0 - Introduction to Deep Learning

Reminder: Buka course outline di acad juga

Introduction

Dataset
Group of data that will be used by our AI Model to learn

Dataset is divided into 3

1. Training set (approx. 60%)
   Used to train data into our model
2. Validation set
   Used to validate the training result, to try validate the model that was trained
3. Testing set
   Used by our model to predict

Metric Evaluation

Accuracy
Accuracy is used in classification tasks, it measures how often the model correctly predict the label.

Loss
Loss is the difference of the model prediction and the true label, can be used for many task, such as regression tasks, etc. Good and balanced model will have the loss decrease over iterations.

Epoch vs. Batch vs. Step

- Epoch:
  Iteration of the data trained to the model
  One complete pass through the entire dataset
- Batch:
  Subset of training data used in one iteration, improves computational efficiency by procesing data in smaller chunks.

- Step:
  One iteration where the parameter models are updated based on the gradient calculated from the batch. (Represents one update to the model's weight)

What is preprocessing?

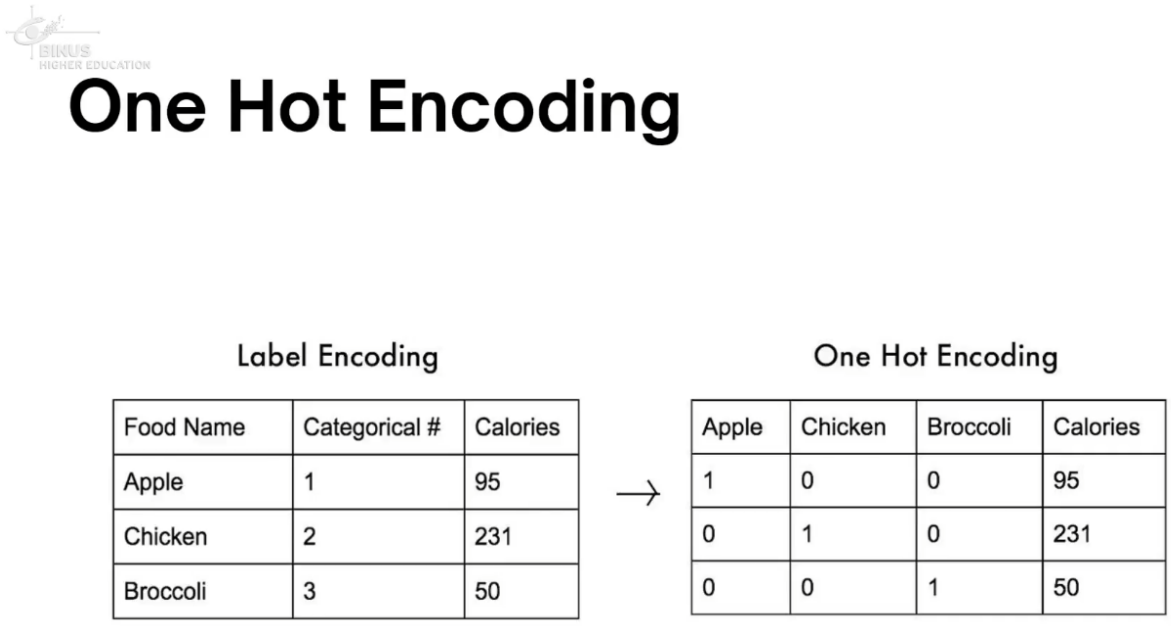
Process data before fed into the model

Example:

- We want to delete unwanted/noise data by preprocessing: Data Cleaning
- We want to encode class in a classification task: Data Encoding

Data Encoding:

- Label Encoding: using category number from 1 to n
- One Hot Encoding: creating new class for each category



Food Name	Categorical #	Calories
Apple	1	95
Chicken	2	231
Broccoli	3	50

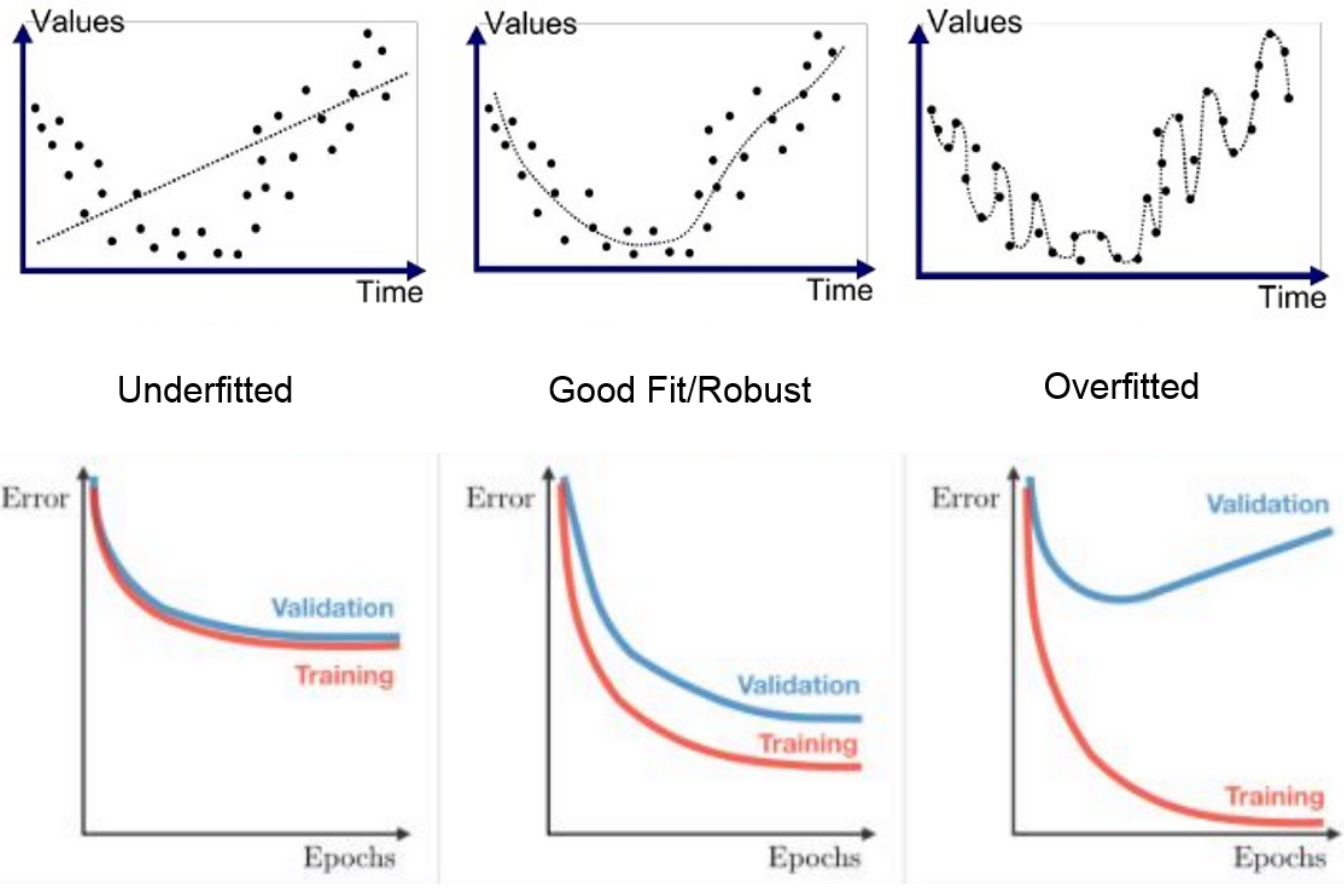
→

Apple	Chicken	Broccoli	Calories
1	0	0	95
0	1	0	231
0	0	1	50

Model Performance Classification

How good our model is:

- Underfit
  The model is not properly trained enough yet, it doesn't recognize the pattern enough. The model is too simple to recognize any meaningful patterns.
- Overfit
  The model is trained very hard that it is accurate to only by the training data, it doesn't recognize the generalization of data.
- Balanced Model
  What we sthrive for



How to combat Underfitting & Overfitting

- **Data preprocessing**
- **Adapting Appropriate Model, Layers, Activation Function, etc.**
- **Hyperparameter Tuning**
- **Regularization Techniques** (Specific to Overfitting)

- **Early Stopping**