



PREDICTING DISNEY WORLD RIDE WAIT TIMES

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MOTIVATION

Spending less time waiting in ride lines opens up more opportunities to enjoy other aspects of the Disney parks.

OBJECTIVE AND GOAL

The objective is to build a linear regression model to predict wait times for rides at Disney World. Understanding how features contribute to wait time length will help park goers make more informed decisions on when to go in line for a ride.

METHODOLOGY

DATA

Data Sources:

- TouringPlans.com
- Weather Underground
(webscraped hourly data)

Period:

May – August 2018

Ride:

Splash Mountain
(Magic Kingdom)

TOOLS



pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



Selenium



Seaborn

BeautifulSoup



METRICS

Predicting: Wait Time

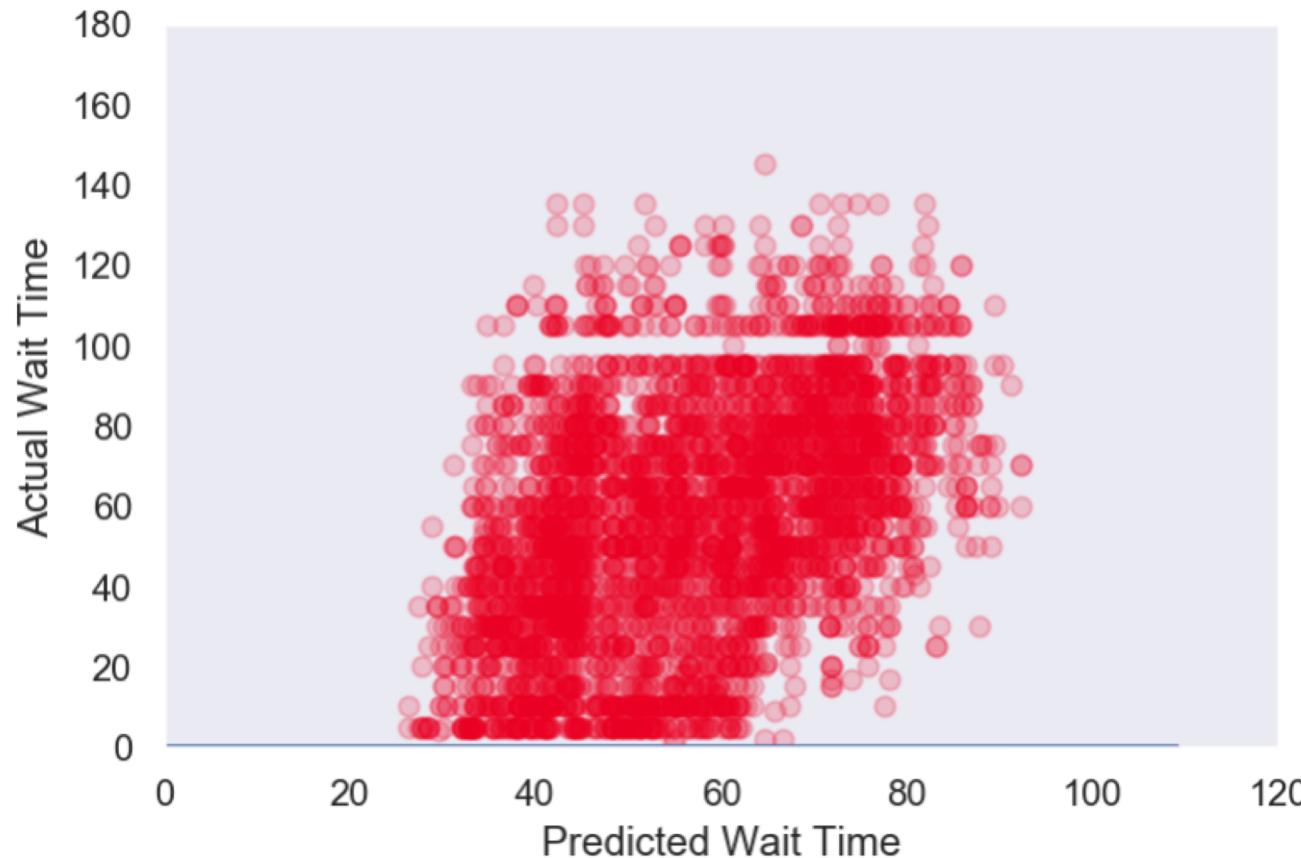
Features:

- Ticket Season*
- Month
- Day of the Week
- Hour of the Day
- Temperature
- Dew Point
- Humidity
- Wind Speed
- Wind Gust
- Pressure
- Precipitation

*One-Day Tickets only: Peak, Regular, or Value

LINEAR REGRESSION MODEL #1

Weather features alone explain 22% of the variance in wait times at Splash Mountain.



Features:

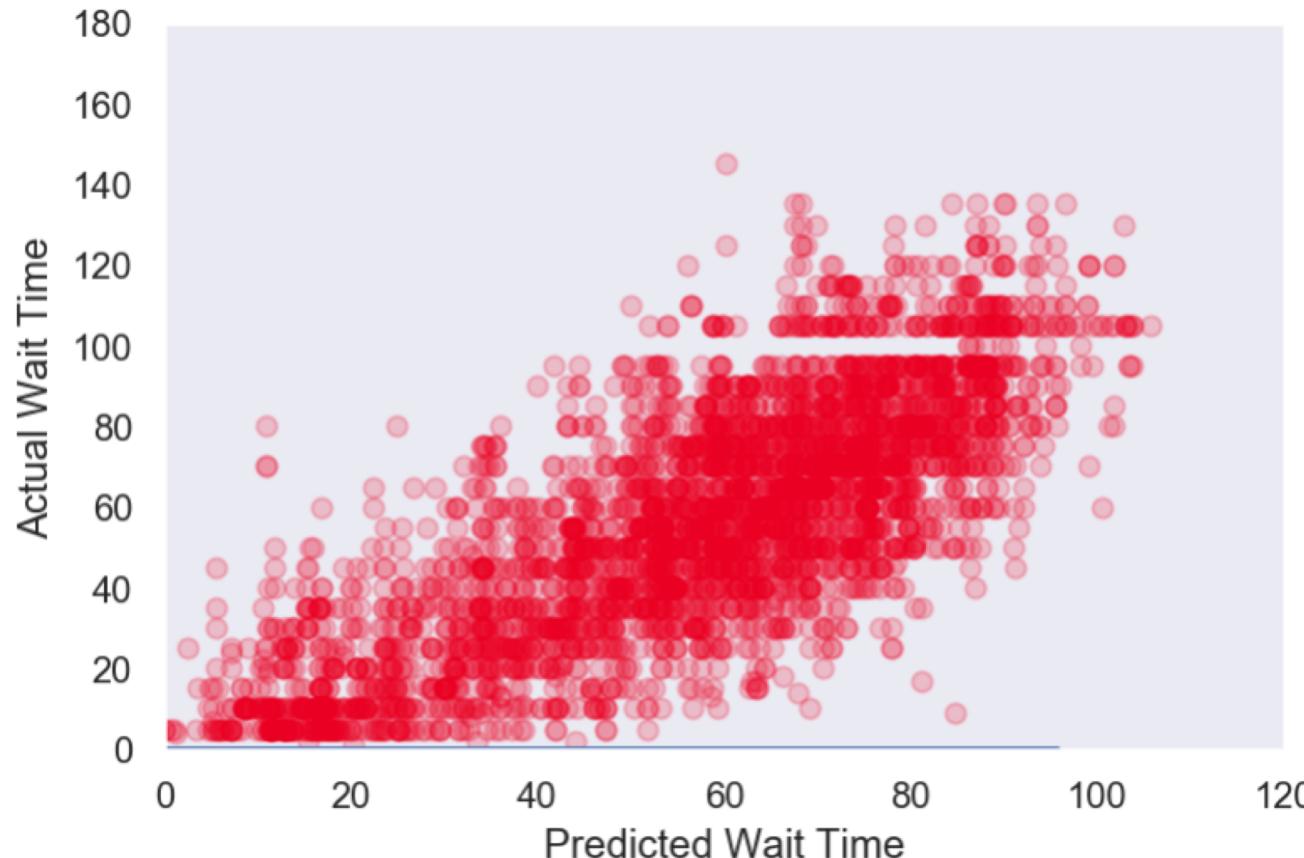
- Temperature
- Dew Point
- Humidity
- Wind Speed
- Wind Gust
- Pressure
- Precipitation

R^2 Train: 0.23
 R^2 Test : 0.20

MAE: 21.5
MSE: 709.8
RMSE: 26.6

LINEAR REGRESSION MODEL #2

Adding time features as dummy variables to the weather features increased R^2 to 0.60.



Features:

Temperature

Dew Point

Humidity

Wind Speed

Wind Gust

Pressure

Precipitation

Month

Day of the Week

Hour of the Day

R^2 Train: 0.61

R^2 Test : 0.60

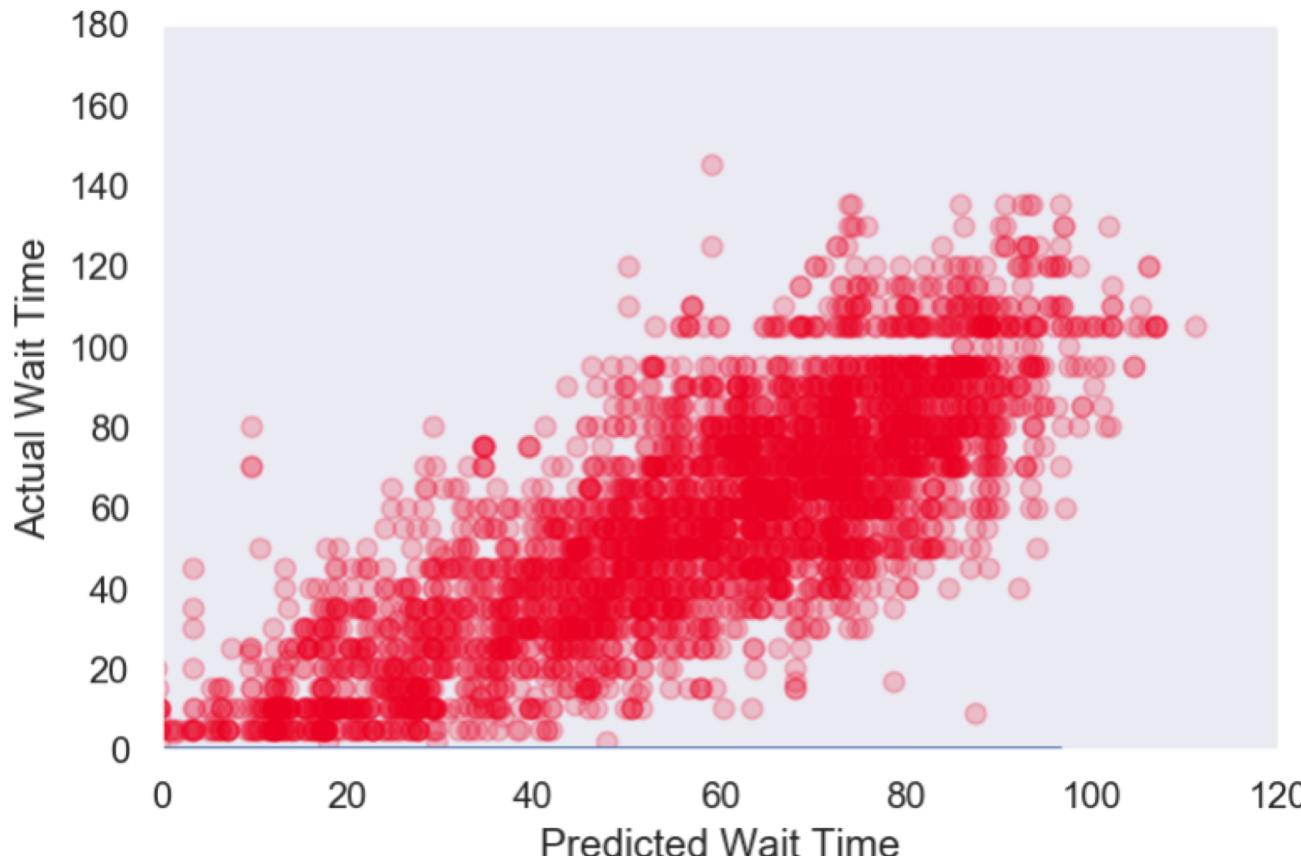
MAE: 14.7

MSE: 354.0

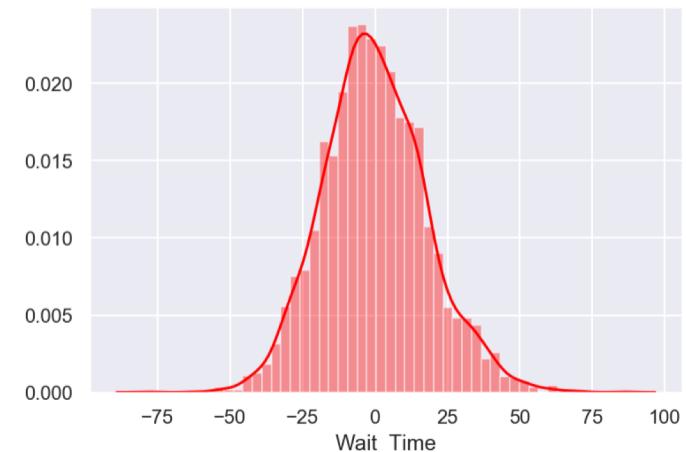
RMSE: 18.8

LINEAR REGRESSION MODEL #3

After adding the ticket season feature and removing temperature and pressure (p-values < 0.05), the R^2 increased to 0.64.



Residuals normally distributed:



R^2 Train: 0.65
 R^2 Test : 0.64

MAE: 14.0
MSE: 319.7
RMSE: 17.9

CONCLUSION

Feature	Lower Wait Times	Higher Wait Times
Month (during this period)	May	June
Day of the Week	Sundays	Wednesdays
Hour	Before 10AM After 8PM	12PM-5PM
Ticket Season	Value	Peak
Weather	Higher temp., more humid, rain	Windy conditions



FUTURE WORK

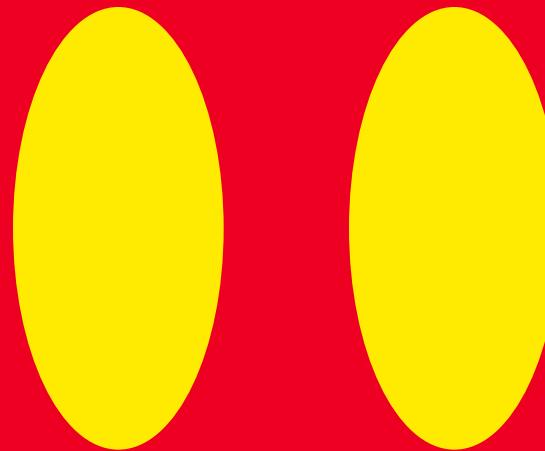
Incorporate times for parades, fireworks, shows

New rides/attractions

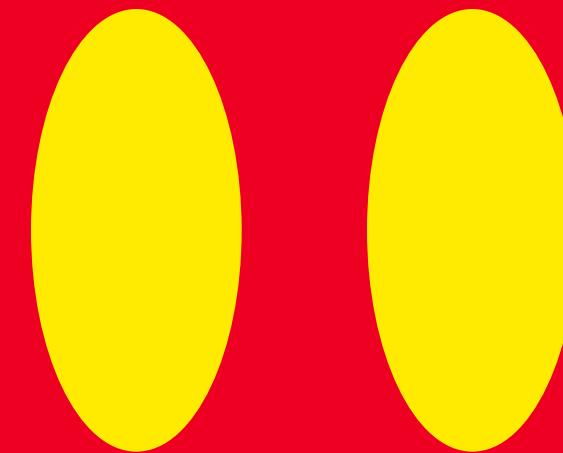
Different rides, parks at WDW, WDW vs Disneyland

Full year and multiple years

THANK YOU! QUESTIONS?



APPENDIX



COEFFICIENTS OF FINAL MODEL

Train R^2 score was: 0.647454256854771

Test R^2 score was: 0.6376955399959451

Feature coefficient results:

Temp_(F) : -0.23

Dew_Point_(F) : 0.75

Humidity_(%) : -0.58

Wind_Speed_(mph) : 0.08

Wind_Gust_(mph) : 0.07

Pressure_(in) : -0.13

Precip_(in) : -5.18

Day_of_the_Week_Friday : -2.06

Day_of_the_Week_Monday : 3.37

Day_of_the_Week_Saturday : -5.03

Day_of_the_Week_Sunday : -10.65

Day_of_the_Week_Thursday : 3.86

Day_of_the_Week_Tuesday : 1.33

Day_of_the_Week_Wednesday : 9.18

Hour_0 : -32.05

Hour_1 : -46.75

Hour_2 : 0.00

Hour_21 : -14.15

Hour_6 : -0.00

Hour_22 : -13.25

Hour_7 : -31.91

Hour_23 : -16.09

Hour_8 : -36.80

Month_5 : -9.93

Hour_9 : -25.02

Month_6 : 10.96

Hour_10 : 0.37

Month_7 : 2.90

Hour_11 : 16.18

Month_8 : -3.93

Hour_12 : 27.23

WDW_TICKET_SEASON_peak : 11.90

Hour_13 : 30.81

WDW_TICKET_SEASON_regular : 5.61

Hour_14 : 26.02

WDW_TICKET_SEASON_value : -17.51

Hour_15 : 19.14

Intercept: 49.81010512363845

Hour_16 : 25.73

MAE: 14.048224136491386

Hour_17 : 22.14

MSE: 319.7272269744922

Hour_18 : 21.27

RMSE: 17.88091795670715

Hour_19 : 17.33

Hour_20 : 9.78