MINI PROJECT FOML

High-Accuracy Digit Classification with Convolutional Neural Networks on MNIST Dataset

```
import tensorflow as tf
from tensorflow.keras.datasets import mnist
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense
from tensorflow.keras.utils import to_categorical

# Load and preprocess data
(x_train, y_train), (x_test, y_test) = mnist.load_data()
x_train = x_train.reshape(-1, 28, 28, 1).astype("float32") / 255
x_test = x_test.reshape(-1, 28, 28, 1).astype("float32") / 255
y_train = to_categorical(y_train)
y_test = to_categorical(y_test)

# Build CNN model
model = Sequential([
    Conv2D(32, kernel_size=(3, 3), activation='relu', input_shape=(28, 28, 1)),
    MaxPooling2D(pool_size=(2, 2)),
    Flatten(),
    Dense(128, activation='relu'),
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    Dense(10, activation='softmax')
])

# Compile and train
model.compile(optimizer='adam', loss='categorical_crossentropy', metrics=['accuracy'])
model.fit(x_train, y_train, epochs=5, batch_size=128, validation_split=0.1)

# Evaluate
test_loss, test_acc = model.evaluate(x_test, y_test)
print(f"Test Accuracy: {test_acc:.4f}")
```