingdom. On October 1, 1971, Magic Kingdom was the first of the four parks to open up. As years have passed Walt Disney World continued to grow and expand, adding Epcot in 1982 and Disney-MGM Studios (now Disney's Hollywood Studios) in 1989, along with water parks and more than a dozen resorts. In 1998, Disney opened yet another theme park, this one dedicated to zoological entertainment and aptly called Animal Kingdom. Within each WDW park, we scrutinize closely at each popular attraction to determine the best time to be on site.

Attraction Name	Opening Date of attraction	Height Requirement	Length of attraction	Location
Pirates of the Caribbean	12/15/1973	No minimum	8 minutes 30 seconds	Magic Kingdom
Seven Dwarf Mine Train	5/28/2014	38"	2 minutes 30 seconds	Magic Kingdom
Splash Mountain	7/17/1998	40"	11 minutes	Magic Kingdom
Soaring	6/17/2016	40"	4 minutes 51 seconds	Epcot
Spaceship Earth	10/1/1992	No minimum	15 minutes	Epcot
Alien Flying Saucers	6/30/2018	32"	1 minute 30 seconds	Hollywood Studios
Rock 'n' Roller Coaster	7/30/1999	48"	1 minute 22 seconds	Hollywood Studios
Slinky Dog Dash	6/30/2018	38"	2 minutes	Hollywood Studios
Toy Story Mania	5/31/2008	38"	8 minutes	Hollywood Studios
Dinosaur	4/22/1998	40"	3 minutes	Animal Kingdom
Expedition Everest	4/7/2006	44"	3 minutes	Animal Kingdom
Flight of Passage	5/27/2017	44"	5 minutes	Animal Kingdom
Kilimanjaro	4/22/1998	32"	22 minutes	Animal Kingdom
Na'vi River Journey	5/27/2017	No minimum	5 minutes	Animal Kingdom

Table 1. Opening date, height requirement, length of attraction, and location within the four parks.

The data obtained from the website, "TouringPlans.com," is based on Disney World waiting times on particular days throughout 2012-2018 daily between the six years in Orlando Florida. Table 1 illustrates a sample of the data downloaded from the website. Further, the master data set is divided into a number of specialized data sets, pertinent to metadata, entities, holiday codes, event codes, and attractions. A summary of the specialized data sets is outlined in Table 2. Generally speaking, the metadata describes the events that occur at each of the four theme parks daily such as the season, location of the park, times of the events, opening and closing times of the four parks, weather temperatures. The entities describe the name of the theme parks, a section that relates to various wait times throughout the years from certain rides located throughout the four theme parks that make up Disney World. The four parks that listed in the dataset are Magic Kingdom, Epcot, Hollywood Studios, and Animal Kingdom. The data also contains the horizons for the waiting times such as day of the week, time of day, and month.

Datasets	Description
Metadata	191 variables that describes the events that occur at each theme park on a daily basis such as the season, location of park, times of events, opening/closing time of park, weather temperatures, and more.
Entities	Describes the name of the theme park, section of the theme park, and attraction name. This also includes the opening day and times of each attraction and duration of wait.
Holiday Codes	Descriptions for each holiday reference throughout the year.
Event Codes	Descriptions for the events/shows that occur at each park.
Attractions	Data reported for 13 selected rides that define the date and time of stamp including the standby and actual wait times.

Table 2. Descriptions of data sets for analysis.

III. Exploratory Analysis

a. Average waiting time during different hours of the day

When looking at the hourly average waiting time is that by noon each of the waiting times for the attractions seem to peak compared to the time the parks opens for each attraction. According to the website, the waiting time of each attraction is smaller during the mornings than the afternoons. During the afternoons, crowds tend to get larger in each park. “The first two to three hours of every day are the time of the lowest crowds of the day. It is almost Magical. The waiting time for Space Mountain at 10:00 am usually around 20-30 minutes. At noon, it is for 60-90 minutes. That is true of almost every ride in the park (Dadsguide, 2019)”. The majority of the population that visits WDW tends to be on vacation, implying that families may not get up as early as usual. This leaves opening hours’ waiting time for attractions to be less than the afternoon time at the parks. Please refer to the Appendix for data visualization of the analysis.

b. Average waiting time during weekdays *vs* weekends

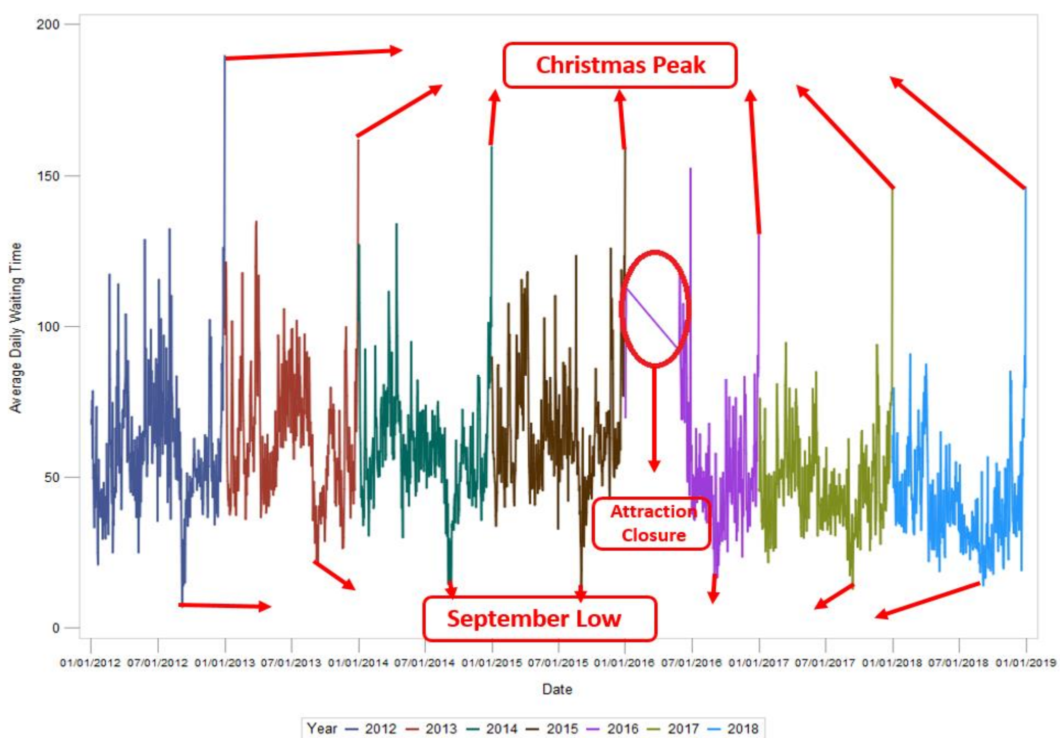
When comparing the weekday to weekend figures, weekdays seem to have a decrease in the waiting times for each attraction throughout the year except for certain months such as December, March, April, June, July, and August. During these months, the average waiting time increases throughout the weekdays including Wednesday when it is usually low during other months. This is because those months are favorite times for when students are out from school, which leads families to take their vacation during these times of the year. As mentioned in the article by Suzanne Kelleher, “Crowds will be the worst during school holidays, such as summer vacation, Thanksgiving, Christmas, and spring break (Kelleher, 2018).” Please refer to the Appendix for data visualization of the analysis.

c. Average waiting time during different months (seasons) of the year

After the data has been analyzed, the visualization figures (see the Appendix) distinguish a similar pattern can among the 13 attractions. When referring back to the average daily waiting times throughout the years of 2012-2018, the pattern between all of the attractions where that during the December period the waiting times were a lot longer compared to the September period where it is much lower. All 13 attractions were able to continue this similar pattern where December where higher waiting times for the attractions at each park and September was a low waiting time. According to the website, “DadsGuide,” December is a busy month for Walt Disney World due to the events going on through the month such as the National cheerleading competition and Pop Warner Super Bowl. “The football teams and cheerleaders show up. The Pop Warner Super Bowl and National Cheerleading and Dance competition is typically the second week in December (December Disney World Crowds, 2018).” Not only is December busy due to events, but including on the holidays such as Christmas Eve and Christmas Day, which seem to be the big days for guest to arrive at the parks. At times WDW stops allowing guest to go into the parks as early in the morning due to capacity limits, as described "Christmas Day will be crazy. It always is. In the past, on Christmas Day the Magic Kingdom has stopped accepting any guests as early 10:00 in the morning. The days from Christmas until New Year's Eve, December Disney World crowds will be wall-to-wall." Therefore we can justify that December is going to cause the waiting times of the attractions to be longer due to a high capacity among the parks.

In comparison to December, September is the complete opposite. According to the figures analyzed, the average daily waiting time during September for each attraction is consistently low each year. Reasons for attractions to have a low average waiting time in September can be due to the parks having a lower capacity since families tend not to visit due to students going back to school. On a Disney touring blog, Tom Briker mentioned, "It is the first full month of school being back in session, and crowds tend to be light after the Labor Day holiday and stay low until the end of the month (Briker, 2019)."

d. Overall trend of average daily waiting time



The final figures (see the inter-temporal plot above and additional schematics in the Appendix) that represent the daily average of the wait time by the month throughout the years of 2012-2018 demonstrate how the attraction wait times have changed throughout the years by its popularity. For example, The bar graph for the attraction Soarin shows the average wait times for each given month in a year for the ride Soarin. During the year of 2016, the graph displays a gap during the wait time for Soarin. Throughout the years of 2012 up to 2016, Soarin was a ride that was based off different areas over California until August 16, 2015, when Disney announced that Soarin would receive new film based off different areas around the World (Tourguide, 2018). On January 4, 2016, Soarin "Over California" closed to make way for Soarin "Around the World" (Tourguide, 2018). On May 27, 2016, the Original Soarin "Around California" reopened up to the guest for a brief period until June 16, 2016, when Soarin "Around California" closed completely. Soarin "Around the World" made its day debut on June 17, 2016, for the first time (Tourguide,2018). According to the bar graph before the gap started, Soarin "Around California" had high daily wait times. Looking at the previous patterns, we can denote that during the winter seasons that Soarin had highly wait times as well indicating that guests were trying to ride Soarin "Around California" before it closed on January 4, 2016. Now, during the period Soarin "Over California" reopen only for a limited period we can see how the ride wait time increased. In 2017, when Soarin "Around the World" made its first debut, the line seems to go above the 150-minute waiting time — indicating that the guest was willing to wait in line to see the new film of the ride. Then as the year goes by, the same pattern seems to take into effect, where the summer and winter seasons incur longer waiting times compared to the fall season. During the years 2017 and 2018, the graph shows that the average daily waiting time decreased during each month for the ride Soarin throughout the year. During these two years, Walt Disney World opens two new attractions in different locations that could have impacted the waiting time for Soarin. On May 27, 2017, Pandora - The World of Avatar opened at Walt Disney World in Animal Kingdom (Lema, 2017). On June 30, 2018, Toy Story Land opened at Walt Disney World (Fickly-Baker, 2018).

IV. Regression Analysis

We model the expected waiting time of different attractions within the same park using a multiple regression model. We let the response variable Y^i be the waiting time for an attraction in park i; let X^i_{SEASON} be a categorical predictor indicating the park season officially announced by WDW; and let $X^i_{ATTRACTION}$ be another categorical variable indicate the specific attraction in park i. Since X^i_{SEASON} has 17 categories, we create 16 binary dummy variables Z^i_j. Similarly we create $k-1$ binary dummy variables W^i_l for $X^i_{ATTRACTION}$ if there are in total k attractions in park i. The regression model we build is:

$$\mathrm{Y}^{\mathrm{i}} = \beta_0 + \sum_{\mathrm{j}=1}^{16} \beta_{\mathrm{zj}} \mathrm{Z}^{\mathrm{i}}_{\mathrm{j}} + \sum_{l=1}^{k-1} \beta_{wl} \mathrm{W}^{\mathrm{i}}_{l} + \varepsilon^{\mathrm{i}};$$

$$\mathrm{Z}^{\mathrm{i}}_{\mathrm{j}} = \begin{cases} 1 & \text{for Season } j \\ 0 & \text{Otherwise} \end{cases}; \qquad \mathrm{W}^{\mathrm{i}}_{l} = \begin{cases} 1 & \text{for Attraction } l \\ 0 & \text{Otherwise} \end{cases};$$

where the random error $\boldsymbol{\varepsilon^i}$ is assumed to have mean of zero and constant variance $\boldsymbol{\sigma^2}$.

Table 3 tabulates the results of regression modeling of five attractions over 17 seasons at Animal Kingdom theme park. It should be noted that the statistical learning procedure used for regression is identical for all four parks and that, as shown in data visualization in the previous section and the appendix, the generalized patterns are essentially the same. Hence, for simplicity, the regression results for the other three parks are not displayed here.

Parameter	Estimate		Standard Error	t Value	Pr > |t|	Confidence	
Intercept	74.198	B	0.746	99.46	<.0001	72.736	75.660
SEASON CHRISTMAS	14.982	B	0.845	17.74	<.0001	13.326	16.637
SEASON CHRISTMAS PEAK	26.669	B	1.303	20.47	<.0001	24.115	29.223
SEASON COLUMBUS DAY	9.593	B	1.608	5.97	<.0001	6.442	12.744
SEASON EASTER	9.683	B	0.854	11.34	<.0001	8.009	11.356
SEASON FALL	-3.515	B	0.653	-5.38	<.0001	-4.795	-2.234
SEASON HALLOWEEN	-4.296	B	1.421	-3.02	0.0025	-7.081	-1.511
SEASON JERSEY WEEK	3.059	B	1.076	2.84	0.0045	0.951	5.168
SEASON JULY 4TH	0.103	B	1.426	0.07	0.9422	-2.691	2.898
SEASON MARDI GRAS	10.489	B	1.928	5.44	<.0001	6.709	14.269
SEASON MARTIN LUTHER KING JUNIOR DAY	4.857	B	1.056	4.6	<.0001	2.787	6.927
SEASON MEMORIAL DAY	7.947	B	1.578	5.04	<.0001	4.855	11.040
SEASON PRESIDENTS WEEK	9.497	B	1.053	9.02	<.0001	7.434	11.560
SEASON SEPTEMBER LOW	-11.520	B	0.742	-15.53	<.0001	-12.974	-10.066
SEASON SPRING	1.777	B	0.551	3.23	0.0013	0.697	2.858
SEASON SUMMER BREAK	-0.169	B	0.639	-0.26	0.7916	-1.421	1.083
SEASON THANKSGIVING	11.690	B	0.987	11.85	<.0001	9.756	13.625
SEASON WINTER	0.000	B	.	.	.	.	.
Attraction Avatar Flight of Passage	59.472	B	0.864	68.87	<.0001	57.780	61.165
Attraction Dinosaur	-53.315	B	0.684	-77.91	<.0001	-54.657	-51.974
Attraction Expedition Everest	-46.273	B	0.681	-67.97	<.0001	-47.608	-44.939
Attraction Kilimanjaro Safaris	-43.316	B	0.681	-63.61	<.0001	-44.651	-41.981
Attraction Na'vi River Journey	0.000	B	.	.	.	.	.

R-Square	Coeff Var	Root MSE	Avg_Daily_WT_Raw Mean
0.796	38.414	15.112	39.340

Table 3. Regression modeling of 5 attractions over 17 seasons at Animal Kingdom theme park.

The obtained regression models can now be used to predict waiting times. Listed below are examples of interpretations from the regression models of a particular attraction in a certain park at either season of December peak or September low.

December Peak:

The expected average daily waiting time for **Flight of Passage** during the **Christmas Peak** is:

$$E\ (\ Y^i \mid X^i_{SEASON} = Christmas\ Peak;\ X^i_{ATTRACTION} \ = Flight\ of\ Pssage)$$

$$= 74.198 + 26.669 + 59.472 = 160.34 \approx \boldsymbol{160\ minutes}$$

The expected average daily waiting time for **Seven Dwarf Mine Train** during the **Christmas Peak** is:

$$E\ (\ \mathrm{Y}^{\mathrm{i}} \mid X^{i}_{SEASON} = Christmas\ Peak;\ X^{i}_{ATTRACTION} = \textit{Seven Dwarf Mine Train})$$

$$= 30.048 + 26.012 + 39.961 = 96.021 \approx \mathbf{96}\ \boldsymbol{minutes}$$

The expected average daily waiting time for **Soaring** during the **Christmas Peak** is:

$$E\ (\ \mathrm{Y}^{\mathrm{i}} \mid X^{i}_{SEASON} = Christmas\ Peak;\ X^{i}_{ATTRACTION} = \textit{Soaring})$$

$$= 9.989 + 39.276 + 39.077 = 88.342 \approx \mathbf{88}\ \boldsymbol{minutes}$$

The expected average daily waiting time for **Slinky Dog Dash** during the **Christmas Peak** is:

$$E\ (\ \mathrm{Y}^{\mathrm{i}} \mid X^{i}_{SEASON} = Christmas\ Peak;\ X^{i}_{ATTRACTION} = \textit{Slinky Dog Dash})$$

$$= 58.741 + 47.675 + 13.597 = 120.013 \approx \mathbf{120}\ \boldsymbol{minutes}$$

September Low:

The expected average daily waiting time for **Flight of Passage** during the **September Low** is:

$$E\ (\ \mathrm{Y}^{\mathrm{i}} \mid X^{i}_{SEASON} = \textit{September Low};\ X^{i}_{ATTRACTION} = Flight\ of\ Pssage)$$

$$= 74.198 + -11.520 + 59.472 = 122.18 \approx \mathbf{122}\ \boldsymbol{minutes}$$

The expected average daily waiting time for **Seven Dwarf Mine Train** during the **September Low** is:

$$E\ (\ \mathrm{Y}^{\mathrm{i}} \mid X^{i}_{SEASON} = \textit{September Low};\ X^{i}_{ATTRACTION} = \textit{Seven Dwarf Mine Train})$$

$$= 30.048 + -2.517 + 39.961 = 67.492 \approx \mathbf{67}\ \boldsymbol{minutes}$$

The expected average daily waiting time for **Soaring** during the **September Low** is:

$$E\ (\ \mathrm{Y}^{\mathrm{i}} \mid X^{i}_{SEASON} = \textit{September Low};\ X^{i}_{ATTRACTION} = \textit{Soaring})$$

$$= 9.989 + -6.119 + 39.077 = 42.947 \approx \mathbf{43}\ \boldsymbol{minutes}$$

The expected average daily waiting time for **Slinky Dog Dash** during the **September Low** is:

$$E\ (\ \mathrm{Y}^{\mathrm{i}} \mid X^{i}_{SEASON} = \textit{September Low};\ X^{i}_{ATTRACTION} = \textit{Slinky Dog Dash})$$

$$= 58.741 + -9.636 + 13.597 = 62.702 \approx \mathbf{63}\ \boldsymbol{minutes}$$

When comparing December peak season to September low season there is a noticeable change in the wait times for the popular rides in each park. In December peak season, each of the popular rides in each park has a longer wait time than September Low season. For example, to wait in line for Slinky Dog Dash in Hollywood Studios during December peaks takes an average of 120 minutes but in September the average is 63 minutes, making it a 57 minute difference.

V. Conclusions

After analyzing the data sets of all 13 popular attractions at Walt Disney World, we can conclude the most popular attractions at each of the four parks are Seven Dwarf Mine Train located in Magic Kingdom, Flight of Passage in Animal Kingdom, Slinky Dog Dash located in Hollywood Studios, and Soarin located in Epcot. Each attraction holds a substantial similarity in seasonality and heterogeneity. Generally, December is the high peak throughout the year, while September is the low season in the year. As for March, June, July, and August, the waiting times tend to be longer during the weekdays than the weekends compared to other months in the year. As for the regression model, it was able to explain approximately 80% of the total variations in the average daily waiting time with a 15-minute average error. Looking back at models for the best time for tourist to attend Walt Disney World is in September if they would like to avoid long periods of waiting, rather than the months that contain holidays such as December peak season. Our analyses also provide managerial insights based on the results from data visualization and statistical learning. Possible future extensions to the study include predictive analytics and waiting system optimization using machine learning techniques.

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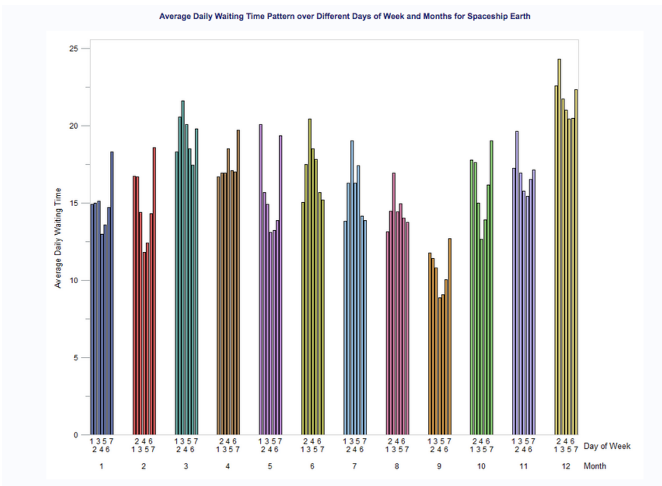
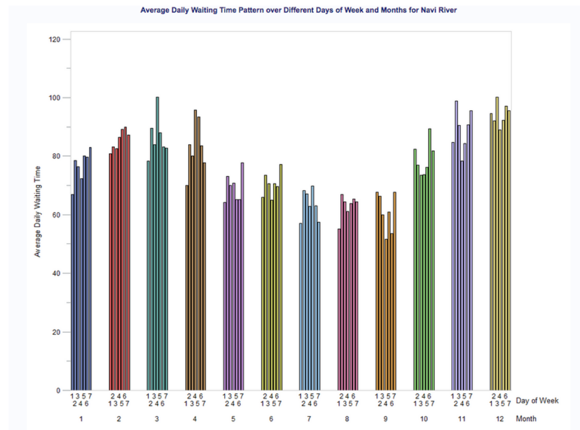
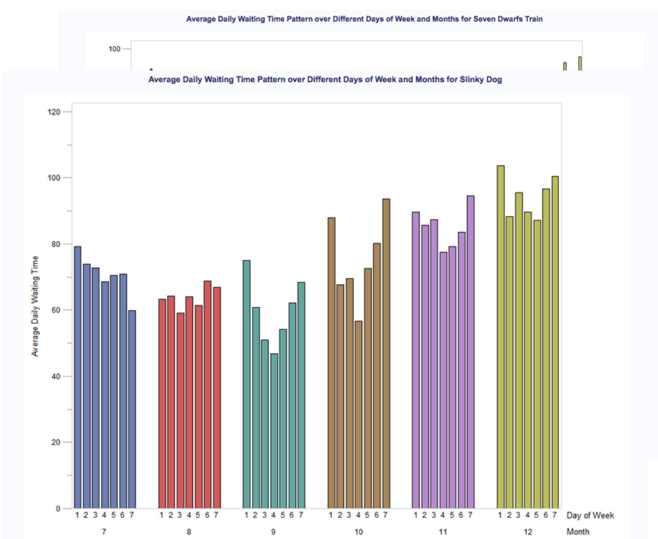
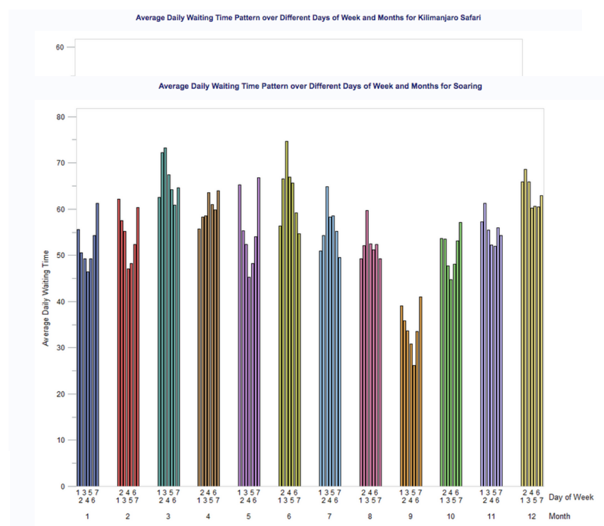
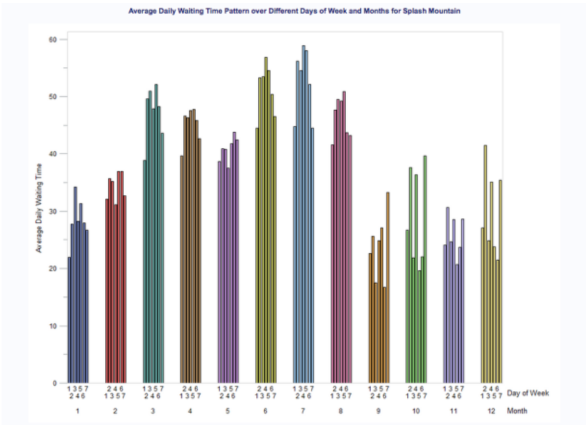
Appendix (Data Visualization)

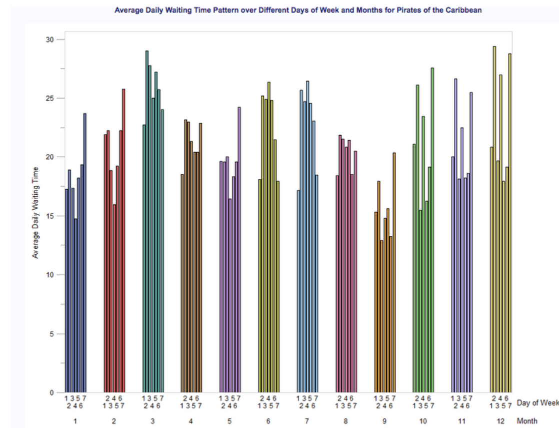


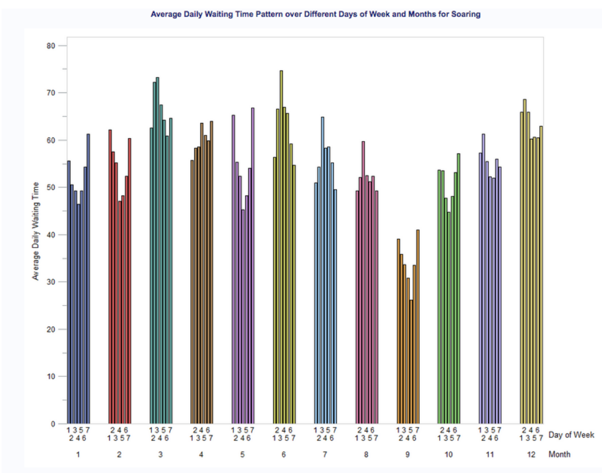


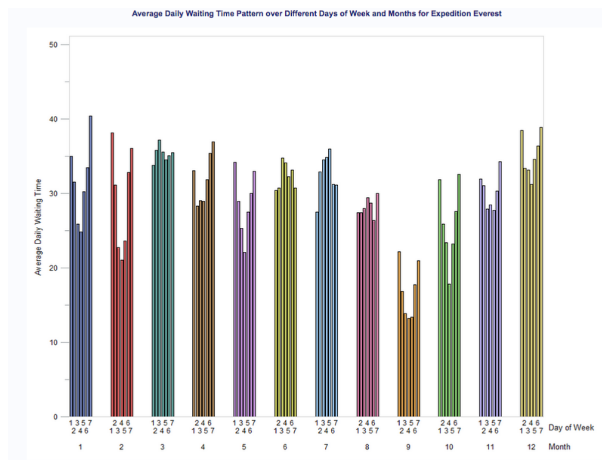


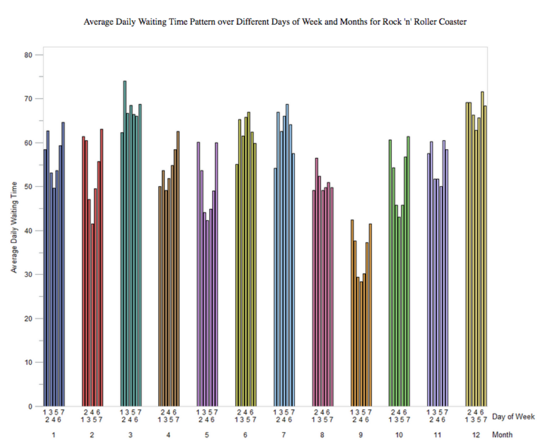


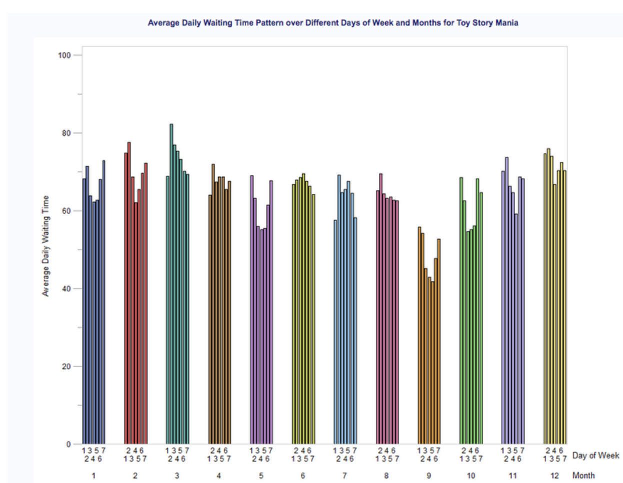

Average Daily Waiting Time Pattern over Different Days of Week and Months for Splash Mountain
Average Daily Waiting Time
Day of Week
Month

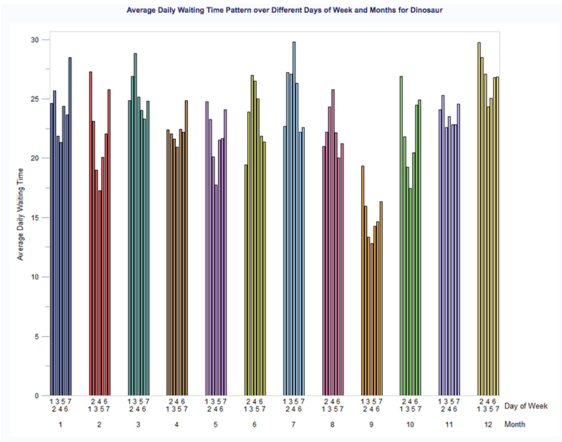

Average Daily Waiting Time Pattern over Different Days of Week and Months for Pirates of the Caribbean
Average Daily Waiting Time
Day of Week
Month

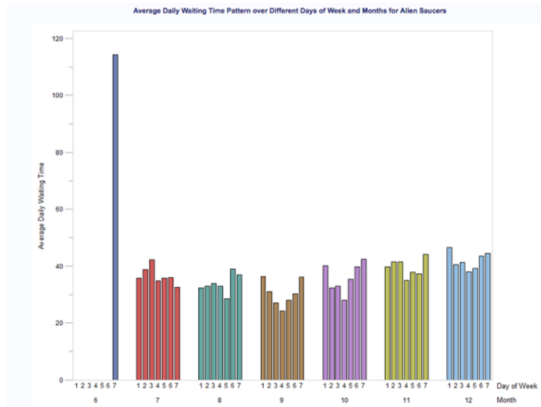

Average Daily Waiting Time Pattern over Different Days of Week and Months for Soaring
Average Daily Waiting Time
Day of Week
Month

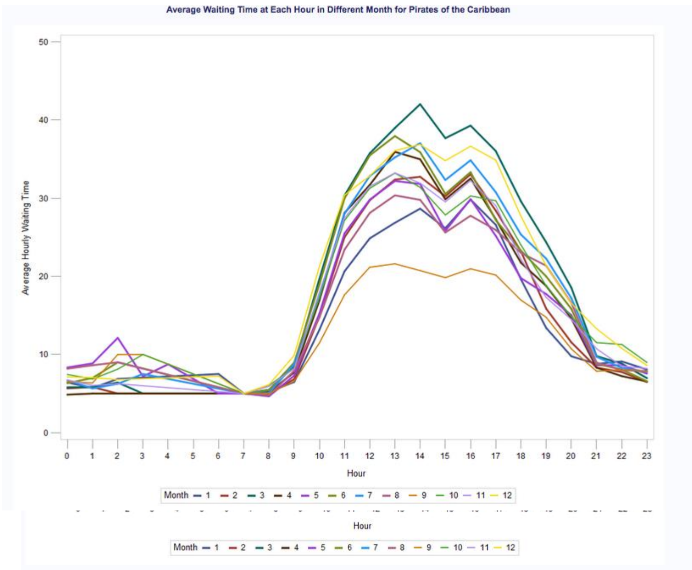

Average Daily Waiting Time Pattern over Different Days of Week and Months for Expedition Everest
Average Daily Waiting Time
Day of Week
Month

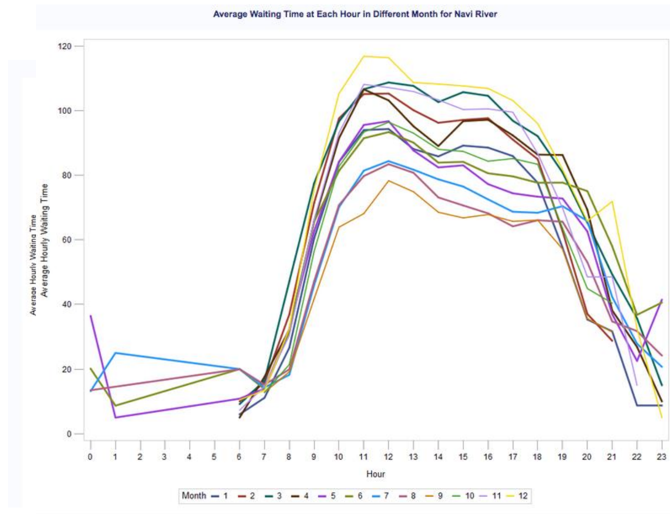

Average Daily Waiting Time Pattern over Different Days of Week and Months for Rock 'n' Roller Coaster
Average Daily Waiting Time
Day of Week
Month

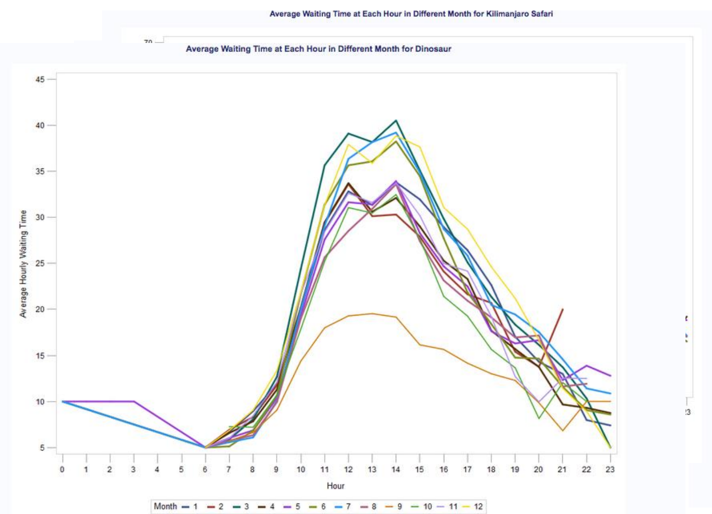

Average Daily Waiting Time Pattern over Different Days of Week and Months for Toy Story Mania
Average Daily Waiting Time
Day of Week
Month

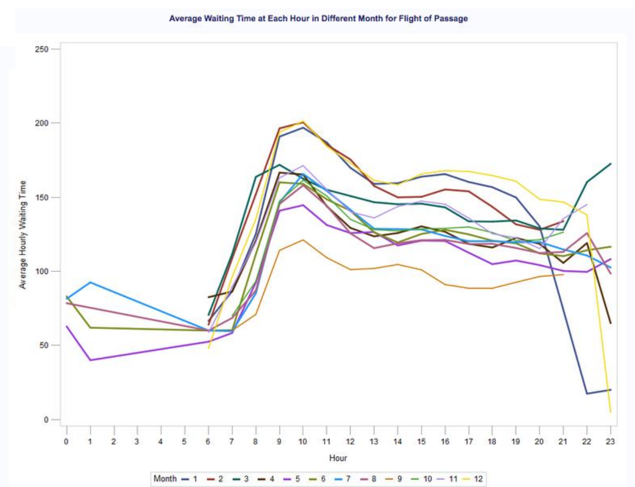

Average Daily Waiting Time Pattern over Different Days of Week and Months for Dinosaur
Average Daily Waiting Time
Day of Week
Month

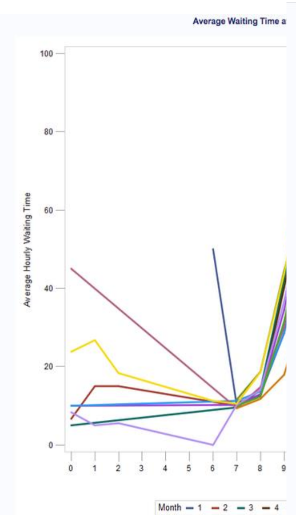

Average Daily Waiting Time Pattern over Different Days of Week and Months for Alien Saucers
Average Daily Waiting Time
Day of Week
Month

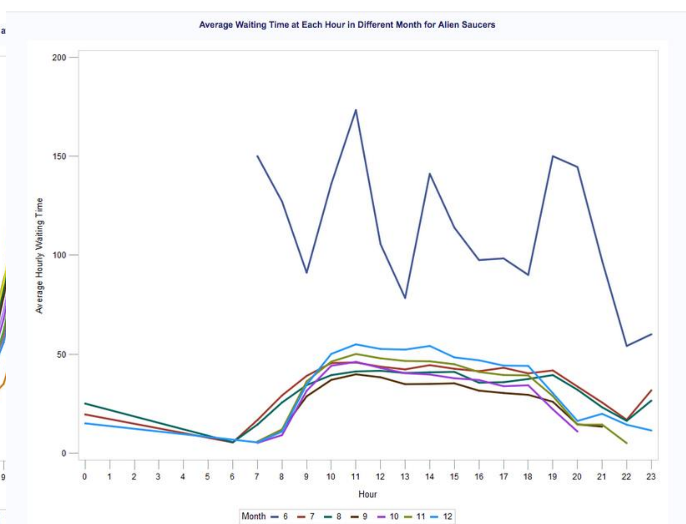




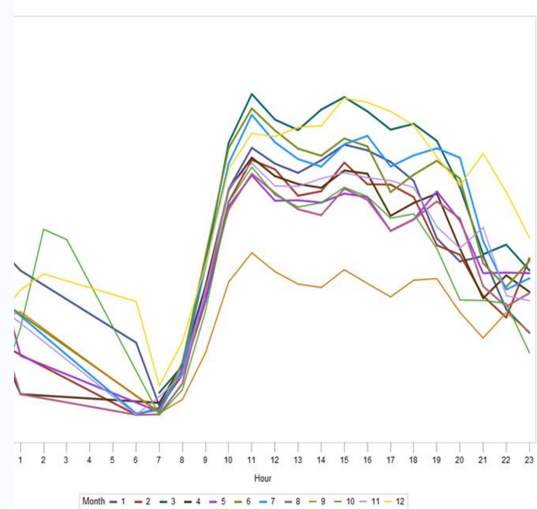


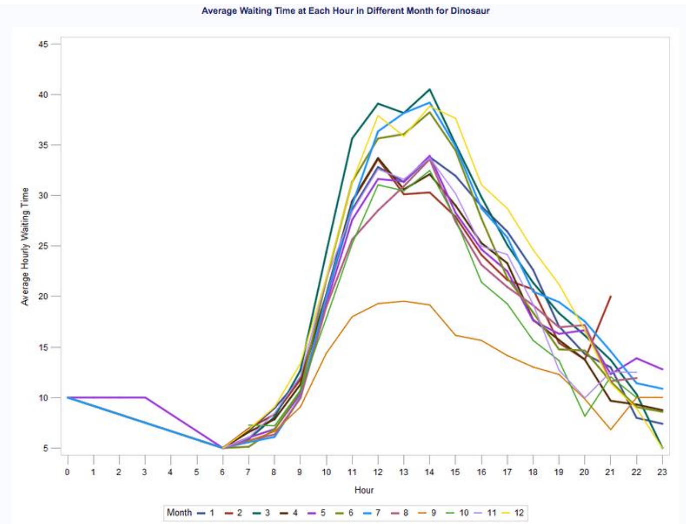


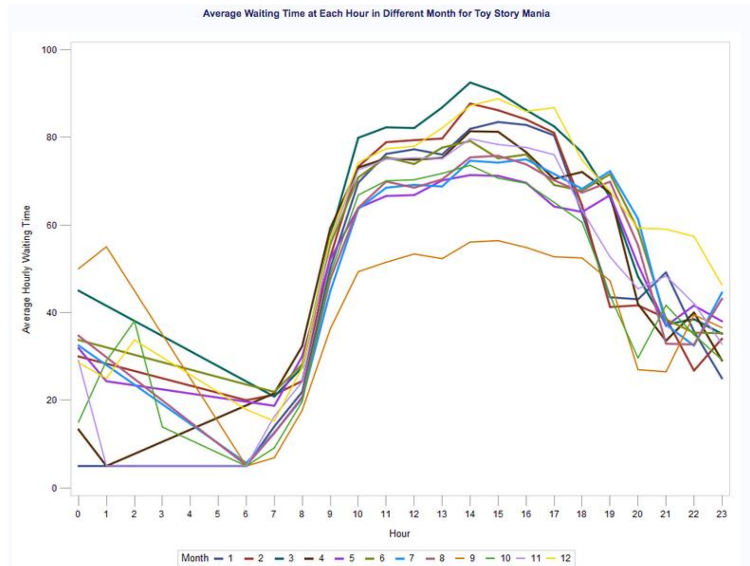


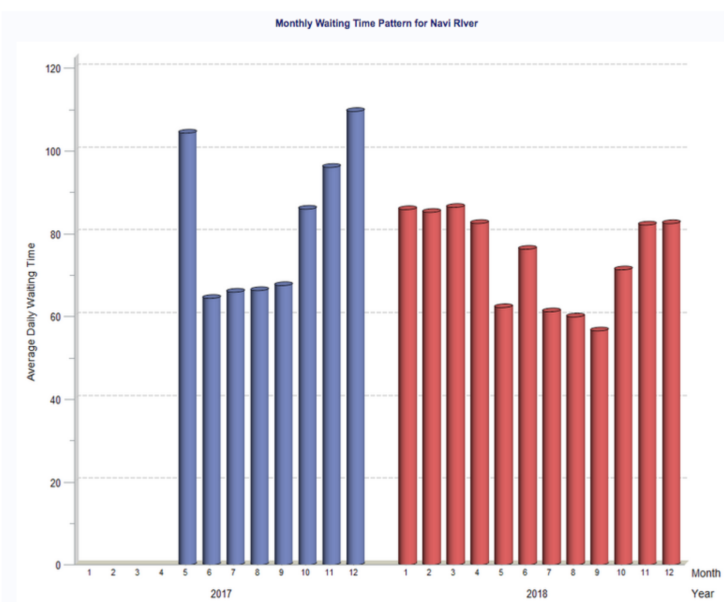


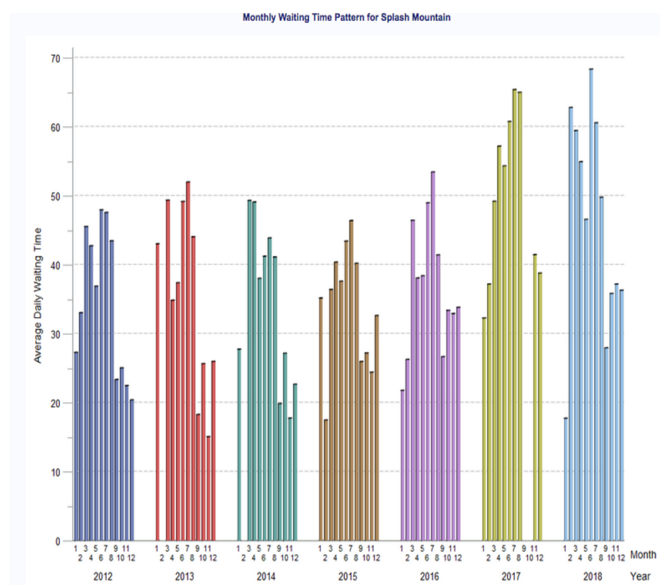
Average Waiting Time at Each Hour in Different Month for Rock 'n' Roller Coaster

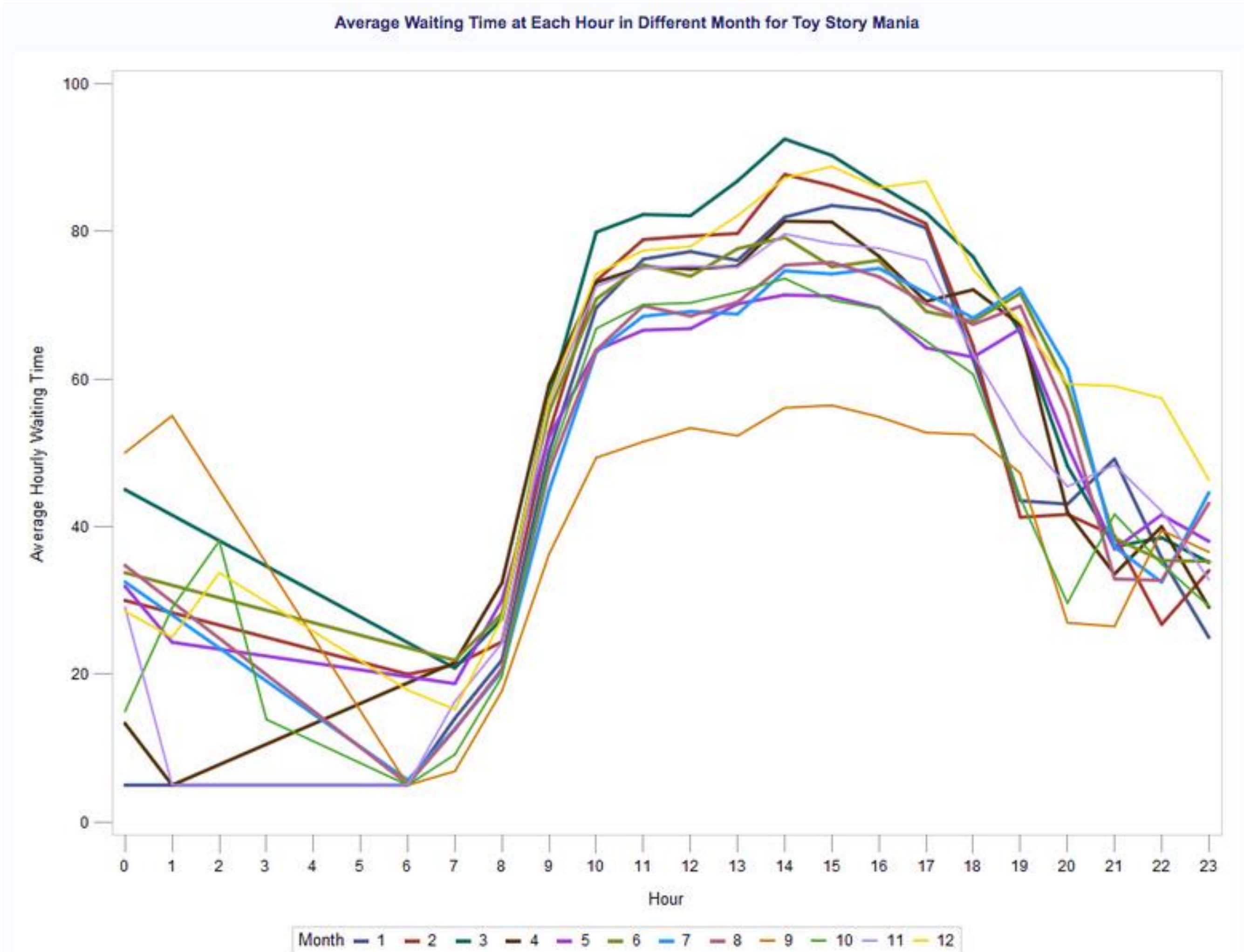



Average Waiting Time at Each Hour in Different Month for Dinosaur
Average Hourly Waiting Time
Hour
Month 1 2 3 4 5 6 7 8 9 10 11 12

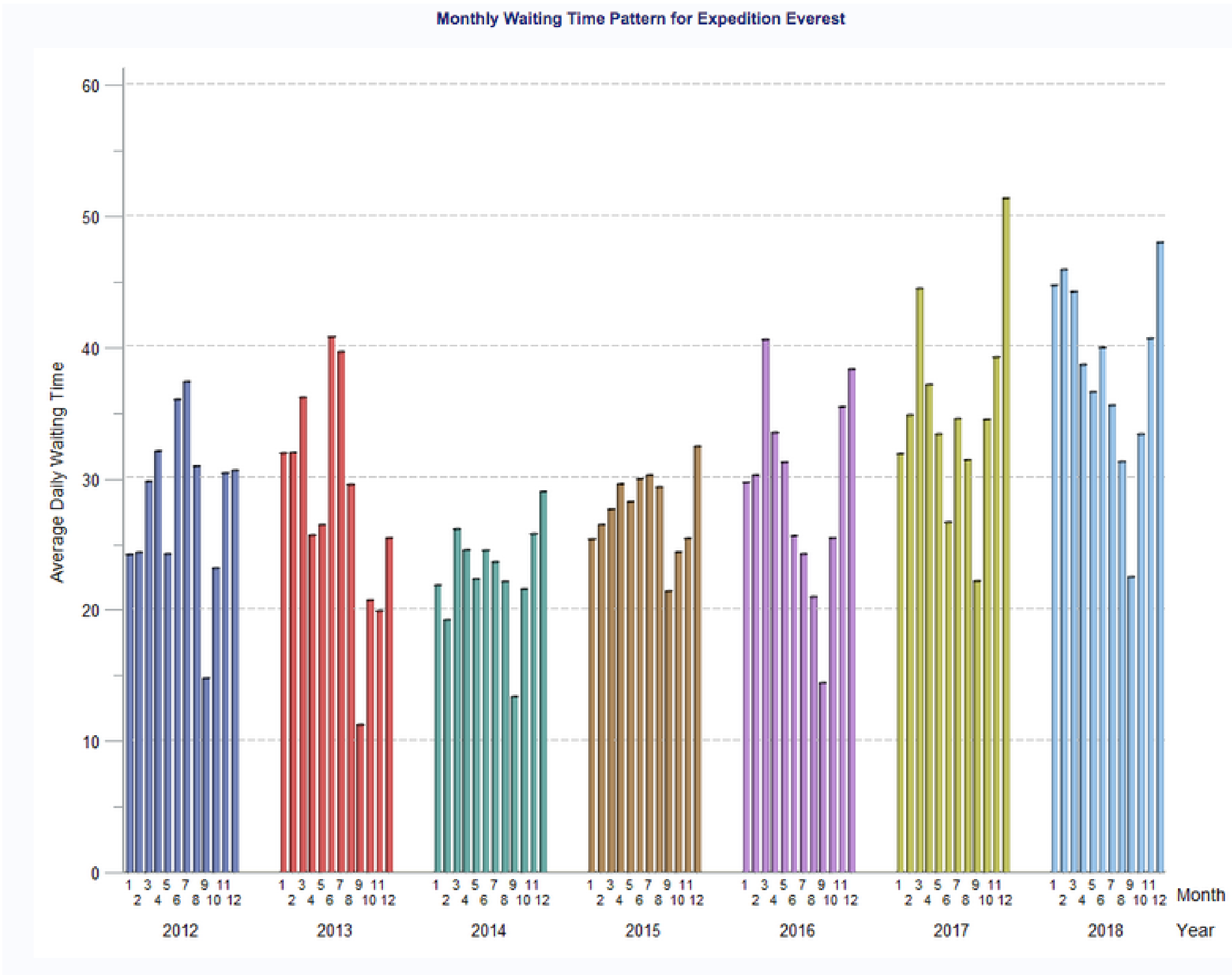

Average Waiting Time at Each Hour in Different Month for Toy Story Mania
Average Hourly Waiting Time
Hour
Month 1 2 3 4 5 6 7 8 9 10 11 12

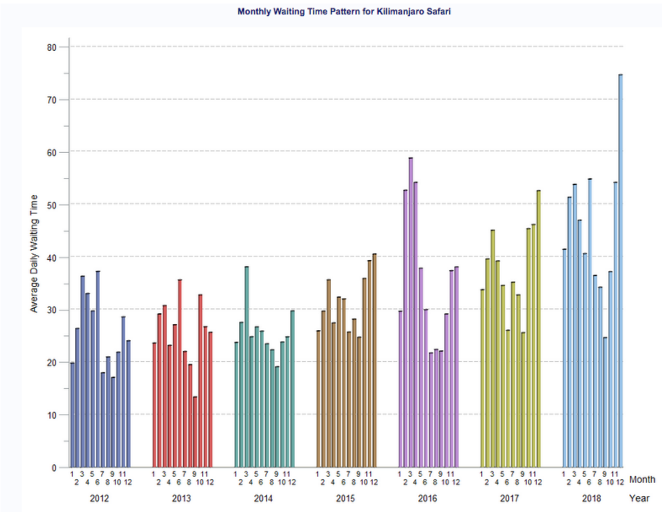

Monthly Waiting Time Pattern for Navi River
Average Daily Waiting Time
Month
Year
2017
2018

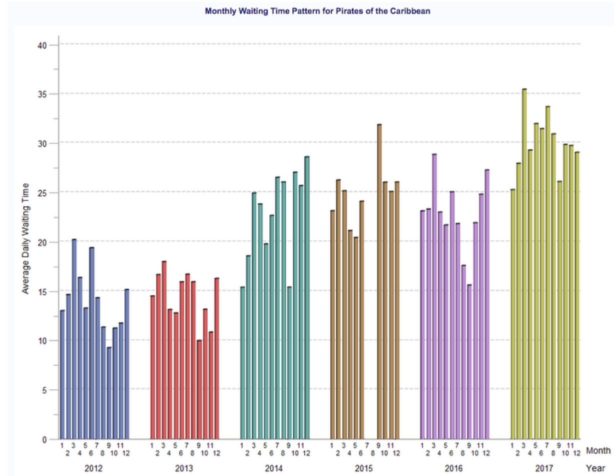

Monthly Waiting Time Pattern for Splash Mountain
Average Daily Waiting Time
Month
Year
2012
2013
2014
2015
2016
2017
2018

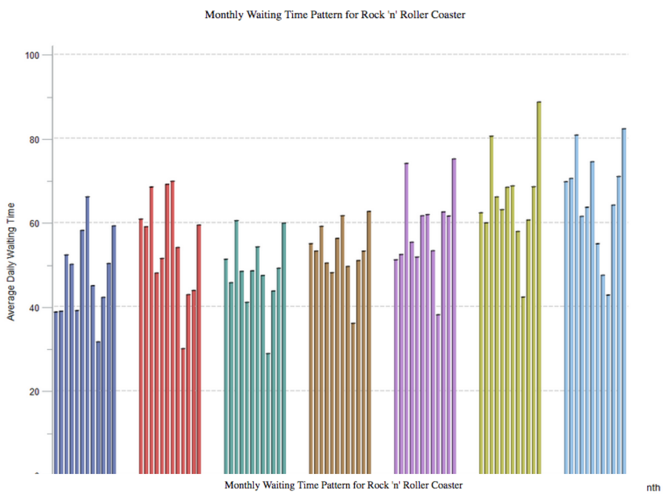


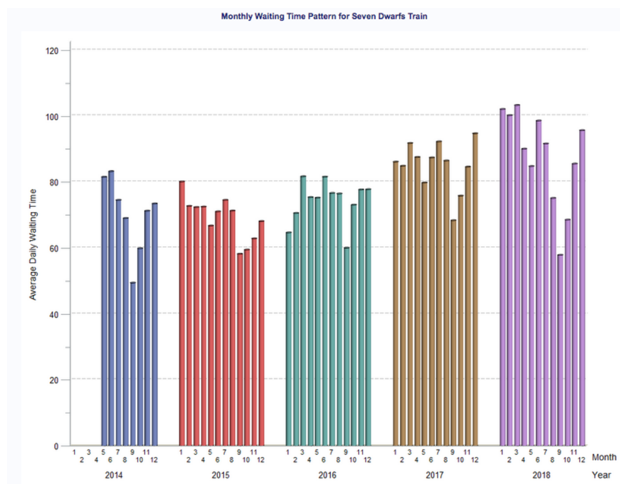
Average Waiting Time at Each Hour in Different Month for Toy Story Mania
Average Hourly Waiting Time
0
20
40
60
80
100
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hour
Month 1 2 3 4 5 6 7 8 9 10 11 12

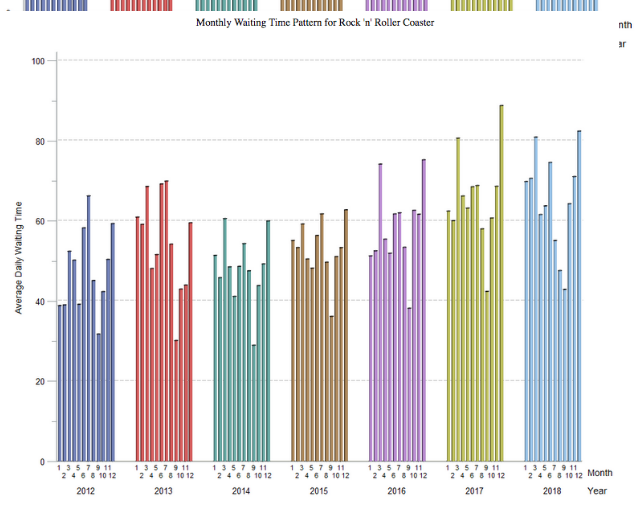

Monthly Waiting Time Pattern for Expedition Everest
Average Daily Waiting Time
60
50
40
30
20
10
0
1 3 5 7 9 11
2 4 6 8 10 12
Month
2012
2013
2014
2015
2016
2017
2018
Year

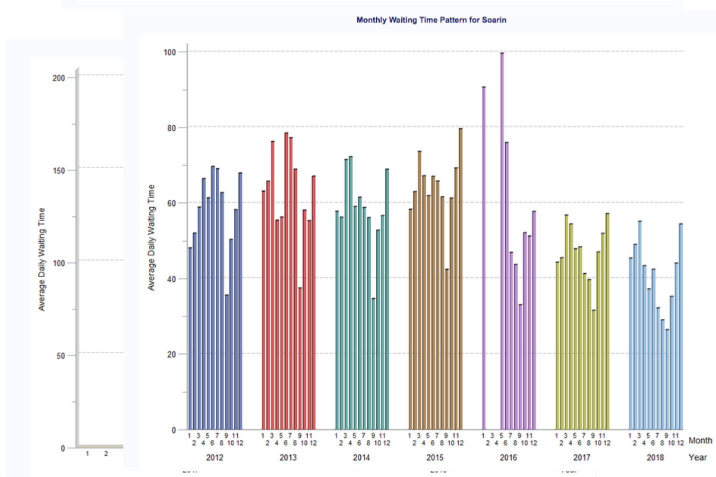

Monthly Waiting Time Pattern for Kilimanjaro Safari
Average Daily Waiting Time
Month
Year

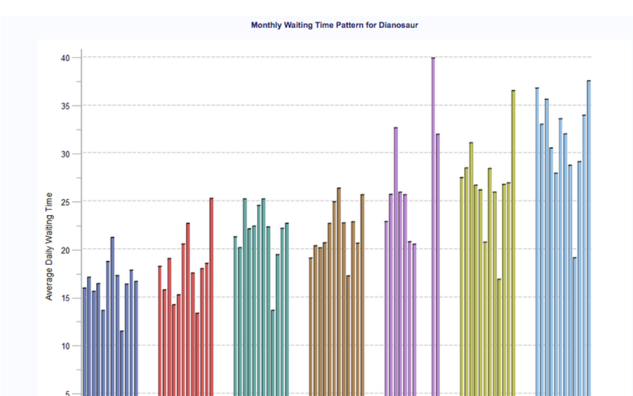

Monthly Waiting Time Pattern for Pirates of the Caribbean
Average Daily Waiting Time
Month
Year


Monthly Waiting Time Pattern for Rock 'n' Roller Coaster
Average Daily Waiting Time

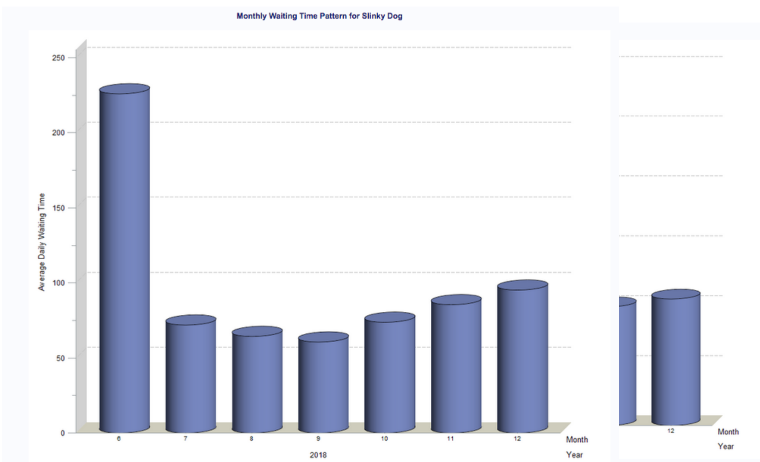

Monthly Waiting Time Pattern for Seven Dwarfs Train
Average Daily Waiting Time
Month
Year

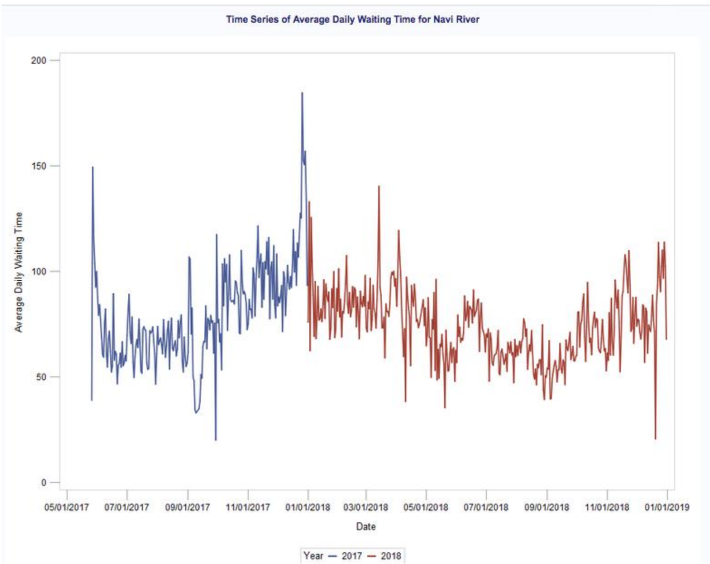

Monthly Waiting Time Pattern for Rock 'n' Roller Coaster
Average Daily Waiting Time
Month
Year

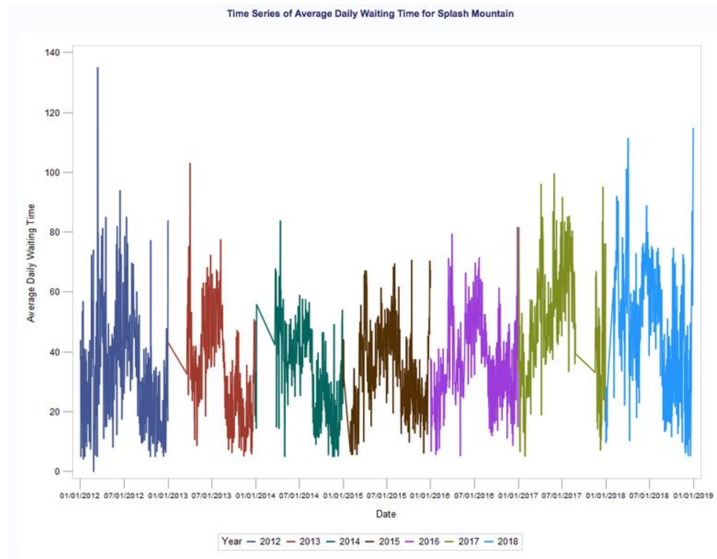

Monthly Waiting Time Pattern for Soarin
Average Daily Waiting Time
Month
Year

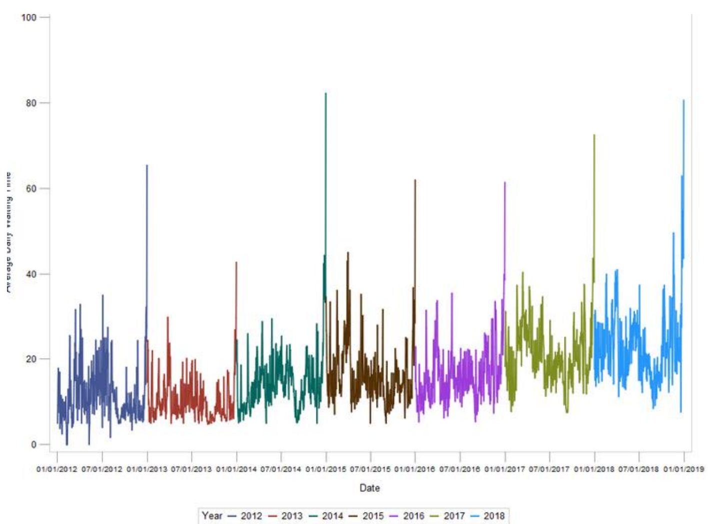

Monthly Waiting Time Pattern for Dianosaur
Average Daily Waiting Time

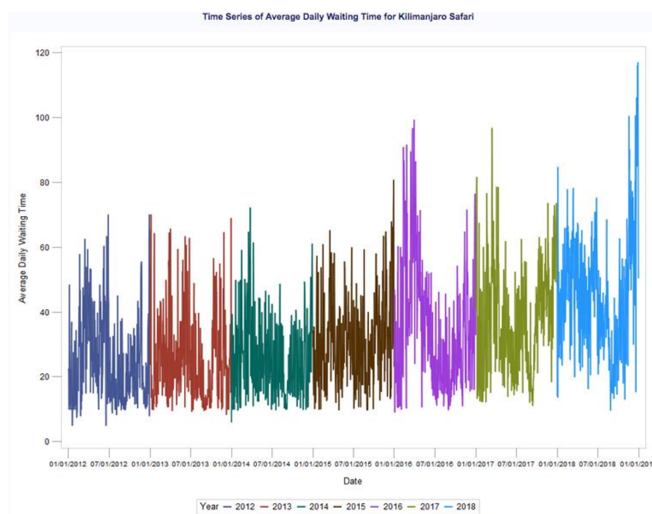

Monthly Waiting Time Pattern for Seven Dwarfs Train

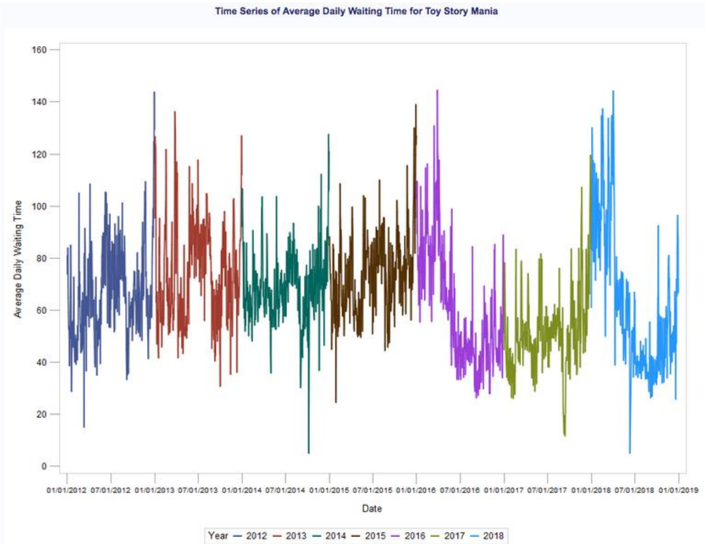

Monthly Waiting Time Pattern for Slinky Dog
Average Daily Waiting Time
250
200
150
100
50
0
6
7
8
9
10
11
12
Month
2018
Year
12
Month
Year

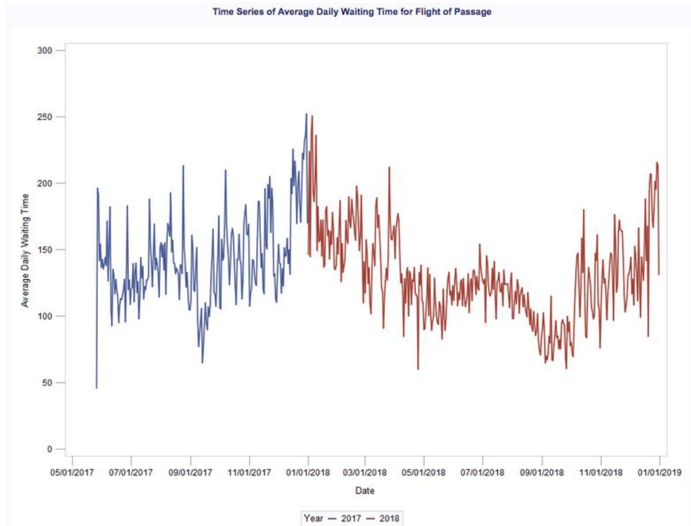

Time Series of Average Daily Waiting Time for Navi River
Average Daily Waiting Time
0
50
100
150
200
05/01/2017 07/01/2017 09/01/2017 11/01/2017 01/01/2018 03/01/2018 05/01/2018 07/01/2018 09/01/2018 11/01/2018 01/01/2019
Date
Year — 2017 — 2018

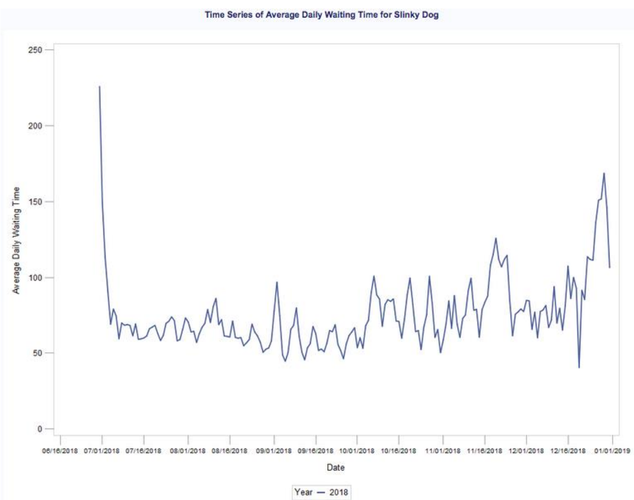

Time Series of Average Daily Waiting Time for Splash Mountain
Average Daily Waiting Time
0
20
40
60
80
100
120
140
01/01/2012 07/01/2012 01/01/2013 07/01/2013 01/01/2014 07/01/2014 01/01/2015 07/01/2015 01/01/2016 07/01/2016 01/01/2017 07/01/2017 01/01/2018 07/01/2018 01/01/2019
Date
Year — 2012 — 2013 — 2014 — 2015 — 2016 — 2017 — 2018

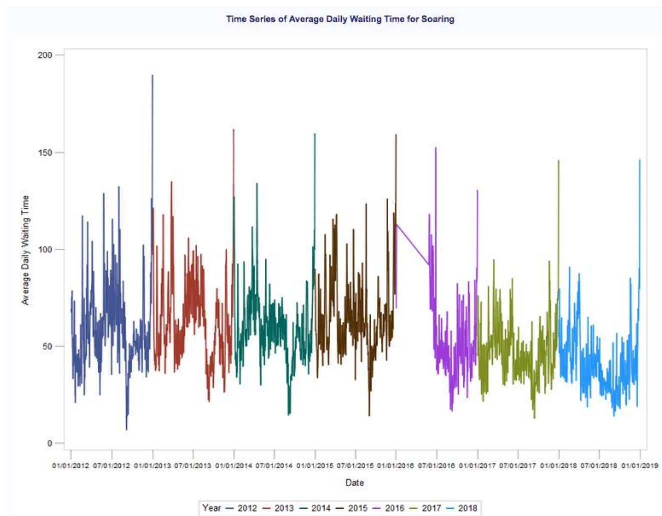

0
20
40
60
80
100
01/01/2012 07/01/2012 01/01/2013 07/01/2013 01/01/2014 07/01/2014 01/01/2015 07/01/2015 01/01/2016 07/01/2016 01/01/2017 07/01/2017 01/01/2018 07/01/2018 01/01/2019
Date
Year — 2012 — 2013 — 2014 — 2015 — 2016 — 2017 — 2018

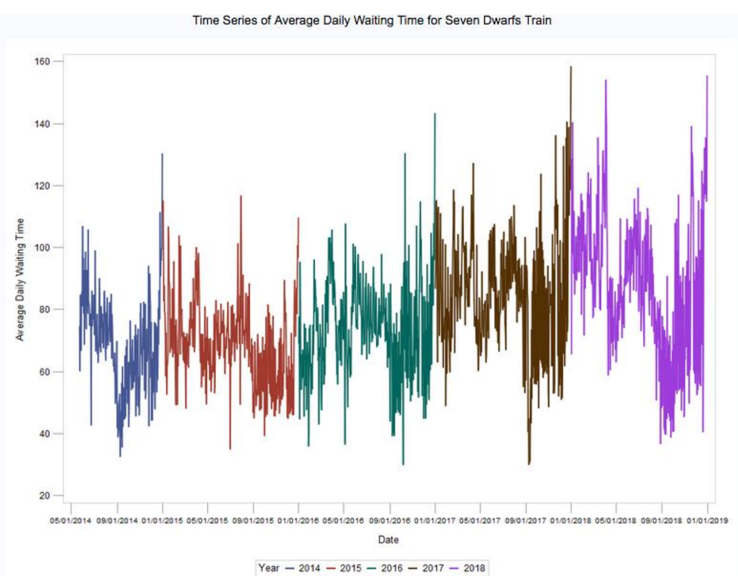

Time Series of Average Daily Waiting Time for Kilimanjaro Safari
Average Daily Waiting Time
0
20
40
60
80
100
120
01/01/2012 07/01/2012 01/01/2013 07/01/2013 01/01/2014 07/01/2014 01/01/2015 07/01/2015 01/01/2016 07/01/2016 01/01/2017 07/01/2017 01/01/2018 07/01/2018 01/01/2019
Date
Year — 2012 — 2013 — 2014 — 2015 — 2016 — 2017 — 2018


Time Series of Average Daily Waiting Time for Toy Story Mania
Average Daily Waiting Time
Date
Year — 2012 — 2013 — 2014 — 2015 — 2016 — 2017 — 2018


Time Series of Average Daily Waiting Time for Flight of Passage
Average Daily Waiting Time
Date
Year — 2017 — 2018


Time Series of Average Daily Waiting Time for Slinky Dog
Average Daily Waiting Time
Date
Year — 2018


Time Series of Average Daily Waiting Time for Soaring
Average Daily Waiting Time
Date
Year — 2012 — 2013 — 2014 — 2015 — 2016 — 2017 — 2018


Time Series of Average Daily Waiting Time for Seven Dwarfs Train
Average Daily Waiting Time
Date
Year — 2014 — 2015 — 2016 — 2017 — 2018