Deep Learning Demo

Objective:

Build a simple neural network that predicts whether a student will pass or fail.

Features:

- Study hours

- Attendance

Target:

- 0 = Fail

- 1 = Pass

Proc1: Install Required Library

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pip install tensorflow

Proc2 : Python Code

```
import numpy as np

import tensorflow as tf

from tensorflow import keras

from tensorflow.keras import layers
```

```
# Proc3 : Create dataset
# Features: [study_hours, attendance]
X = np.array([
    [1, 50],
    [2, 60],
    [3, 65],
    [4, 70],
    [5, 75],
    [6, 80],
    [7, 85],
    [8, 90]
])

# Target: 0 = Fail, 1 = Pass
y = np.array([0, 0, 0, 1, 1, 1, 1, 1])
```

```
# Proc4 : Build neural network
model = keras.Sequential([
    layers.Dense(4, activation='relu', input_shape=(2,)),  # hidden layer
    layers.Dense(1, activation='sigmoid')                  # output layer
])

# Proc4 :  Compile model
model.compile(
    optimizer='adam',
    loss='binary_crossentropy',
    metrics=['accuracy']
)

# Proc5 : Train model
model.fit(X, y, epochs=100, verbose=0)

print("Model training complete.")
```

```
# Proc6: Test prediction
new_student = np.array([[4, 72]])
prediction = model.predict(new_student)

if prediction[0][0] > 0.5:
    print("Prediction: Student will PASS")
else:
    print("Prediction: Student will FAIL")
```

Explanation

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1. The model receives input features (study hours and attendance).

2. A hidden layer processes the inputs.

3. The output layer predicts pass or fail.

4. During training, the model learns patterns in the data.

5. After training, it can predict results for new students.

Concepts

- Neural Network: A model made of layers of neurons.

- Hidden Layer: Learns patterns from the data.

- Output Layer: Produces the final prediction.

- Training: Process where the model learns from data.