

# A VGG-19 PREDICTION MODEL FOR CLASSIFYING A NOVEL AFRICAN FASHION DATASET (CASE STUDY OF NIGERIA ETHNIC GROUPS)

Esther Oduntan, Fortunatus O. Adegoke, Rasheed I. Ramon

[eduntan@aimsammi.org](mailto:eduntan@aimsammi.org), [fortunatusoluwadara@gmail.com](mailto:fortunatusoluwadara@gmail.com), [ramonrash2@gmail.com](mailto:ramonrash2@gmail.com)

## INTRODUCTION

Datasets are fundamental to foster the development of several computational fields, giving scope, robustness, and confidence to results. African data set on fashion has been inadequate over the years. This study creates a novel dataset on fashion and employed the use of VGG-19 deep learning model for predicting the class labels of the novel dataset, specifically focused on Nigeria's ethnic groups.

## OBJECTIVES

- To highlight and preserve the cultural heritage and diversity of the country.
- To help identify and understand the unique characteristics of each ethnic group's fashion preferences.
- To accurately classify different types of African fashion items based on their respective Nigeria ethnic groups.

## METHODOLOGY

VGG-19 is a convolutional neural network that comprises 19 layers with 16 convolution layers and 3 fully connected to classify the images into 1000 object categories.

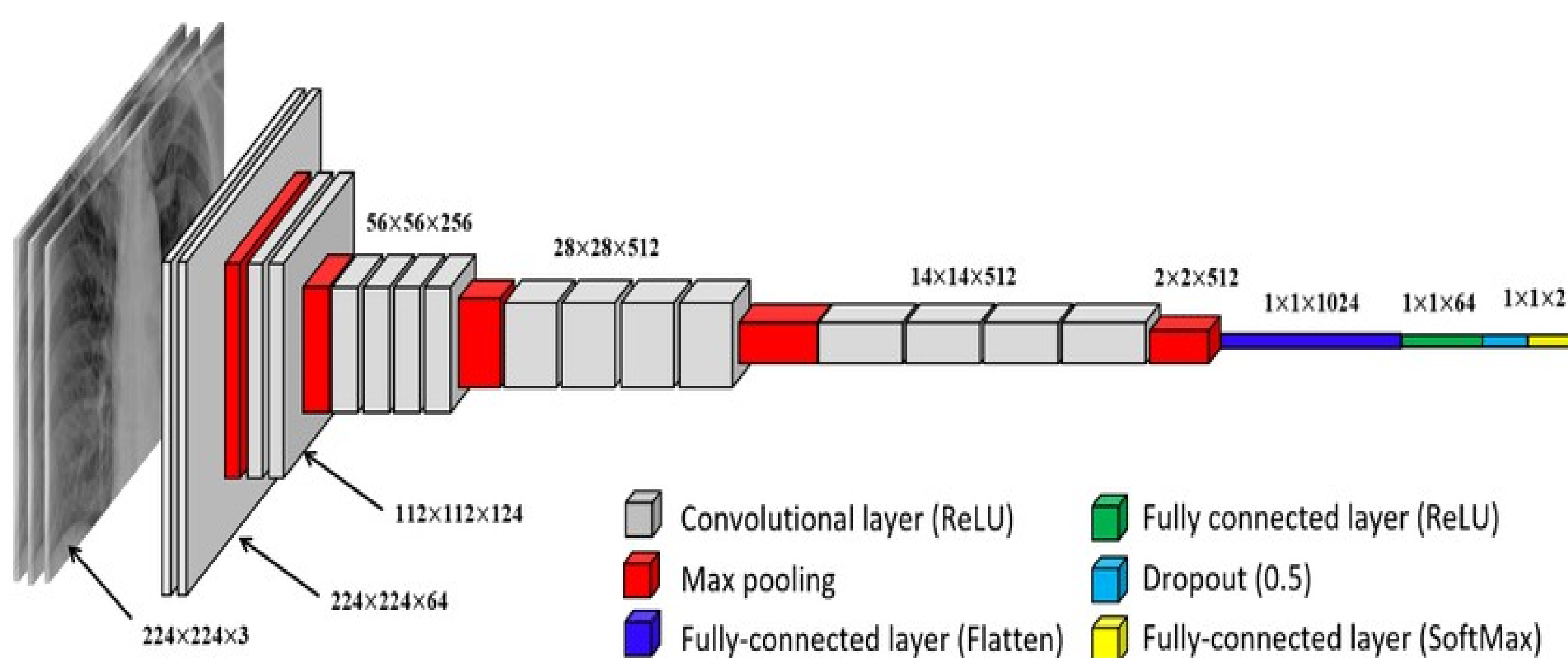


Fig. 1: Image source: [https://www.researchgate.net/figure/Modified-VGG-19-model-architecture\\_fig1\\_344398328](https://www.researchgate.net/figure/Modified-VGG-19-model-architecture_fig1_344398328)

```
Epoch 1/10
21/21 [=====] - 18s 266ms/step - loss: 1.1077 - accuracy: 0.3982 - val_loss: 1.1266 - val_
accuracy: 0.3125
Epoch 2/10
21/21 [=====] - 3s 156ms/step - loss: 0.9915 - accuracy: 0.4772 - val_loss: 0.9722 - val_a
ccuracy: 0.5312
Epoch 3/10
21/21 [=====] - 3s 164ms/step - loss: 0.9152 - accuracy: 0.6033 - val_loss: 0.9226 - val_a
ccuracy: 0.5625
Epoch 4/10
21/21 [=====] - 3s 157ms/step - loss: 0.8462 - accuracy: 0.7067 - val_loss: 0.8176 - val_a
ccuracy: 0.6875
Epoch 5/10
21/21 [=====] - 3s 159ms/step - loss: 0.7850 - accuracy: 0.7948 - val_loss: 0.7665 - val_a
ccuracy: 0.8438
Epoch 6/10
21/21 [=====] - 4s 164ms/step - loss: 0.7343 - accuracy: 0.8252 - val_loss: 0.7300 - val_a
ccuracy: 0.7812
Epoch 7/10
21/21 [=====] - 3s 164ms/step - loss: 0.6904 - accuracy: 0.8480 - val_loss: 0.7132 - val_a
ccuracy: 0.8125
Epoch 8/10
21/21 [=====] - 3s 163ms/step - loss: 0.6513 - accuracy: 0.8708 - val_loss: 0.7447 - val_a
ccuracy: 0.8125
Epoch 9/10
21/21 [=====] - 3s 159ms/step - loss: 0.6189 - accuracy: 0.8678 - val_loss: 0.7106 - val_a
ccuracy: 0.7188
Epoch 10/10
21/21 [=====] - 3s 160ms/step - loss: 0.5861 - accuracy: 0.8875 - val_loss: 0.5949 - val_a
ccuracy: 0.9375
```

Fig. 2: Training the fashion cap image data over 10 epoch.

The size of the dataset created was categorised into Igbo, Yoruba and Hausa ethnic groups. The VGG-19 model was trained on the training set and validated on the validation set using the categorical cross-entropy loss function and the Adam optimizer. 80:20 train test split was used to train the VGG-19 model and F1-Score was used for performance evaluation.

## RESULT

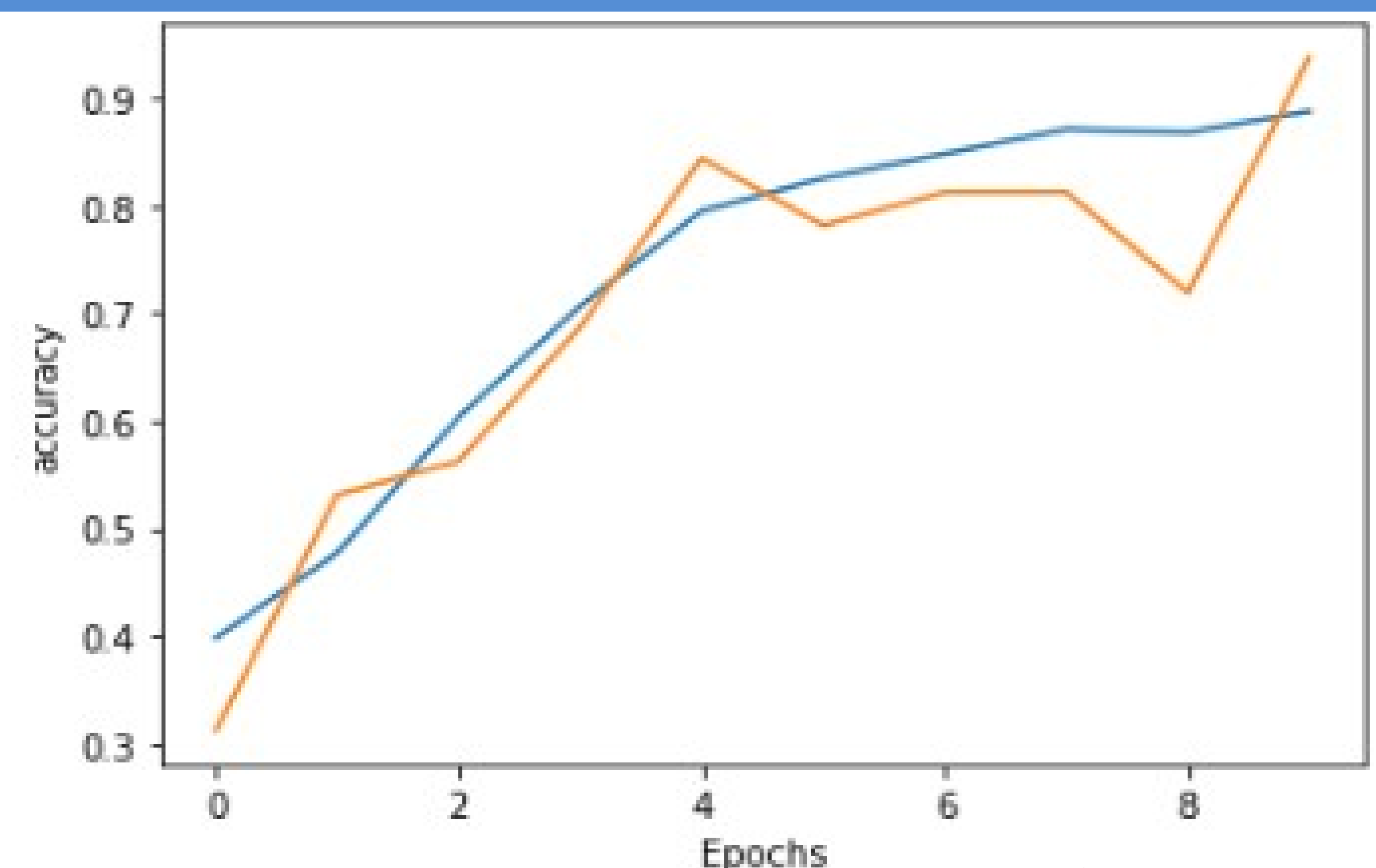


Fig. 3: Plotting the training accuracy against number of epochs.

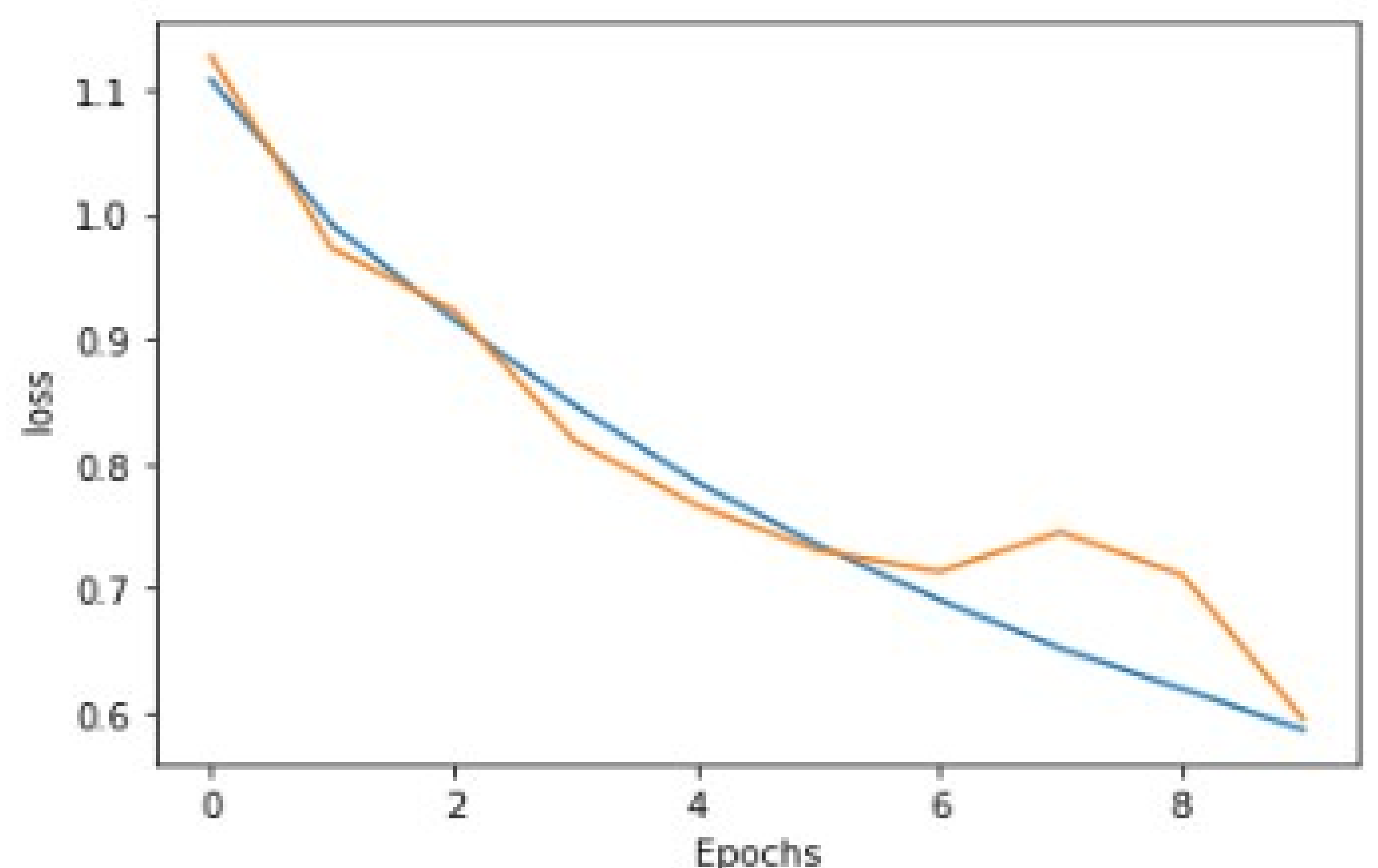


Fig. 4: Plotting the training loss against number of epochs.

## CONCLUSION

The VGG-19 model was trained on the training set and validated on the validation set using the categorical cross-entropy loss function and the Adam optimizer. The performance of the model was evaluated using several metrics, including accuracy, precision, recall, and F1-score. Experimental results showed that the VGG-19 model achieves an overall accuracy of 88.75% on the test set, outperforming existing state-of-the-art models in African fashion classification.

## REFERENCE

- Simonyan K, Zisserman A (2014) Very deep convolutional networks for large-scale image recognition. <http://arxiv.org/abs/1409.1556>.
- Mohammed Y. Kamil (2021) A deep learning framework to detect Covid-19 disease via chest X-ray and CT scan images.