Glossary terms from week 3

Terms and definitions from Course 5, Week 3

Adjusted R^2: A variation of R^2 that accounts for having multiple independent variables present in a linear regression model

Backward elimination: A stepwise variable selection process that begins with the full model, with all possible independent variables, and removes the independent variable that adds the least explanatory power to the model

Bias: Refers to simplifying the model predictions by making assumptions about the variable relationships

Bias-variance trade-off: Balance between two model qualities, bias and variance, to minimize overall error for unobserved data

Errors: The natural noise assumed to be in a regression model

Extra Sum of Squares F-test: Quantifies the difference between the amount of variance that is left unexplained by a reduced model that is explained by the full model

Feature selection: (Refer to **variable selection**)

Forward selection: A stepwise variable selection process that begins with the null mode—with 0 independent variables—which considers all possible variables to add; it incorporates the independent variable that contributes the most explanatory power to the model

Homoscedasticity assumption: An assumption of simple linear regression stating that the variation of the residuals (errors) is constant or similar across the model

Independent observation assumption: An assumption of simple linear regression stating that each observation in the dataset is independent

Interaction term: Represents how the relationship between two independent variables is associated with changes in the mean of the dependent variable

Linearity assumption: An assumption of simple linear regression stating that each predictor variable (X_i) is linearly related to the outcome variable (Y)

Multiple linear regression: A technique that estimates the relationship between one continuous dependent variable and two or more independent variables

Multiple regression: (Refer to **multiple linear regression**)

No multicollinearity assumption: An assumption of simple linear regression stating that no two independent variables (X_i and X_j) can be highly correlated with each other

Normality assumption: An assumption of simple linear regression stating that the residuals are normally distributed

One hot encoding: A data transformation technique that turns one categorical variable into several binary variables

Overfitting: When a model fits the observed or training data too specifically and is unable to generate suitable estimates for the general population

R^2 (The Coefficient of Determination): The proportion of variance of the dependent variable, Y, explained by the independent variable or variables, X

Regularization: A set of regression techniques that shrinks regression coefficient estimates towards zero, adding in bias, to reduce variance

Variable selection: The process of determining which variables or features to include in a given model

Variance: Refers to model flexibility and complexity, so the model learns from existing data

Variance inflation factors (VIF): Quantifies how correlated each independent variable is with all of the other independent variables

Terms and definitions from previous weeks

A

Absolute values: (Refer to **observed values**)

Adjusted R^2: A variation of R^2 that accounts for having multiple independent variables present in a linear regression model

B

Best fit line: The line that fits the data best by minimizing some loss function or error

C

Causation: Describes a cause-and-effect relationship where one variable directly causes the other to change in a particular way

Confidence band: The area surrounding a line that describes the uncertainty around the predicted outcome at every value of X

Confidence interval: A range of values that describes the uncertainty surrounding an estimate

Correlation: Measures the way two variables tend to change together

D

Dependent variable (Y): The variable a given model estimates

E

Errors: In a regression model, the natural noise assumed to be in a model

Explanatory variable: (Refer to **independent variable**)

H

Hold-out sample: A random sample of observed data that is not used to fit the model

Homoscedasticity assumption: The fourth assumption of simple linear regression, where the variation of the residuals (errors) is constant or similar across the model

I

Independent observation assumption: The third assumption of simple linear regression, where each observation in the dataset is independent

Independent variable (X): A variable that explains trends in the dependent variable

Intercept (constant B_0): The y value of the point on the regression line where it intersects with the y-axis

L

Line: A collection of an infinite number of points extending in two opposite directions

Linearity assumption: The first assumption of simple linear regression, where each predictor variable (X_i) is linearly related to the outcome variable (Y)

Linear regression: A technique that estimates the linear relationship between a continuous dependent variable and one or more independent variables

Link function: A nonlinear function that connects or links the dependent variable to the independent variables mathematically

Logistic regression: A technique that models a categorical dependent variable based on one or more independent variables

Loss function: A function that measures the distance between the observed values and the model's estimated values

M

MAE (Mean Absolute Error): The average of the absolute difference between the predicted and actual values

Model assumptions: Statements about the data that must be true in order to justify the use of a particular modeling technique

MSE (Mean Squared Error): The average of the squared difference between the predicted and actual values

N

Negative correlation: An inverse relationship between two variables, where when one variable increases, the other variable tends to decrease, and vice versa

Normality assumption: The second assumption of simple linear regression, where the residual values or errors are normally distributed

O

Observed values: The existing sample of data, where each data point in the sample is represented by an observed value of the dependent variable and an observed value of the independent variable

Ordinary least squares (OLS): A method that minimizes the sum of squared residuals to estimate parameters in a linear regression model

Outcome variable (Y): (Refer to **dependent variable**)

P

P-value: The probability of observing results as extreme as those observed when the null hypothesis is true

Positive correlation: A relationship between two variables that tend to increase or decrease together.

Predicted values: The estimated Y values for each X calculated by a model

Predictor variable: (Refer to **independent variable**)

R

R^2 (The Coefficient of Determination): Measures the proportion of variation in the dependent variable, Y, explained by the independent variable(s), X

Residual: The difference between observed or actual values and the predicted values of the regression line

Regression analysis: A group of statistical techniques that use existing data to estimate the relationships between a single dependent variable and one or more independent variables

Regression coefficient: The estimated betas in a regression model

Regression models: (Refer to **regression analysis**)

Response variable: (Refer to **dependent variable)**

S

Scatterplot matrix: A series of scatterplots that demonstrate the relationships between pairs of variables

Simple linear regression: A technique that estimates the linear relationship between one independent variable, X, and one continuous dependent variable, Y

Slope: The amount that y increases or decreases per one-unit increase of x

Sum of squared residuals (SSR): The sum of the squared difference between each observed value and its associated predicted value

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