



राष्ट्रीय प्रौद्योगिकी संस्थान दिल्ली
National Institute of Technology Delhi
(An autonomous Institute under the aegis of Ministry of Education, Govt. of India)

CSP312: Summer Internship -1

Artificial Intelligence Project on Fashion MNIST

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Project Recap

The main goal of this project is to create and deploy an Artificial Neural Network (ANN) for image classification on the Fashion MNIST dataset, utilising the Keras Sequential API. Building a deep learning model that can correctly classify photos of clothes and accessories into the appropriate categories is the main objective.



Problem

The primary objective is to create a robust neural network model for image classification using the Fashion MNIST dataset using keras sequential API.



About the dataset

The Fashion MNIST(Modified National Institute of Standards and Technology) dataset consists of 70,000 grayscale images of fashion items, categorized into 10 classes. It serves as a benchmark for testing machine learning algorithms.



About ANN

Artificial Neural Networks (ANN) are a key component in analyzing the Fashion MNIST dataset. They mimic the human brain and are adept at pattern recognition and classification tasks.





Tech Stack Used

- Python (Google Colaboratory)
- Streamlit
- Keras Sequential API
- Sklearn
- Fashion MNIST Dataset

Process

01

Obtain the Fashion MNIST dataset and convert it into a structured DataFrame for ease of analysis and model training.

02

Implement an Artificial Neural Network using the Keras Sequential API, considering the unique characteristics of the Fashion MNIST dataset. This involves defining layers, choosing activation functions, and configuring the model architecture.

03

Train the neural network on the Fashion MNIST dataset, adjusting hyperparameters as necessary for optimal performance.

04

Now we will use streamlit to create the web applications for the model. Streamlit is an open-source Python library used for creating web applications for machine learning and data science projects. It simplifies the process of turning data scripts into shareable web apps.

Insights

Insights will be derived from the performance metrics of both the neural network model on Fashion MNIST

01.

The accuracy of model turned out to be 89.03%.

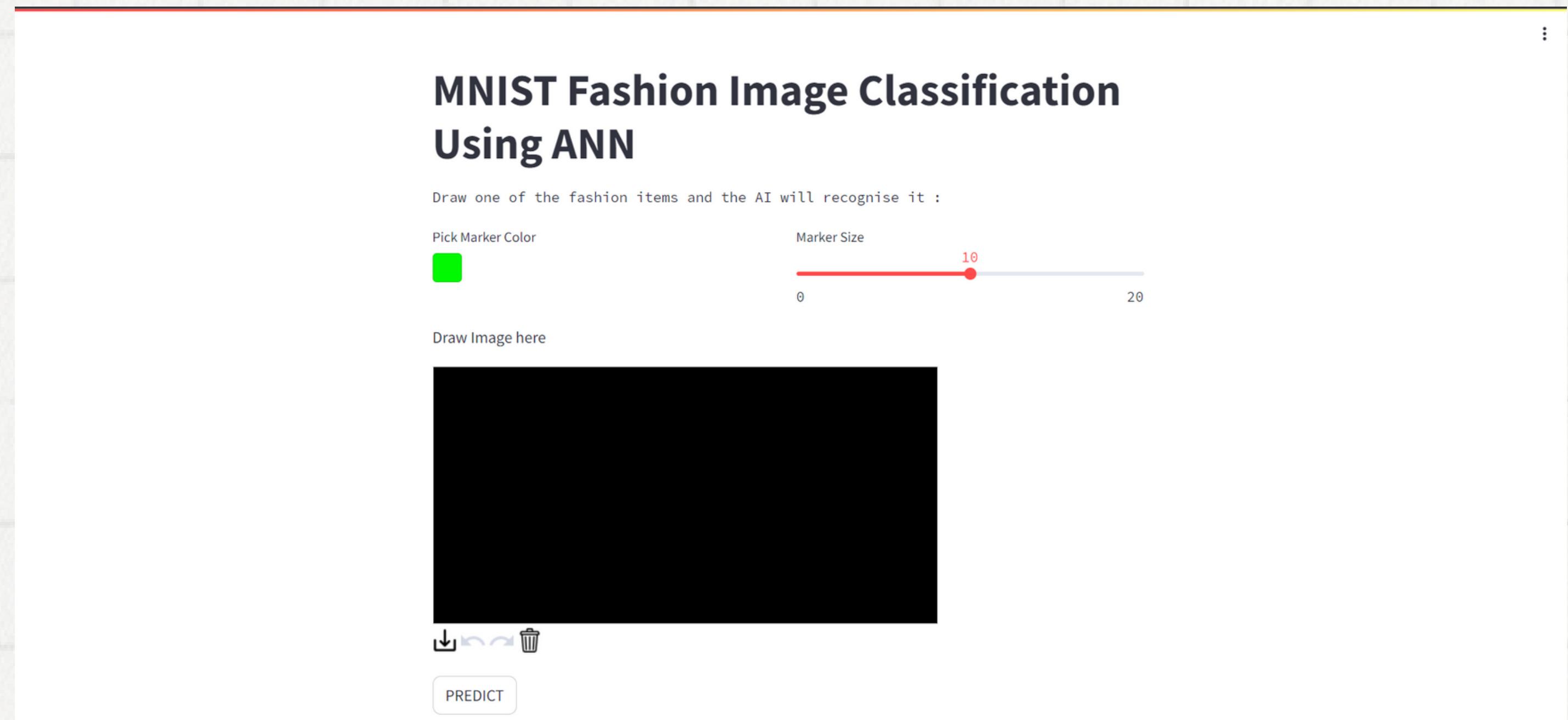
02.

The Macro Average F1 score turned out to be 0.89.

03.

The maximum F1 score was for class1 i.e. trousers

This is how the streamlit generated interface was looking.



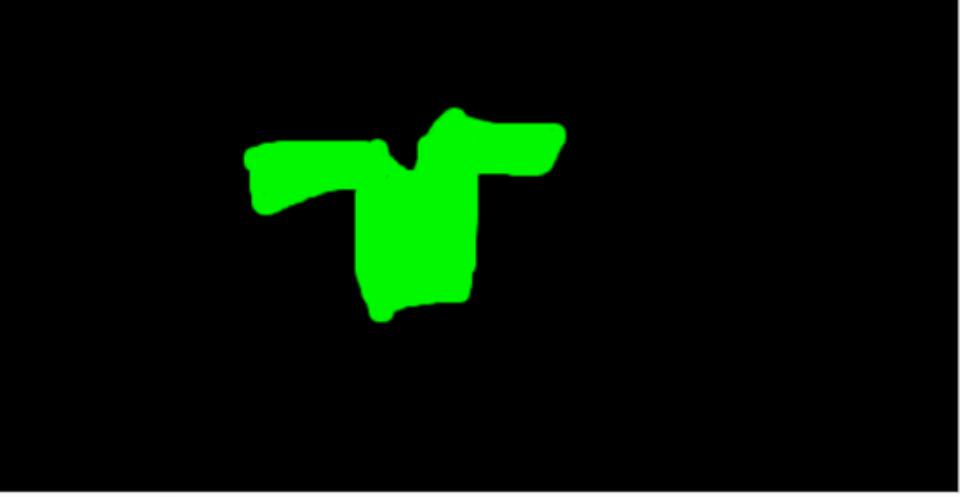
This is an example of how the AI was working

Draw one of the fashion items and the AI will recognise it :

Pick Marker Color

Marker Size 10

Draw Image here



Down Left Right Up

Delete

PREDICT

Result: T-shirt/top



Summary

This project aims to demonstrate the effectiveness of neural networks in image recognition by building and training an Artificial Neural Network on the Fashion MNIST dataset using the Keras Sequential API efficiently. The results obtained and the knowledge gained will help comprehend the effectiveness of artificial neural networks (ANNs) in image classification and their practical applications.

Conclusion

In conclusion, the application of Artificial Neural Networks to the Fashion MNIST dataset signifies a significant leap in the intersection of fashion and AI, paving the way for innovative advancements in the industry.



**Thank you
very much!**

[Link to project](#)