Deep Learning – Case Study

Title: fuel performance predictor

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Abstract

In a regression problem, we aim to predict the output of a continuous value, like a price or a probability. Contrast this with a classification problem, where we aim to select a class from a list of classes (for example, where a picture contains an apple or an orange, recognizing which fruit is in the picture). This notebook uses the classic Auto MPG Dataset and builds a model to predict the fuel efficiency of late-1970s and early 1980s automobiles. To do this, we'll provide the model with a description of many automobiles from that time period. This description includes attributes like: cylinders, displacement, horsepower, and weight.

Notebook Used

Google Colab - Colaboratory, or "Colab" for short, is a product from Google Research. Colab allows anybody to write and execute arbitrary python code through the browser, and is especially well suited to machine learning, data analysis and education.

Tools and Libraries

Tools and Libraries	Usage
Keras	This library is used for building the network architecture. It allows us to use several layers, callbacks, and InceptionResNetV2 model.
seaborn	is an open-source Python library built on top of matplotlib. It is used for data visualization and exploratory data analysis. Seaborn works easily with dataframes and the Pandas library.

	The graphs created can also be customized easily
Numpy	We are using it for the Image matrix handling
tensorflow	TensorFlow is a free and open-source software library for machine learning and artificial intelligence. It can be used across a range of tasks but has a particular focus on training and inference of deep neural networks

Model Explanation and Architecture:-

BP neural networks, support vector regression (SVR), and random forests are several common prediction methods with high accuracy and operation efficiency. This study built three types of prediction models, compared the difference in the prediction results, and finally we chose the best model for fuel consumption prediction.
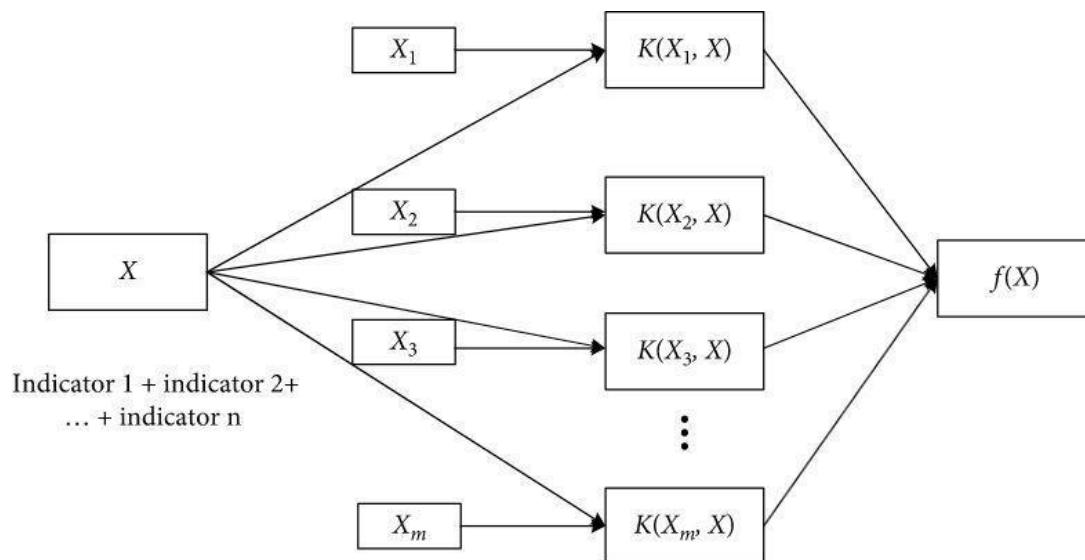
Workflow:-

Step 1: Import Requires Libraries

Step 2: Get the data

Step 3: Split the data into train and test

Step 4: Split features from labels Tarin and test
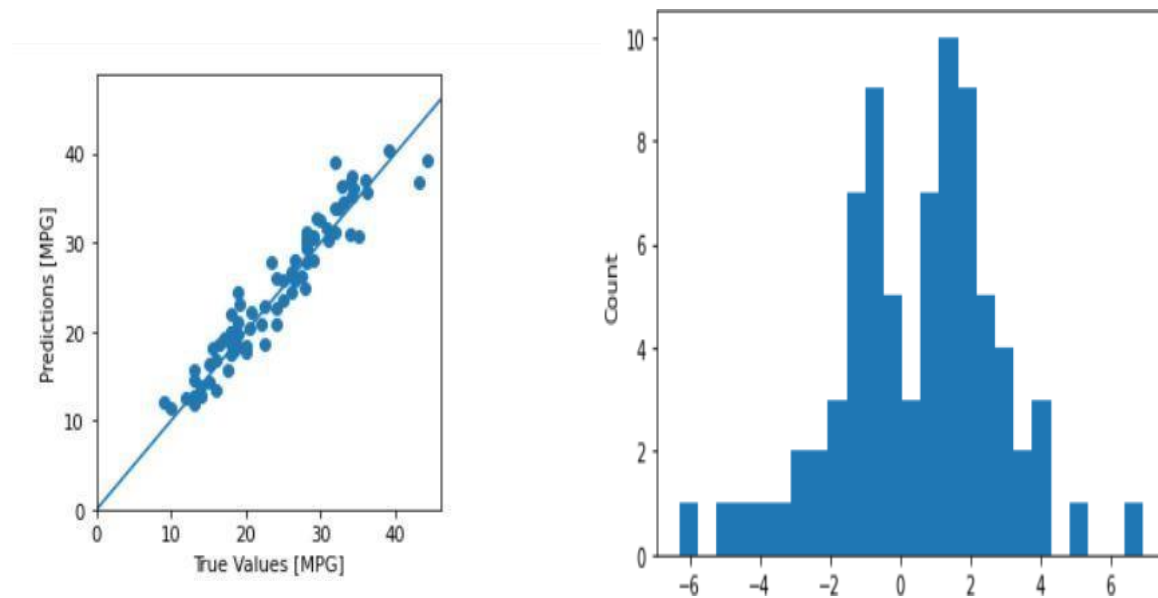
Step 5: Normalize the data

Step 6: Build the model

Step 7: Inspect the model

Step 8: Train the model for 1000 epochs

Step 9: Result Prediction

Output:-

Conclusion:-

- **Mean Squared Error (MSE) is a common loss function used for regression problems (different loss functions are used for classification problems).**
- **Similarly, evaluation metrics used for regression differ from classification. A common regression metric is Mean Absolute Error (MAE).**
- **When numeric input data features have values with different ranges, each feature should be scaled independently to the same range.**

Dataset :- http://archive.ics.uci.edu/ml/machine-learning-databases/auto-mpg/auto-mpg.data