Bike Share Research

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Why Care About Bike Share?

- Bike sharing companies have exploded in popularity and notoriety in recent years.

- Since 2007, over 1,500 new bike share providers have entered the market.

- Expected revenue for 2022 is to reach $7.96bn and $13.34bn by 2027.

The Problem

- Most of these bike share companies use a flat pricing scheme.

- Using regression models, we can predict ridership and change price accordingly.

- Expected revenue growth under new pricing plans will meet or exceed 7.5%.

Data Acquisition and Wrangling

- Dataset was gathered from University of California Irvine Machine Learning Repository.

- Dataset retrieved as CSV file had very few problems and came in a mostly clean state.

- Setting date strings to datetime values and getting rid of redundant features.

Exploratory Data Analysis
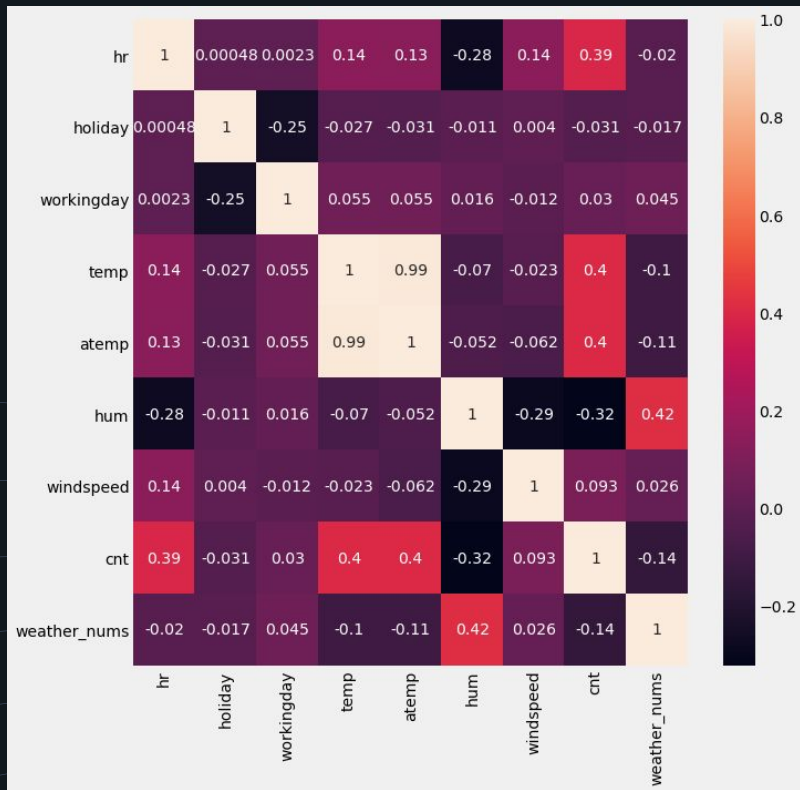
- My EDA journey started when I created the visualization of this correlation matrix.

- Using this, I was able to see which features were highly correlative ridership (cnt).

- I created additional visualizations to get a strong grasp of these relationships.

Additional Visualizations

Initial Modeling

Root Mean Squared Error Scores for Each Model

R Squared Scores for Each Model
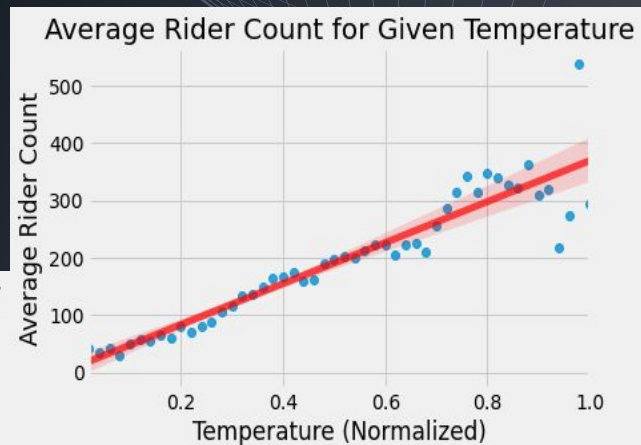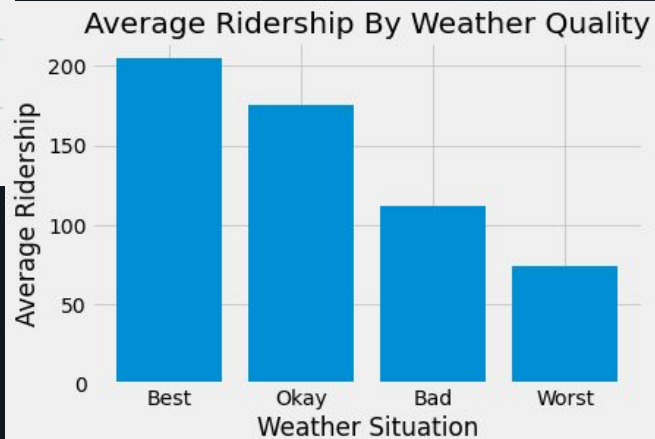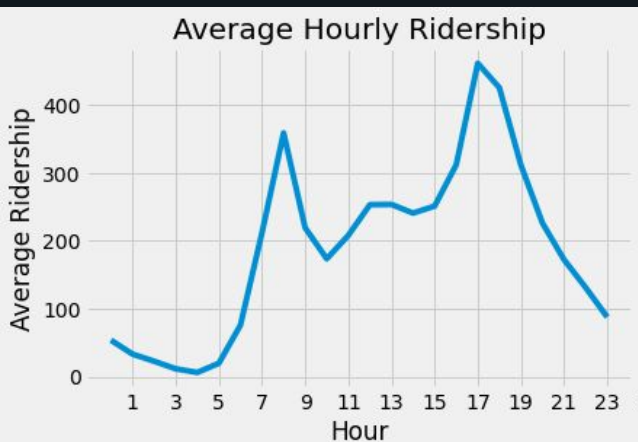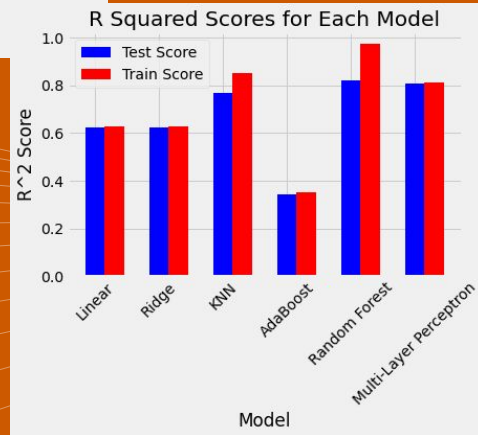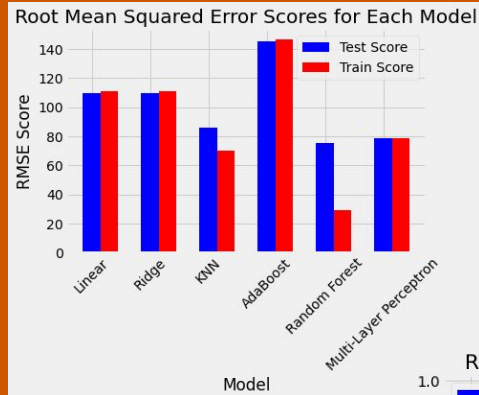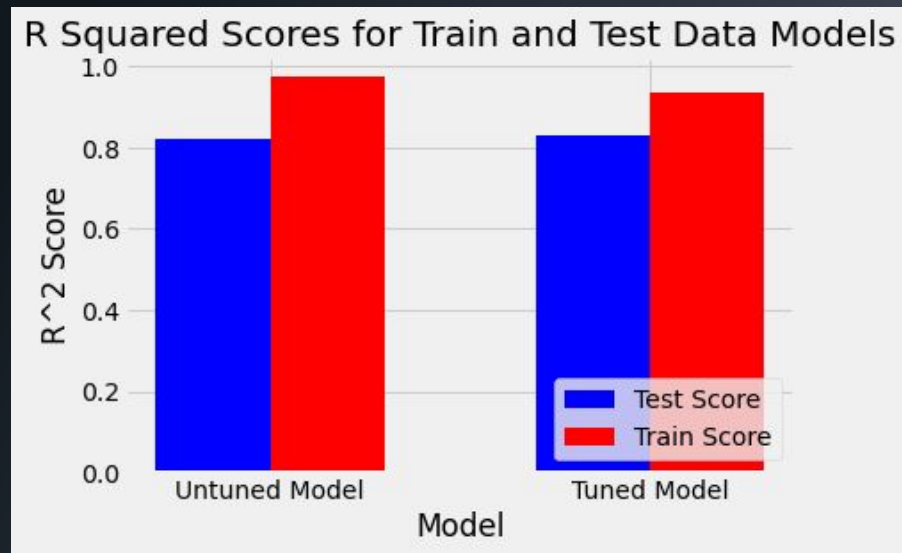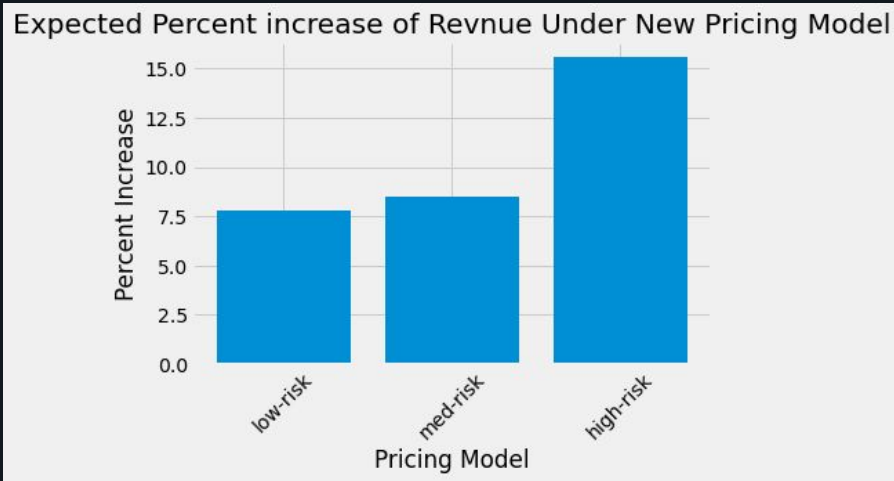
- When modeling started, I initially tried 7 types of regression algorithms.

- The chief metric I chose for comparison was RMSE with R^2 as a secondary metric.

- One of the algorithms failed enough that I made the decision to throw it out.

Further Modeling

- The Random Forest Regressor was chosen as the model to improve.

- For tuning the hyperparameters of the model I used GridSearchCV.
- Under the new tuned model, there was slight improvement to RMSE and R^2.

R Squared Scores for Train and Test Data Models

Pricing Suggestions

Expected Percent increase of Revnue Under New Pricing Model

- Using the prediction of next hour ridership, three pricing models were identified.

- The first and third pricing scheme gives a discount if projected ridership is low.

- All three models apply an increase in price if projected ridership is high.

Future Work

- Additional pricing models can and should be tried, including ones on a scale.

- Trying hyperparameter tuning on some of the other well performing models.

- Collecting data to see how changing the pricing model effects ridership.

Thank You!

Any questions?
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Credits

Special thanks to all the people who made and released these resources for free:

- Presentation template by <u>SlidesCarnival</u>
- Photographs by <u>Unsplash</u>
- Market Information by <u>WRI</u> and <u>Statista</u>
- Dataset by <u>UCI Machine Learning Repository</u>