HANDWRITTEN DIGIT RECOGNITION

1. Introduction

Handwritten digit recognition is a widely used application of machine learning and computer vision. This project aims to develop a web application that can recognize handwritten digits from uploaded images using a pre-trained neural network model. The application allows users to upload images of handwritten digits, processes the images, and predicts the digit using a convolutional neural network (CNN).

2. Objectives

- Develop a web application for handwritten digit recognition.
- Implement an image preprocessing pipeline to prepare images for prediction.
- Use a pre-trained convolutional neural network (CNN) model to predict the digits.
- Display the predicted digit on the web interface.

3. Methodology

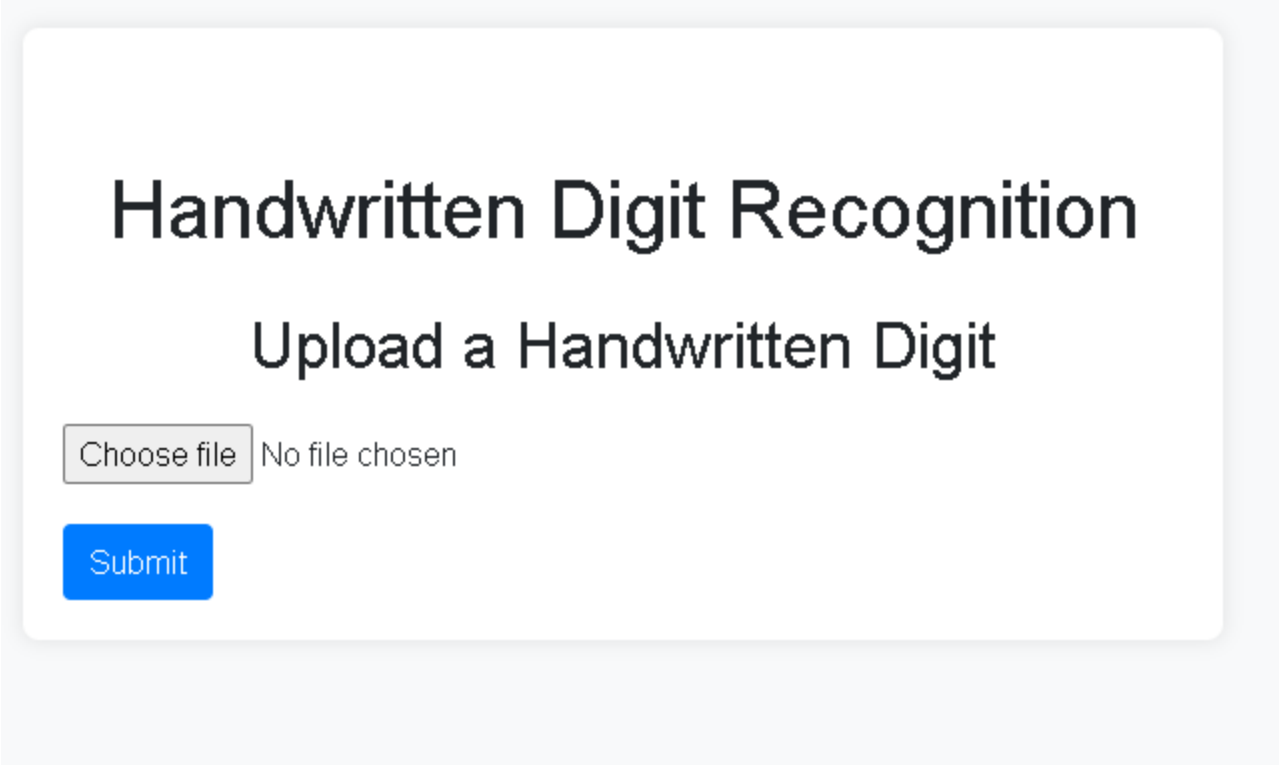
The project involves the following steps:

1. **Data Preparation:** Prepare and preprocess the input images.
2. **Model Loading:** Load the pre-trained CNN model.
3. **Image Preprocessing:** Convert the input images to the required format for the model.
4. **Prediction:** Use the model to predict the digit from the preprocessed image.
5. **Web Interface:** Create a web interface to upload images and display predictions.

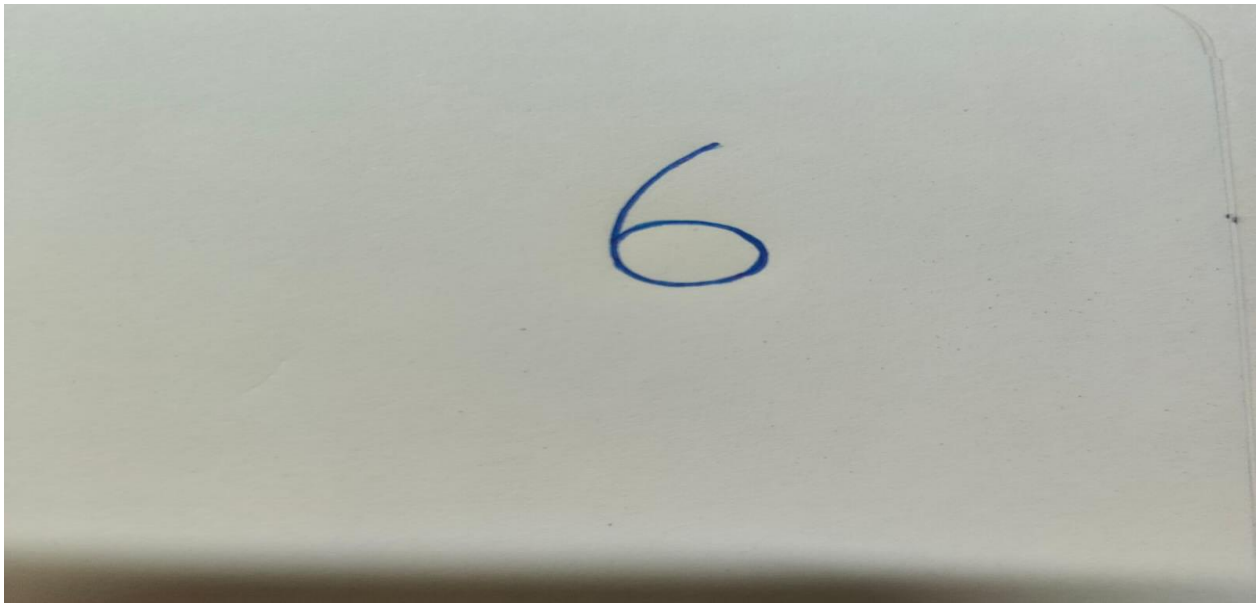
4. Components Used

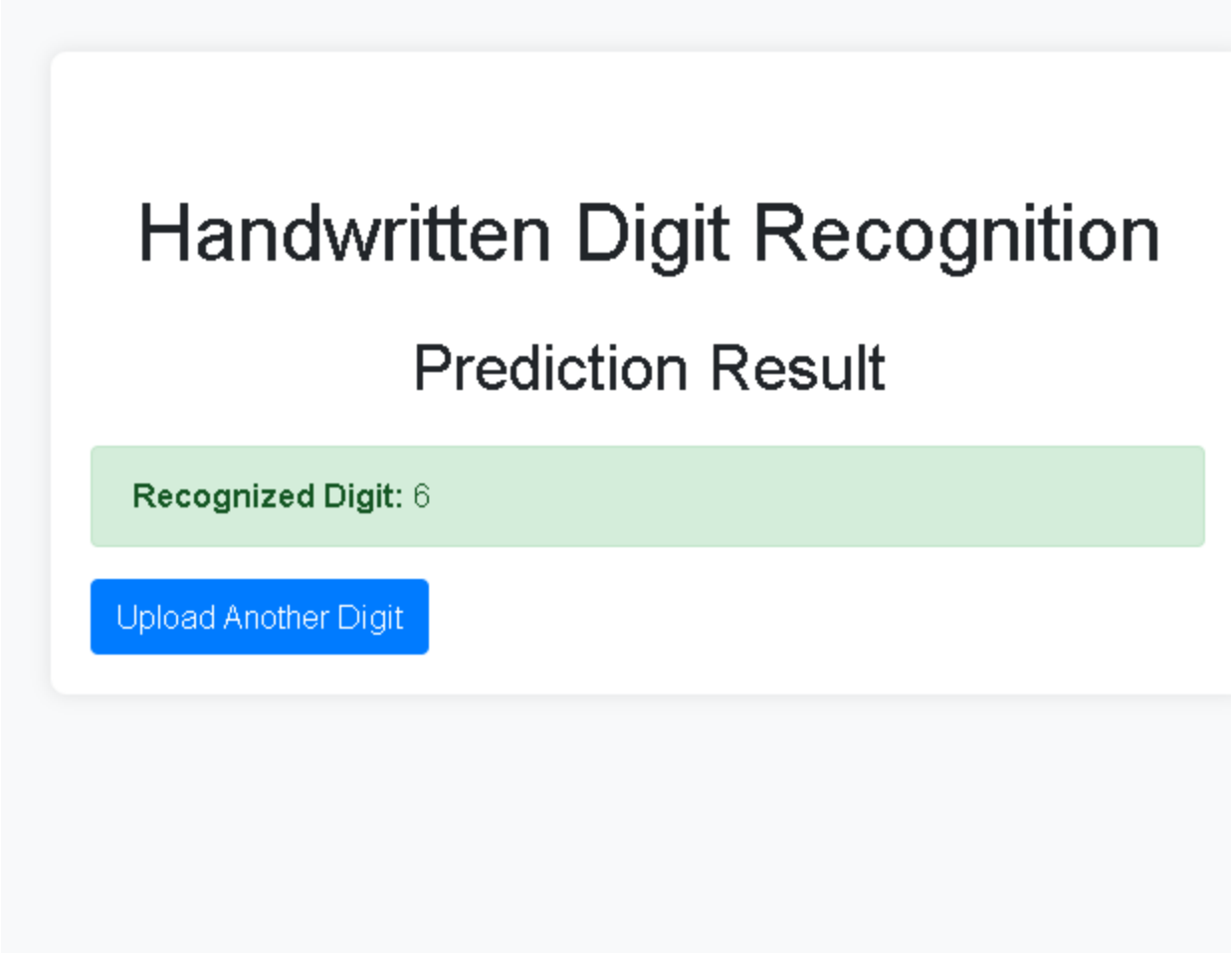
- **Flask:** A micro web framework for Python used to build the web application.
- **OpenCV:** A computer vision library used for image preprocessing.
- **TensorFlow/Keras:** Libraries used for loading and utilizing the pre-trained CNN model.
- **HTML/CSS:** Used for creating the front-end interface of the web application.

5. Implementation Details


Handwritten Digit Recognition
Upload a Handwritten Digit
Choose file
No file chosen
Submit

Test image:-





7. Conclusion

This project successfully implements a handwritten digit recognition system using a convolutional neural network (CNN). The system is integrated into a web application using Flask, allowing users to upload images and receive predictions. The project demonstrates the application of machine learning and computer vision techniques in a real-world scenario, providing a foundation for further enhancements and applications.