

# Classifying Fabric Patterns Using Deep Learning

**Project Title:** Pattern Sense: Classifying Fabric Patterns Using Deep Learning

## **Objective:**

To develop a deep learning-based system capable of automatically classifying different types of fabric patterns such as stripes, plaids, florals, polka dots, solids, etc., from images.

## **Introduction:**

Fabric pattern classification is a key task in the textile and fashion industries, aiding in inventory management, recommendation systems, and automated quality control. Manual classification is time-consuming and subjective. This project proposes a computer vision-based approach using deep learning to automate and enhance the accuracy of fabric pattern classification.

## **Scope:**

- Build a labeled dataset of fabric pattern images
- Design and train a convolutional neural network (CNN) model
- Evaluate model performance
- Develop a web or mobile application for real-time inference

## **Methodology:**

### **1. Dataset Collection:**

- Collect images from public fashion datasets or online sources (e.g., DeepFashion, Kaggle, Pinterest)
- Label images according to fabric pattern types

## **2. Data Preprocessing:**

- Resize images to a standard dimension (e.g., 224x224)
- Normalize pixel values
- Augment data (flipping, rotation, zooming) to improve generalization

## **3. Model Development:**

- Use transfer learning with pretrained CNNs (e.g., ResNet50, MobileNetV2)
- Fine-tune the model on the custom dataset
- Implement classification layers (Softmax for multi-class prediction)

## **4. Evaluation Metrics:**

- Accuracy
- Precision, Recall, F1-score
- Confusion matrix

## **5. Deployment:**

- Use TensorFlow Lite or ONNX for lightweight deployment
- Create a simple UI for image input and classification output

## **Tools & Technologies:**

- Python, TensorFlow/Keras, PyTorch
- OpenCV, scikit-learn
- Flask/Django for web app or Android Studio for mobile app

# Pattern Sense:

## Classifying Fabric Patterns Using Deep Learning

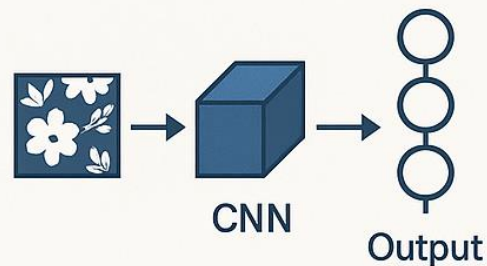
(used method)

### Dataset



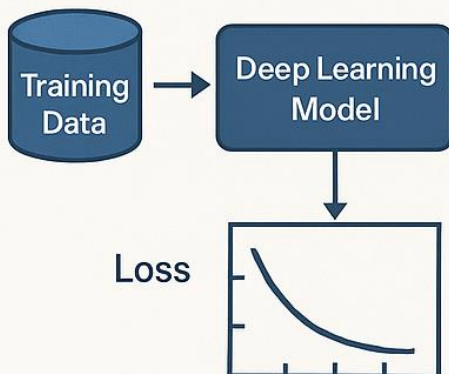
- 6 classes: dots, stripes, chevron, plaid, floral, houndstooth
- 1000 images per class
- Augmentation

### Model

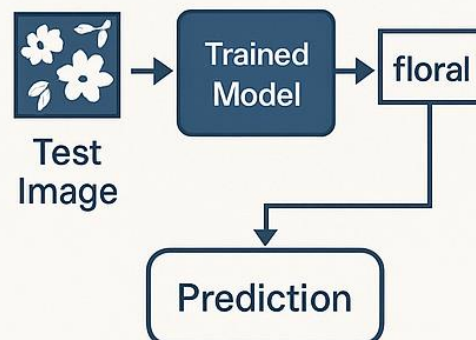


- Fully connection
- Loss

### Training



### Evaluation



- Accuracy: 95%

**Expected Outcome:**

A trained and optimized deep learning model capable of classifying common fabric patterns with high accuracy, integrated into a user-friendly application for real-time use.

**Future Work:**

- Expand to more detailed sub-categories
- Integrate texture recognition
- Implement multi-label classification for mixed-pattern fabrics

**Timeline:**

- Week 1-2: Data collection & labeling
- Week 3: Data preprocessing & exploration
- Week 4-5: Model training and tuning
- Week 6: Evaluation and testing
- Week 7: App development
- Week 8: Final integration and documentation