DEPARTMENT OF APEX INSTITUTE OF TECHNOLOGY

PROJECTPROPOSAL

1. Project Title: - Handwritten Digit Recognition Using Deep Learning

2. Project Scope:

A fundamental problem in machine learning and artificial intelligence is the recognition of handwritten numbers. The main goal of our project is to develop a reliable handwritten digit recognition system. We'll achieve this by utilizing convolutional neural networks (CNNs), implemented in Python using the TensorFlow library. An additional aspect of our investigation involves assessing how different numbers of hidden layers in the CNN architecture affect the model's performance.

This undertaking demands a deep understanding of machine learning and artificial intelligence. Through the development of this system, we aspire to not only contribute to the field's practical applications but also gain valuable insights into the impact of architectural choices on recognition accuracy. By leveraging CNNs and Python with TensorFlow, we're poised to tackle this challenge head-on and potentially revolutionize automated digit recognition, with implications spanning various industries.

Objectives: -

The primary objectives of this project are as follows:

- **CNN-based Model Development:** The primary aim is to create a Convolutional Neural Network (CNN) model tailored specifically for recognizing handwritten digits. This entails designing a neural network architecture optimized for image-based pattern recognition.

- **Model Training with a Dataset:** We will employ a relevant dataset, such as the widely-used MNIST dataset, to train our CNN model. The dataset will

serve as the foundation upon which our model learns to identify and distinguish between handwritten digits.

- **Performance Evaluation:** Rigorous evaluation is essential. We will assess the model's performance using appropriate evaluation metrics, including accuracy, precision, recall, and F1-score. This step ensures that our system not only recognizes digits but does so with high precision and recall.

- **Hidden Layer Impact Analysis:** To gain deeper insights into neural network architecture, we will experiment with different configurations, specifically varying the number of hidden layers. This analysis will elucidate how architectural choices affect the model's overall performance.

3. Requirements: -

Hardware Requirements

- GPU (Graphics Processing Unit)
- CPU (Central Processing Unit)
- Sufficient RAM

Software Requirements

- Operating System
- Integrated Development Environment (IDE) such as PyCharm
- Deep Learning Framework (TensorFlow)

STUDENTS DETAILS

Name	UID	Signature
Aaditya Singh	21BCS6750	
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APPROVAL AND AUTHORITY TO PROCEED

We approve the project as described above, and authorize the team to proceed.

Name	Title	Signature (With Date)