Neural Networks I

In Class Activity I

Building a Simple Feedforward Neural Network

Southern
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Goal: Implement a **basic FFNN** and observe how changing activation functions affects output.

Dataset: **Titanic Survival Dataset** (small, pre-processed for binary classification)

Activity Steps:
1. Load the Titanic dataset (**features: age, fare, class, gender**)
2. Implement a **2-layer FFNN** in **TensorFlow/Keras**.
3. Experiment with different activation functions (**ReLU, Sigmoid, Tanh**).
4. Visualize how the **activation function changes the decision boundary**.
5. Discuss results: **Which activation function performs better? Why?**

Deliverable: Jupyter Notebook with a **basic FFNN model and activation function comparison.**

Hints:

- **Packages to be imported:**

```python
import numpy as np
import pandas as pd
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
import matplotlib.pyplot as plt
```

- **Titanic dataset (preprocessed for binary classification)**
  https://raw.githubusercontent.com/datasciencedojo/datasets/master/titanic.csv

Hints:

- **Identify features and target from dataset**
- **Split data & Normalize features**
- **Define FFNN model** (you may use a *for* loop for testing different activation functions)
- **Plot accuracy comparison**