Technical Report

Image Recognition – 5 Days Bootcamp (Deep Learning in Google Colab)

Name: Aman Singh Yadav
University: Dr. A.P.J. Abdul Kalam Technical University (056)
Project Title: Image Recognition – 5 Days Bootcamp Deep Learning
Platform: Google Colab, Kaggle, TensorFlow/Keras

1. Introduction

This project stems from a structured 5-day bootcamp on image recognition using deep learning. It was designed to offer a hands-on, project-based learning experience in computer vision, executed entirely within Google Colab. The project showcases an end-to-end workflow—from data preparation to model evaluation—making it both academically rigorous and industry-aligned.

2. Bootcamp Structure & Work Done

Day 1: Dataset Exploration & Preprocessing - MNIST and CIFAR-10 datasets, preprocessing, visualization. Day 2: Building CNN from Scratch - Implemented CNN using TensorFlow/Keras, trained on MNIST and CIFAR-10. Day 3: Optimization Techniques - Applied data augmentation, batch normalization, dropout. Day 4: Transfer Learning - MobileNetV2 on Cats vs. Dogs dataset (Kaggle). Day 5: Evaluation & Deployment - Confusion matrix, ROC/AUC, model saving/loading, deployment tips.

3. Key Features

- Dataset handling and preprocessing (MNIST, CIFAR-10, Cats & Dogs). - Visualization with Matplotlib. - Custom CNN implementation in TensorFlow/Keras. - Data augmentation and batch normalization. - Transfer learning using MobileNetV2. - Evaluation metrics: ROC/AUC, confusion matrix, classification report. - Model saving/loading and deployment readiness.

4. Model Performance & Highlights

- MNIST: >99% accuracy. - CIFAR-10: ~69% accuracy. - Cats vs. Dogs (Transfer Learning): ~88% accuracy. - Visualization outputs include predictions, confusion matrix, ROC curves.

5. Skills Demonstrated

- Deep Learning (CNNs) with TensorFlow/Keras. - Data preprocessing & augmentation. - Visualization and evaluation. - Transfer learning & fine-tuning. - GitHub version control, Colab/Kaggle integration.

6. Significance of the Project

- Complete ML lifecycle demonstration. - Industry-relevant practices. - Recruiter appeal with end-to-end reproducible pipelines. - Portfolio showcase with clear documentation.

7. How to Run the Project

1. Open directly in Google Colab (Open in Colab badge). 2. Or clone repository: git clone https://github.com/ay8112/BUILD-AN-AI-THAT-SEE-AND-RECOGNIZE-THE-IMAGES-.git 3. Run notebooks in Jupyter or Colab.

8. Enhanced Suggestions & Next Steps

- Add validation/test splits for better generalization analysis. - Hyperparameter tuning logs for reproducibility. - Side-by-side model performance comparisons. - Lightweight deployment using TensorFlow Lite or simple API. - Extended README with limitations and future scope.

Recruiter Note

This project exemplifies my capability to build practical deep learning solutions with modern tools, focusing on clarity, reproducibility, and deployment readiness. I am passionate about translating AI into real-world applications, and this bootcamp serves as a strong demonstration of technical proficiency and industry understanding.