

This endeavor marks my first adventure into serious machine learning territory. I'm eager to leverage the knowledge I've accumulated in my math and Deep Learning lectures – particularly concepts like linear algebra, probability, and optimization – to build a classification model.

Throughout this project, We are committed to meticulously documenting our approach, from data preprocessing and model selection to hyperparameter tuning and evaluation metrics. I'm tackling a classic computer vision task: identifying handwritten digits using the renowned MNIST dataset. This massive collection will train our model to decipher tens of thousands of digits.

Background

This project was undertaken as an extracurricular assignment following a lecture on neural networks. My colleague and I decided to build a neural network from scratch, without using any machine learning libraries such as TensorFlow or PyTorch. While we had a some understanding of the underlying mathematical concepts, we lacked the practical experience to implement them effectively.

Approach

To address this knowledge gap, we sought guidance from the course instructor. He provided valuable insights and suggestions, along with examples of similar projects that helped us navigate the challenges involved. We also invested significant time in understanding the mathematical intricacies of neural networks, which proved to be a crucial step in our journey.

Implementation

My primary role in this project was to leverage the functionalities of NumPy, Pandas, and Matplotlib libraries. I meticulously applied my knowledge of these libraries to implement the neural network architecture.

Challenges and Solutions

One of the major challenges we faced was debugging the network. This required a deep understanding of the mathematical concepts involved, as well as the nuances of the code implementation. Through persistent effort and careful analysis, we were able to identify and resolve the issues, resulting in a functional neural network.

Outcomes

This project provided us with a valuable hands-on learning experience in building and implementing neural networks from scratch. We gained a deeper understanding of the underlying mathematical principles, as well as the practical challenges involved in the development process. Additionally, we honed our problem-solving and debugging skills, which are essential for any aspiring machine learning practitioner.

