The purpose of this project was to calculate how much the Big Mountain Adult Weekend lift ticket price should be based on its attributes. Using data from a CSV file of 330 ski resorts around the nation that included attributes of each ski resort, such as location, elevation, number of chair lifts, runs, days open, etc., we built a supervised regression model that predicts ticket prices based off of these various ski resort attributes. Ultimately, the results from this data will be used to create a power-point presentation with recommendations on adult weekend lift ticket pricing.

Originally, the data contained 330 different ski resorts and 27 attributes. 4 rows (1.2%) of data were dropped as they contained outliers. Null values for fastEights, NightSkiing_ac, TerrainParks, and Snow Making_ac were interpreted as 0 values, and null values in every other column were imputed with the mean of the column. 5 attributes were dropped, including non-numeric columns such as Name, Region, and State. Base_elev and summit_elev were also dropped because this data is contained within the vertical_drop column. One column was added using KNN to group the resorts into three different clusters. After cleaning the data, there were 22 features and 326 rows.

The features were scaled using z-score standardization and then split into a training set and a testing set. 75% of the data was used to train the linear regression model while 25% of the data was set aside for model evaluation. Other iterations of the linear regression model were also trained with the addition of the 'state' column converted into dummy variables, as well as the summit_elev column, but these columns were ultimately dropped for the final model.

The model was able to reliably predict the adult weekend ticket price with an explained variance score of .91 and a mean absolute error of 5.00. The AdultWeekday feature by far had
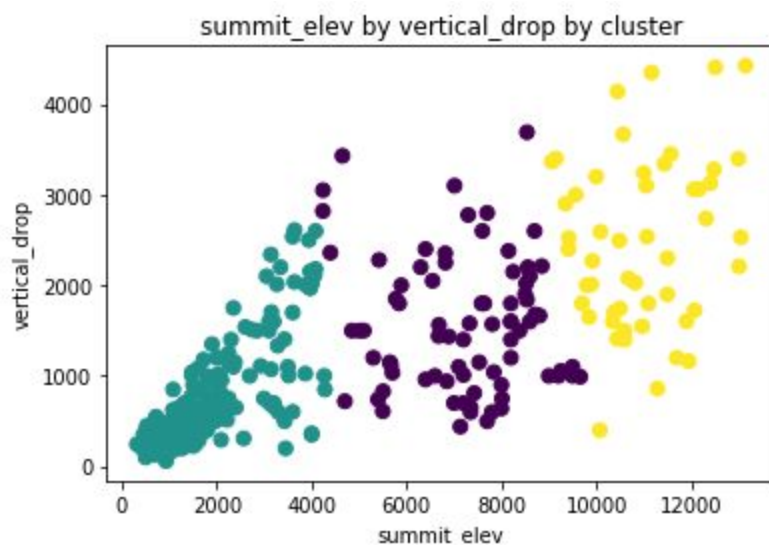
the most importance, along with SkiableTerrain_ac, NightSkiing_ac, daysOpenLastYear, and averageSnowfall. In addition, the clusters calculated through KNN revealed that the resorts are separable into three different clusters based on elevation. This can be interpreted as low elevation resorts with summit_evel from 300 - 4,500 ft, mid elevation resorts from 4,500 - 9,000 ft, and high elevation resorts from 9,000 - 13,500, as shown in the figure to the left.
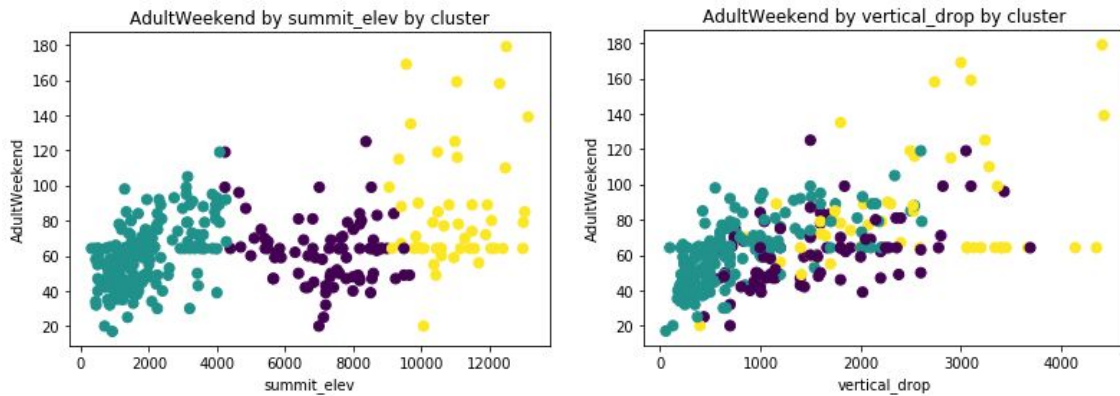
Summit elevation and vertical drop are slightly positively correlated with the adult weekend ticket prices, as shown by the upward trend in the figures above. With a summit elevation of 6,817 ft and a vertical drop of 2,353 ft, Big Mountain falls into the mid elevation category with ticket prices between $20 and $120.

According to the model, Big Mountain has a predicted lift ticket price of $90, which is $9 higher than the current rate. With the $90 lift ticket recommendation price, Big Mountain would need to sell 171,111 adult weekend lift tickets in order to hit the target of a $1.54 million revenue increase.