



Predicting Solar Spectra

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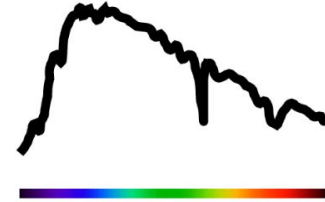
Predicting Solar Spectra



Weather



Machine Learning



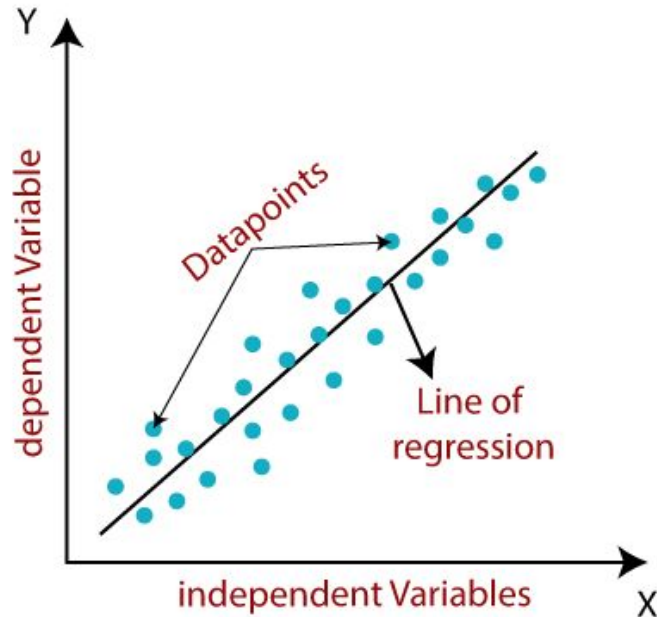
Predicted

- Neural Networks
- Logistic Regression
- Support Vector Machines

Technology: Libraries and Frameworks



Models: Regression



$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$$

Diagram illustrating the components of the linear regression equation:

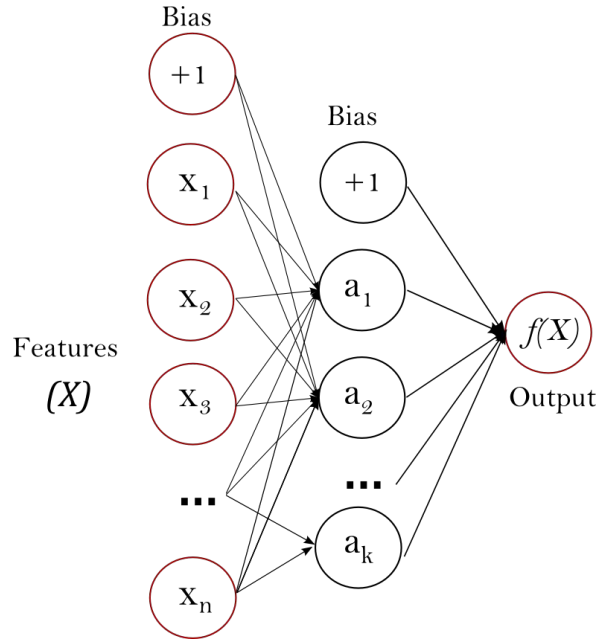
- Y_i : Dependent Variable
- β_0 : Y intercept
- β_1 : Slope Coefficient
- X_i : Independent Variable
- ε_i : Random Error term

The equation is structured as follows:

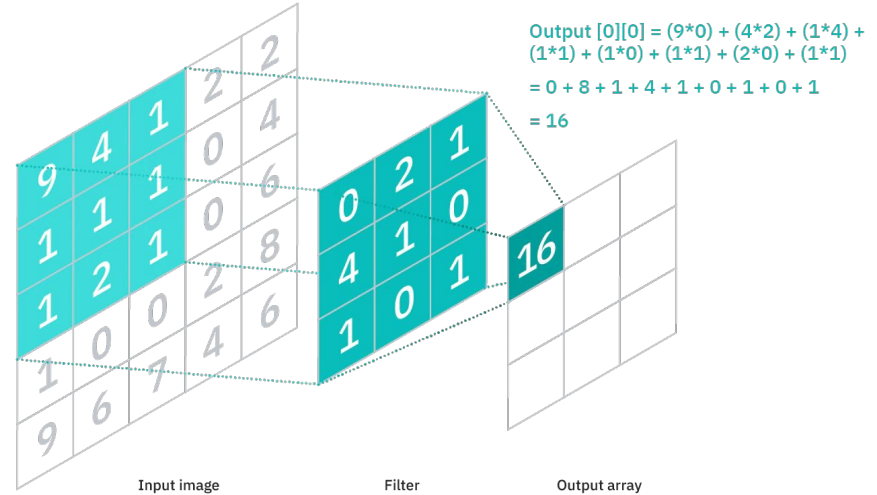
- The term $\beta_0 + \beta_1 X_i$ is grouped by a blue bracket and labeled "Linear component".
- The term ε_i is grouped by a blue bracket and labeled "Random Error component".

Models: Neural Networks

Multilayer Perceptron



Convolutional Neural Network



Comparison of Model Approaches

Model	Appeal	Drawbacks
Linear Regression	<ul style="list-style-type: none">• Least computationally intensive	<ul style="list-style-type: none">• Only able to return scalar estimates (CCT)
Non-Deep Neural Network (MLP)	<ul style="list-style-type: none">• Returns vector (spectra) output	<ul style="list-style-type: none">• Large jump in computational demand (compared to Linear Regression)
Convolutional Neural Network (CNN)	<ul style="list-style-type: none">• Generally expect better estimators• Returns vector output	<ul style="list-style-type: none">• Most computationally intensive

Computational Complexity

