Pattern Sense: Classifying Fabric Patterns using Deep Learning

# Pattern Sense: Classifying Fabric Patterns using Deep Learning

# 1. INTRODUCTION

# 1.1 Project Overview

Pattern Sense is an AI-powered system designed to automate the identification and classification of fabric patterns. By leveraging deep learning techniques, it classifies common textile patterns such as stripes, polka dots, florals, geometrics, and more.

# 1.2 Purpose

The purpose of this project is to reduce the time and manual effort spent in identifying and categorizing fabric patterns, ensuring consistency, improving efficiency, and aiding decision-making.

# 2. IDEATION PHASE

# 2.1 Problem Statement

Manual identification of fabric patterns is time-consuming, error-prone, and inconsistent. A reliable, automated system is needed.

# 2.2 Empathy Map Canvas

User Needs: Fast, accurate classification.

Pain Points: Manual errors, time delays.

Gains: Automated, objective results.

# 2.3 Brainstorming

- Use CNNs for pattern recognition.

- Employ ResNet50.

- Deploy with Flask.

- Build a user-friendly UI.

# 3. REQUIREMENT ANALYSIS

# 3.1 Customer Journey Map

User uploads image -> System processes -> Prediction shown.

# 3.2 Solution Requirement

- ResNet50-based model

- Flask server

- HTML/CSS frontend

- Fabric dataset

# 3.3 Data Flow Diagram

User Upload -> Flask -> Model -> Prediction -> UI

# 3.4 Technology Stack

Backend: Python, Flask, TensorFlow

Frontend: HTML, CSS

Model: ResNet50 CNN

# 4. PROJECT DESIGN

# 4.1 Problem Solution Fit

Solution addresses industry need for automated pattern classification.

# 4.2 Proposed Solution

Web application for image uploads & instant predictions.

# 4.3 Solution Architecture

Flask receives -> preprocesses -> model predicts -> returns result.

# 5. PROJECT PLANNING & SCHEDULING

Week 1: Data prep

Weeks 2-3: Train model

Week 4: Build Flask app

Week 5: Integration

Week 6: Documentation & demo

# 6. FUNCTIONAL AND PERFORMANCE TESTING

# 6.1 Performance Testing

Accuracy: ~92%

Latency: ~1s/image

**7. Output**

# 

# 8. ADVANTAGES & DISADVANTAGES

Advantages: Automated, consistent, easy to use.

Disadvantages: Needs GPU for speed, dataset diversity affects accuracy.

# 9. CONCLUSION

Pattern Sense automates fabric pattern classification effectively.

# 10. FUTURE SCOPE

- Add categories

- Mobile optimization

- Defect detection

- AR integration

# 11. APPENDIX

Source Code: https://github.com/KambothuSrinivasulu/Pattern-Sense-Classifying-Fabric-Patterns-using-Deep-Learning.git

Dataset: https://www.kaggle.com/datasets/nguyngiabol/dress-pattern-dataset

Demo: https://drive.google.com/file/d/1LT9AC3EDv7tpkm5PEbwP8JAujHvRRMEc/view?usp=drivesdk