

Polynomial Regression

Polynomial regression is a type of regression analysis in which the relationship between the independent variable (x) and dependent variable (y) is modeled as an n th degree polynomial. In simpler terms, it is a method of curve fitting that finds the best-fitting polynomial curve to a given set of data points.

Polynomial regression is useful when the relationship between the independent and dependent variables is not linear but can be approximated by a polynomial curve. For example, if we want to predict the price of a house based on its size, a linear regression model may not be the best fit as the relationship between the two variables may not be linear. However, by using polynomial regression, we can find a curve that more accurately models the relationship between house size and price.

The algorithm for polynomial regression involves the following steps:

Collect data: Gather a set of data points with a dependent variable (y) and one or more independent variables (x).

Choose degree of polynomial: Decide on the degree of polynomial that will best fit the data. This involves experimenting with different degrees and comparing the accuracy of the resulting curves.

Fit the polynomial: Use regression analysis to find the coefficients of the polynomial that best fit the data. This is usually done by minimizing the sum of squared errors between the predicted and actual values.

Evaluate the model: Once the polynomial has been fit to the data, evaluate its accuracy by testing it on a new set of data points. This can be done by calculating the root mean squared error (RMSE) or the coefficient of determination (R-squared).

A real-life example of polynomial regression is in the field of finance, where it can be used to model stock prices over time. In this case, the independent variable (x) would be

time, and the dependent variable (y) would be the price of the stock. By using polynomial regression, we can find a curve that accurately models the fluctuations in the stock price over time, which can be useful for predicting future trends and making investment decisions.

In conclusion, polynomial regression is a useful tool for modeling non-linear relationships between variables. By finding the best-fitting polynomial curve to a given set of data points, we can gain insights and make predictions in a variety of fields, including finance, engineering, and social sciences.