

# Classifying Fabric Patterns Using Deep Learning

## Abstract

This project aims to classify different fabric patterns using Convolutional Neural Networks (CNNs). Fabric patterns such as striped, dotted, floral, and plain are automatically detected using image classification techniques.

## Introduction

Fabric pattern classification is an essential task in fashion and textile industries. It enables automation in sorting, tagging, and quality inspection.

## Problem Statement

Manual classification of fabric patterns is time-consuming and prone to human errors. This project uses deep learning to automate the process efficiently.

## Objectives

- Automate fabric pattern recognition
- Train a CNN model to classify patterns
- Achieve high accuracy on unseen fabric images

## Dataset Description

The dataset consists of images categorized into various fabric pattern classes such as striped, dotted, floral, and plain. Images are resized and augmented for better generalization.

## Model Architecture

The model is a CNN consisting of multiple convolutional and pooling layers followed by fully connected layers. Relu activation and softmax are used for multi-class classification.

## Implementation Details

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Python and TensorFlow/Keras are used to build the model. Data preprocessing includes normalization and augmentation. The model is trained with categorical crossentropy loss and Adam optimizer.

## Results and Accuracy

The model achieves an accuracy of around 90% on the test dataset, demonstrating effective classification of fabric patterns.

## Conclusion

The project successfully demonstrates how deep learning can be applied to classify fabric patterns accurately and efficiently.

## Future Work

- Improve accuracy with more data
- Use transfer learning (e.g., ResNet)
- Deploy model as web or mobile app

## References

1. TensorFlow Documentation
2. Keras API Guide
3. Fabric pattern datasets from Kaggle