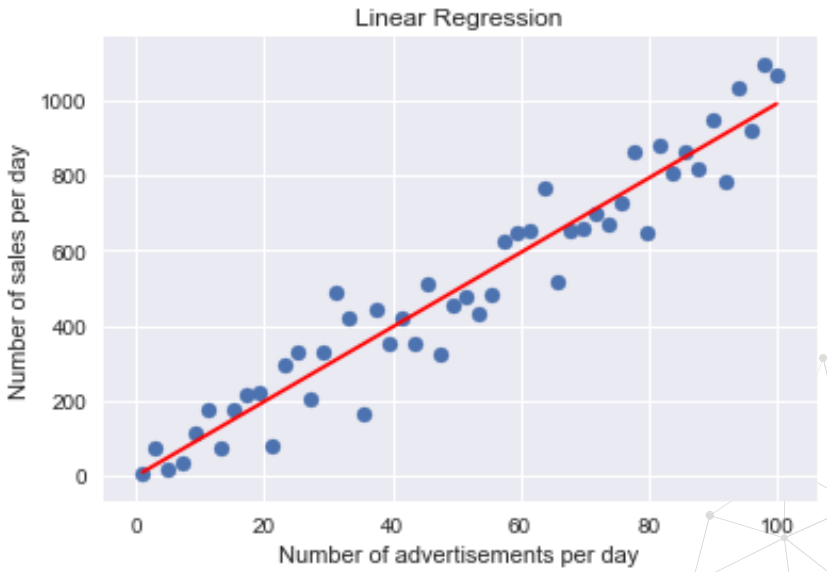
Train In Data

Feature Magnitude

Linear Models

$Y \approx \beta 0 + \beta 1X1 + \beta 2X2 + \ldots + \beta nXn$

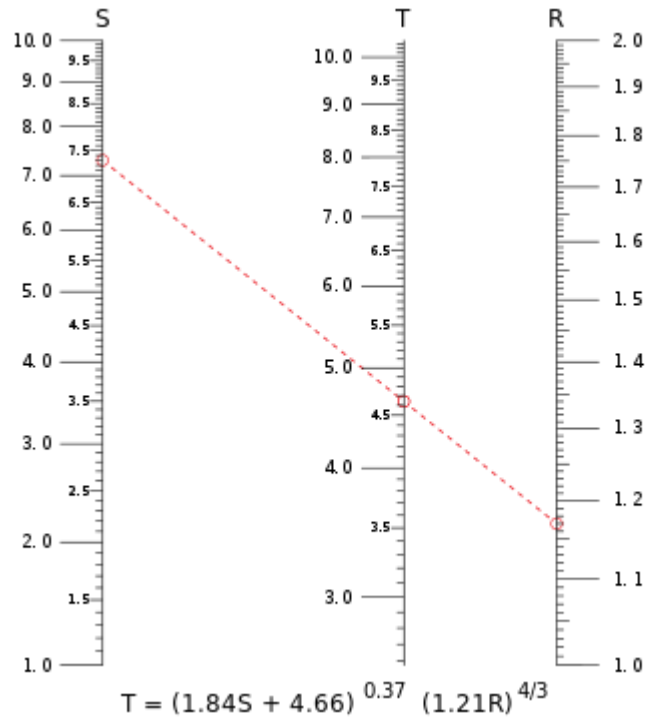
- β indicates the change in Y per unit change of X
- If X changes scale, β will change its value
- Regression coefficients depend of the magnitude of the variable
- Features with bigger magnitudes dominate over features with smaller magnitudes



Feature Magnitude matters

- The regression coefficient is directly influenced by the scale of the variable
- Variables with bigger magnitude / value range dominate over the ones with smaller magnitude / value range
- Gradient descent converges faster when features are on similar scales
- Feature scaling helps decrease the time to find support vectors for SVMs
- Euclidean distances are sensitive to feature magnitude.

Algorithms sensitive to magnitude



The machine learning models affected by the magnitude of the feature:

- Linear and Logistic Regression
- Neural Networks
- Support Vector Machines
- KNN
- K-means clustering
- Linear Discriminant Analysis (LDA)
- Principal Component Analysis (PCA)

Machine learning models insensitive to feature magnitude are the ones based on Trees:

- Classification and Regression Trees
- Random Forests
- Gradient Boosted Trees

Accompanying Jupyter Notebook

- Read the accompanying Jupyter Notebook
- Demo on the effect of feature magnitude on different machine learning algorithms

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THANK YOU

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