

Prerequisites

Team ID	PNT2022TMID13012
Project Name	A Novel Method for Handwritten Digit Recognition System

SYSTEM REQUIREMENTS SPECIFICATION

Various Software Requirements for Novel Method for Handwritten Digit Recognition System are listed below

- Software:
 - Google colab
- Libraries:
 - TensorFlow
 - Keras
 - NumPy

SOFTWARE DESCRIPTION

Google Colab

Colaboratory is a Google Research product. Colab is especially well-suited to machine learning, analysis of data, and education. It enables anyone to create and deploy generic Python scripts through the browser. Technically speaking, Colab is an online Jupyter notebook product that provides free access to computer resources, including GPUs, and involves no setup to use.

Features:

- Create and run Python code.
- Document the code users use to support mathematical equations.
- Compose, upload, and share notebooks.
- Notebooks can be imported or saved to Google Drive.
- Publish and import notes from GitHub.
- Add external datasets, such as those from Kaggle.
- Integrate Keras, TensorFlow, PyTorch, and OpenCV.
- Free Cloud and GPU service.

LIBRARIES

TensorFlow

Fast numerical computing is made possible by the open-source package TensorFlow. Google developed and maintains it, and it was made available under the open-source Apache 2.0 licence. Despite having access to the fundamental C++ API, the API is ostensibly for the programming language Python. Both novices and experts may easily develop machine learning algorithms for mobile, desktop, cloud and web using TensorFlow.

Features:

- TensorFlow provides a variety of data tools to assist with aggregating, cleaning, and pre-processing data at scale.
- For preliminary training and validation, it provides common datasets.
- It also provides data loading pipelines that are very scalable; layers of pre-processing for frequent input alterations; tools for transforming and validating huge datasets.
- Responsible AI tools also aid in identifying and removing bias in data so that models can deliver just and morally correct results.
- In addition to many other features, TensorFlow enables distributed training, quick model iteration, and simple Keras debugging.
- Implementing best practices for model tracking, data automation, model retraining and performance monitoring is made easier with the help of the TensorFlow platform.

Keras

On top of the machine-learning framework TensorFlow, Keras is a Python-based deep learning API. It was created with the goal of facilitating quick experimentation. The secret to conducting effective research is being able to move quickly from conception to conclusion. Layers and models are the two main data structures used by Keras. The Sequential model, a sequential stack of layers, is the most basic sort of model. Utilize the Keras functional API to create random graphs of layers for more complicated structures, or use subclassing to completely design models from scratch.

Features:

- Keras lessens the cognitive strain on developers allowing them to concentrate on the crucial aspects of the issue.
- Keras follows the notion of gradual complexity disclosure.
- Industry-leading performance and scalability are offered by Keras.
- A user-friendly, extremely effective interface with an emphasis on contemporary deep learning for tackling machine learning problems. It offers crucial building elements and abstractions for creating and delivering machine learning solutions quickly.

NumPy

The cornerstone Python module for scientific computing is called NumPy. An array object that is multidimensional, multiple derived objects, and a variety of routines for quick operations on arrays are provided by this Python library. These operations include basic linear algebra, discrete Fourier transforms, random simulation, basic statistical operations, and much more.

Features:

- Sufficient N-Dimensional arrays.
- Tools for numerical computing.
- Numerous hardware and processing platforms are supported by NumPy, which also works well with shared, GPU, and compact array libraries.
- Because of its high-level syntax, NumPy is usable and effective by programmers of many backgrounds and levels of experience.
- NumPy is an open-source library.