Battling Bots

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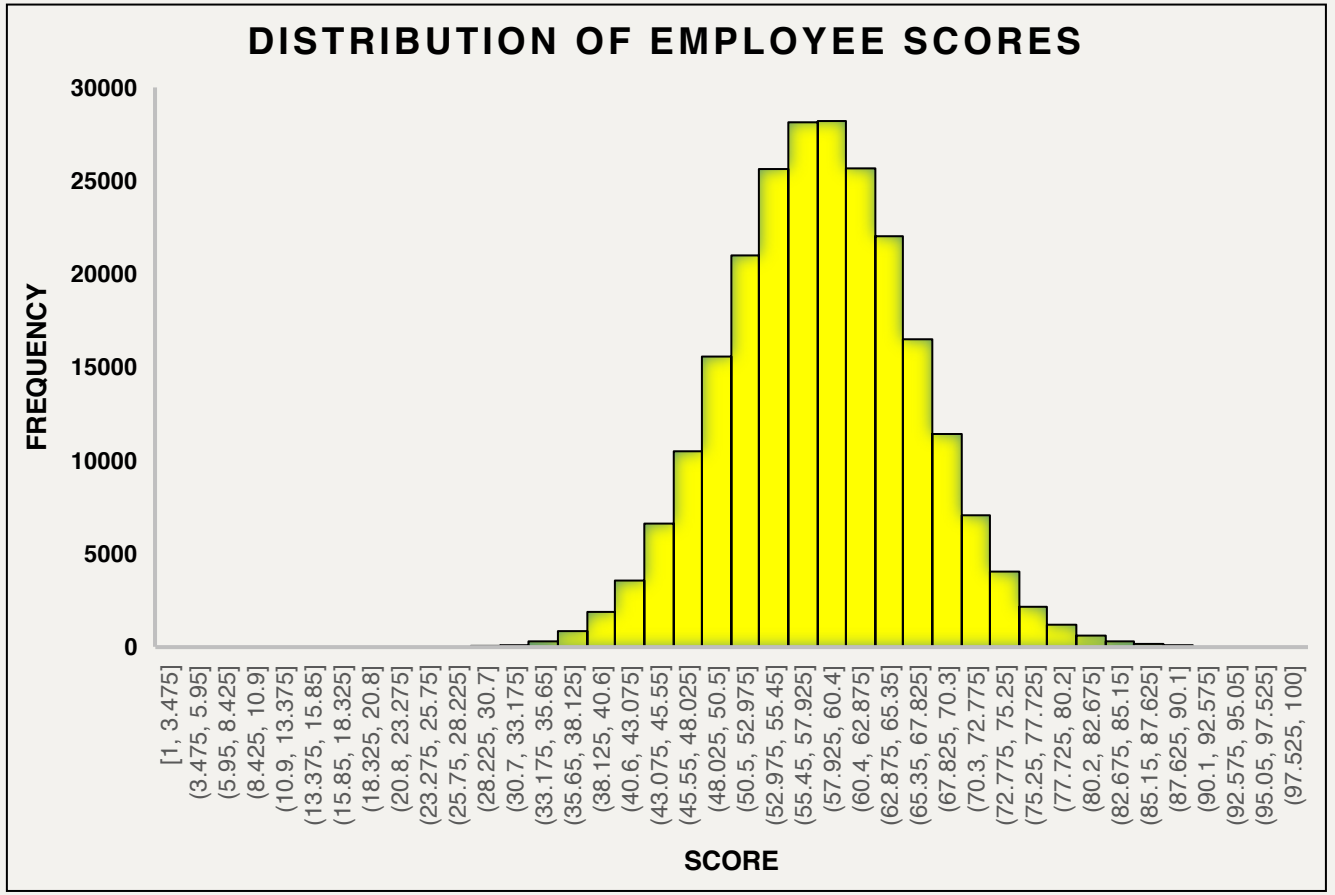
Understanding the Data:

Methodology:

- Is the data normally distributed?
- How many values are missing?
- Is it appropriate to impute the data before training/creating the model?



The Shapiro-Wilk test for normality failed to reject the null hypothesis that the data is normal with a p-value =2.5959; the data is normally distributed.

Data Manipulation

- Dropping observations with missing data:

233,936 observations -> 65,616 observations

- Evaluating the distribution of the new dataset (subset):

The Shapiro-Wilk test yielded identical results to the original dataset

- Converting variables to float and integer variables.

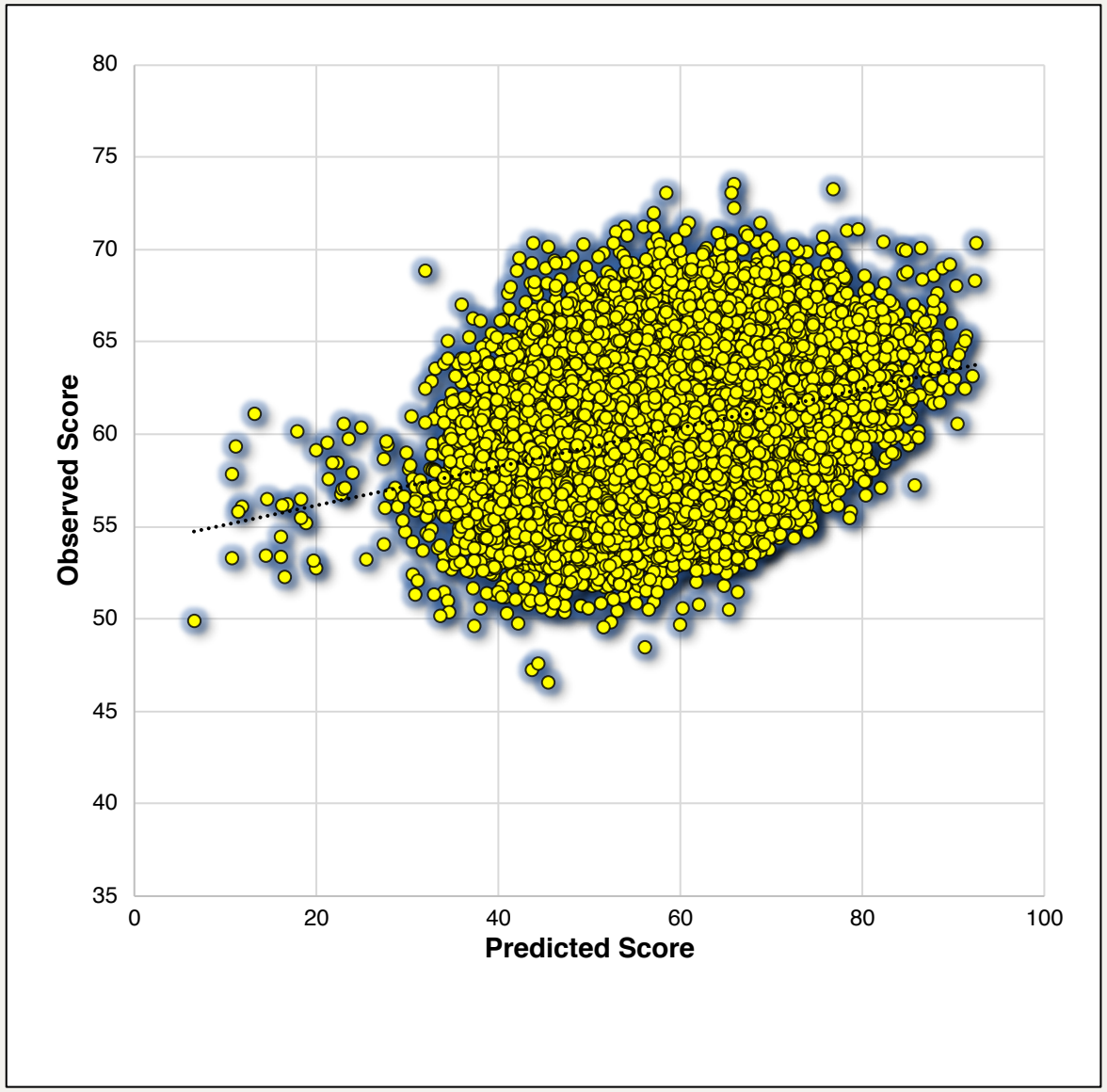
Building the Model:

- The regression model was produced from cross-validation.

- The employee scores were compared to scores predicted from the regression equation.

Score = 210.88 + 0.08(age) –4.2825(problem solving skill) – 0.2768(technology skill) – 0.0014(recent income) + 0.1231(english skill) + 0.0014(total jobs)

- The mean squared error between the employee scores and employee predicted scores was 3.897.



Model Deployment

- The candidate scores were calculated using the regression equation.

- The distribution of candidate scores mirrored the distribution of employee scores:

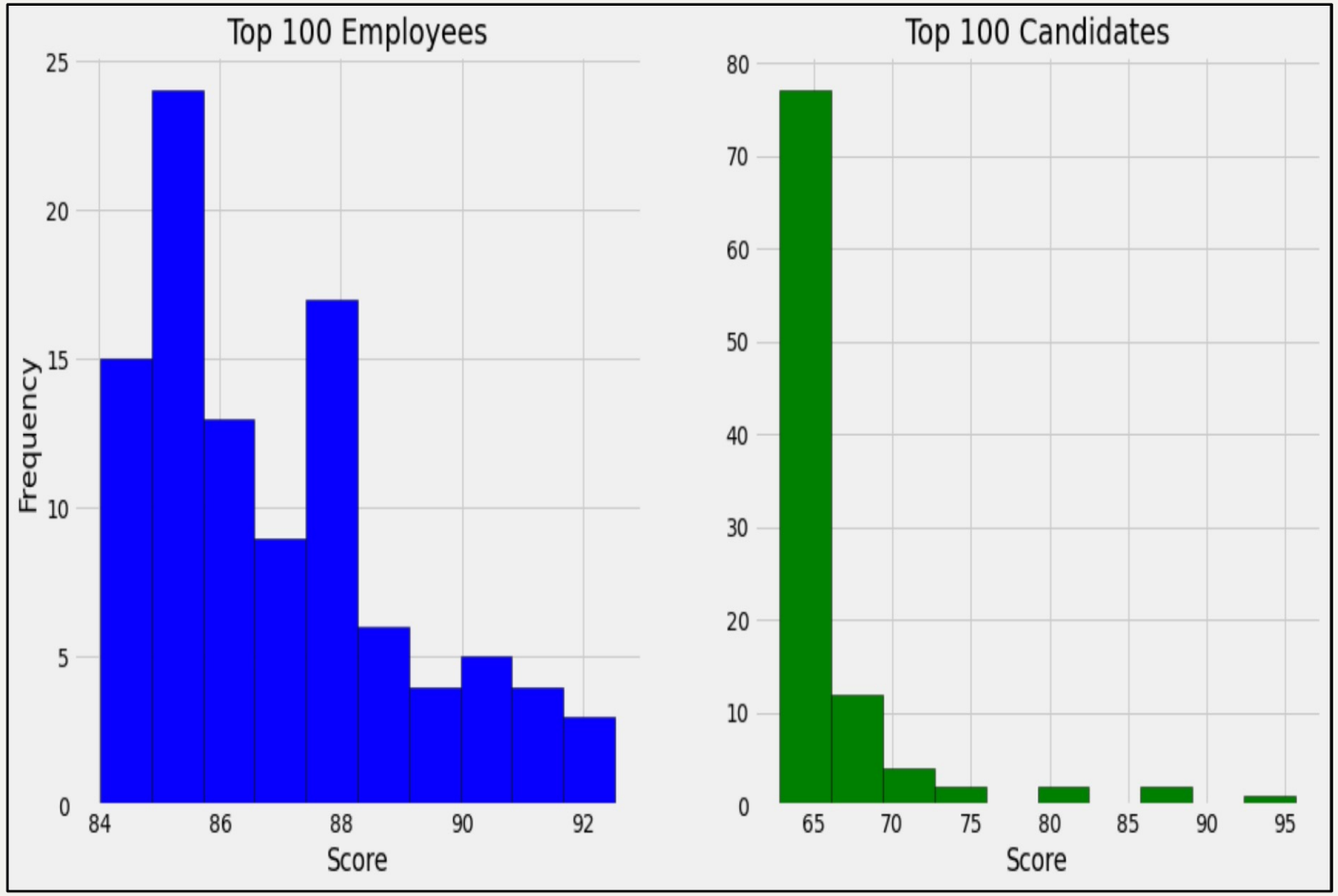
  + similar averages

  + similar q1, q2, and q3

  + similar maximums

	EMPLOYEE SCORES	*CANDIDATE SCORES*
mean	58.2124	60.6036
std	8.1611	4.9316
min	25.5786	6.5300
25%	58.3162	52.7500
50%	60.5602	58.1400
75%	62.4661	63.6600
max	95.6380	92.5400

Screening the Candidates:



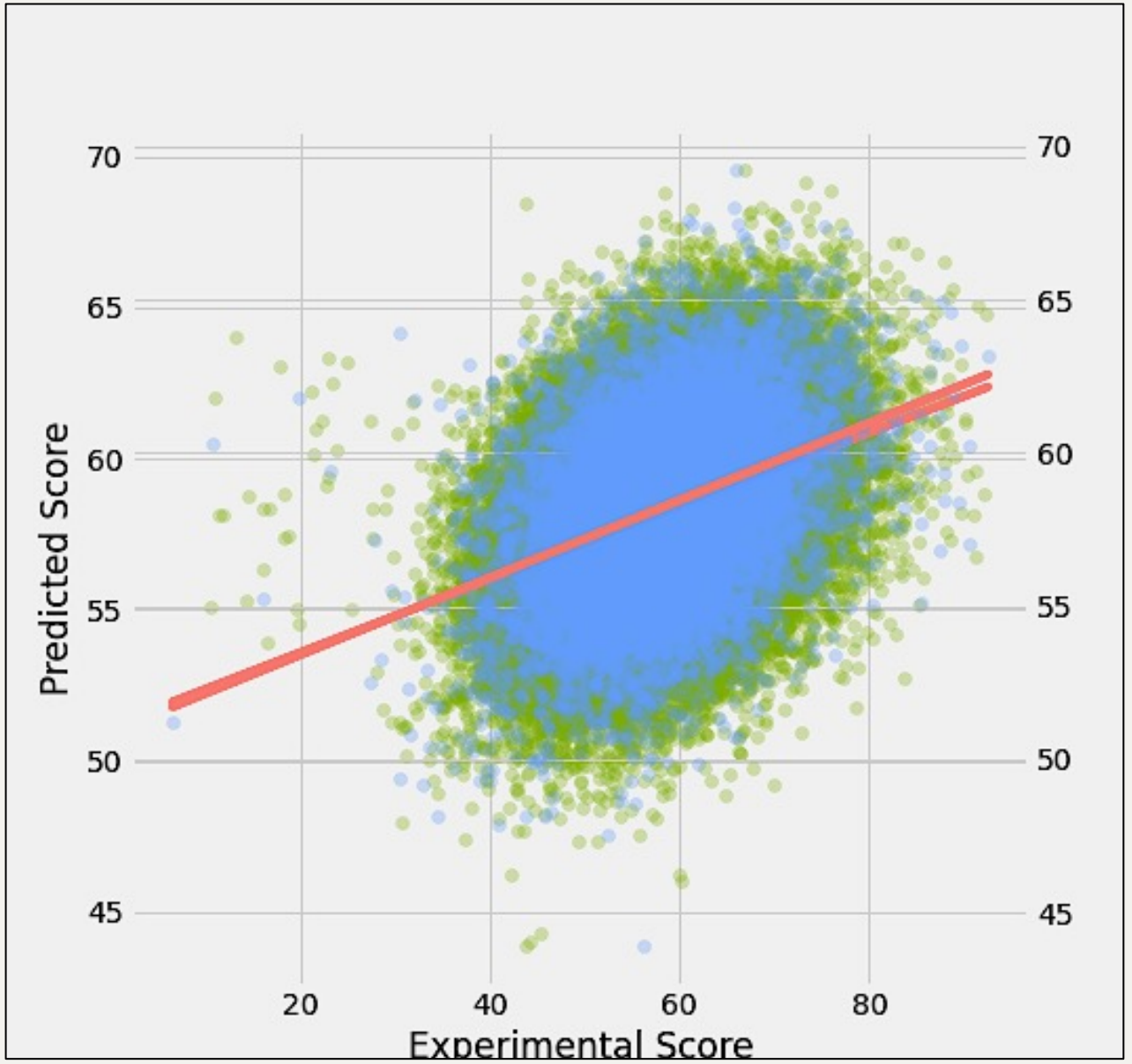
	EMPLOYEE SCORES	CANDIDATE SCORES
mean	86.9423	66.2126
std	2.136	5.3377
min	84.0100	62.8283
25%	85.1675	63.6040
50%	86.4200	64.7732
75%	88.1925	65.8644
max	92.5400	95.6380

- The top 100 candidates were chosen according to calculated scores.
- The top 100 candidates were compared to the top 100 employees.
- Predicted data follows trend of observed data (positive skewness).

Model Evaluation

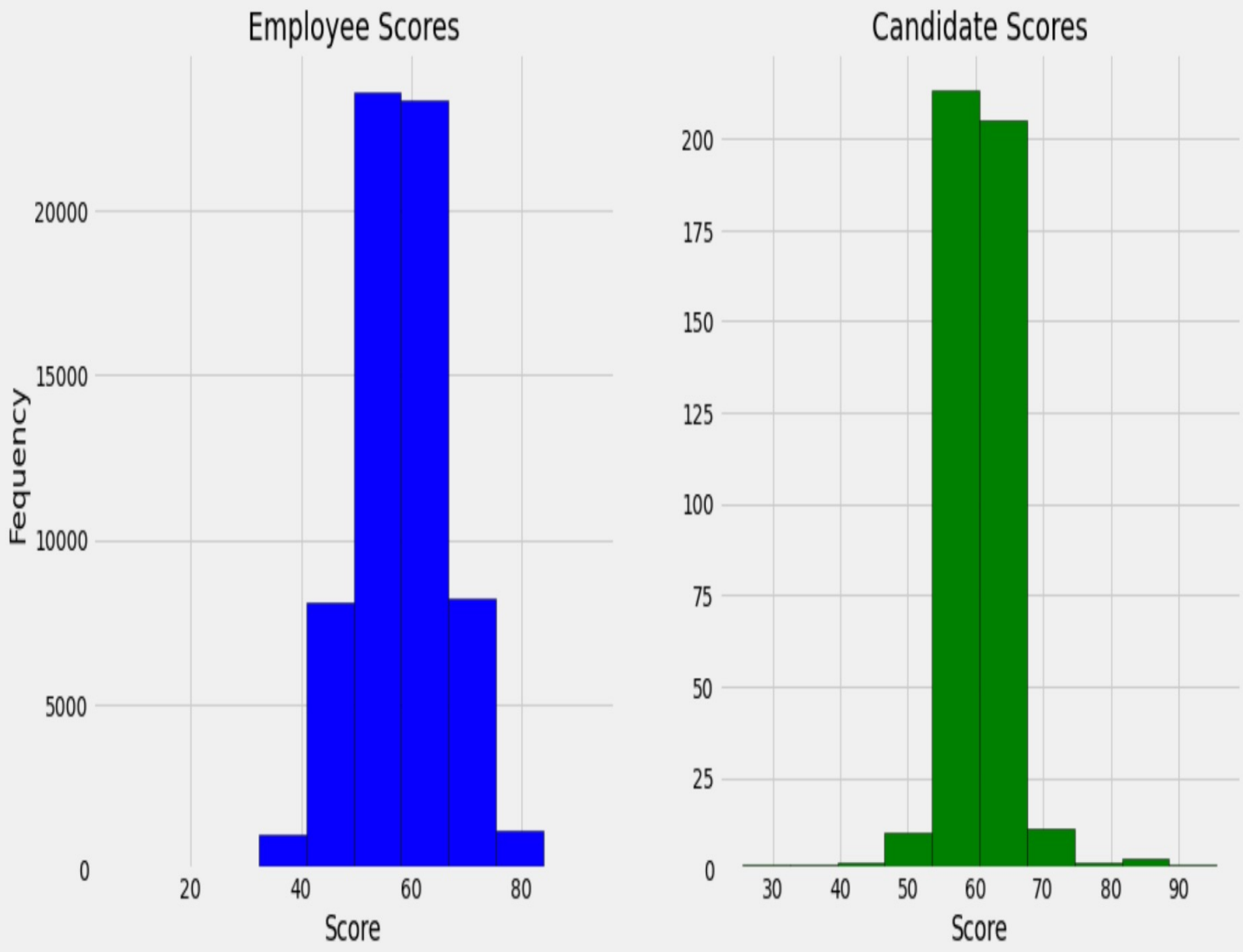
- The original employee scores were compared to scores predicted from the regression model.
- The test set is closer to the trendline and has less outliers.

- test set
- train set



Validating the Data:

- The data was cross-validated (via sklearn in Python).
- Candidate scores almost mirror the distribution of employee scores.



Further Analysis

- Training the model by purposefully feeding it raw and randomized data.
- Imputing data for the outliers in the original “employees” dataset to train the model to account for more outliers.
- Evaluating the linear regression equation against a quadratic regression equation.
- Averaging more regression models to improve accuracy.