



Deep Learning-Based Handwritten Digit Recognition System

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GitHub Repository Link: [GITHUB LINK](#)

1. Problem Statement

The goal is to build a deep learning model that can accurately recognize handwritten digits (0-9) from images.

This is a multiclass classification problem that mimics human-like recognition abilities. Such applications are essential for smart devices, OCR systems, postal automation, and digitizing forms.

2. Abstract

This project focuses on recognizing handwritten digits using a Convolutional Neural Network (CNN).

The model is trained on the MNIST dataset, which contains thousands of grayscale images of handwritten numbers.

By applying deep learning techniques like CNN, we aim to achieve high accuracy in digit recognition.

The model is evaluated using accuracy, confusion matrix, and deployed with Streamlit to



demonstrate real-time digit classification. The project showcases the potential of AI in digitizing and automating tasks involving handwritten data.

3. System Requirements

Hardware:

- 8 GB RAM
- Intel i5/i7 CPU or equivalent
- GPU (optional but recommended for faster training)

Software:

- Python: 3.8+
- IDE: Google Colab / Jupyter Notebook
- Libraries:
 - numpy, pandas
 - matplotlib, seaborn
 - tensorflow / keras
 - scikit-learn
 - streamlit / gradio

4. Objectives

- Build a CNN that can recognize handwritten digits from images
- Train and test using MNIST dataset
- Evaluate performance using standard classification metrics
- Deploy the model for interactive digit recognition
- Demonstrate practical AI application in digital transformation

5. Flowchart of Project Workflow

Data Collection → Preprocessing → EDA → CNN Modeling → Evaluation → Deployment

(*Insert flowchart image here using draw.io or Canva*)