Pattern Sense: Classifying Fabric Patterns Using Deep Learning

1. INTRODUCTION

1.1 Project Overview

Pattern Sense is a deep learning-based solution that classifies fabric patterns into categories such as floral, striped, checked, abstract, and geometric using convolutional neural networks (CNNs).

1.2 Purpose

To assist designers, e-commerce platforms, and manufacturers by accurately identifying and categorizing fabric patterns to streamline inventory and enhance customer search experiences.

2. IDEATION PHASE

2.1 Problem Statement

Manual classification of fabric patterns is time-consuming and error-prone. An automated system using deep learning is needed.

2.2 Empathy Map Canvas

Says: Needs a tool to classify fabrics quickly

Thinks: Accuracy and time-efficiency are key

Does: Tags fabrics manually

Feels: Frustrated with manual labeling

2.3 Brainstorming

Ideas: CNN models (VGG16, ResNet), Labeled datasets, GUI, Data Augmentation

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3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

Discovery -> Use -> Feedback; Pain Points: Time, Error; Opportunity: Automation

3.2 Solution Requirement

Labeled dataset, CNN model, GUI, Evaluation metrics

3.3 Data Flow Diagram

User -> Upload Image -> CNN -> Predict -> Display Result

3.4 Technology Stack

Python, TensorFlow, OpenCV, Flask, Google Colab

4. PROJECT DESIGN

4.1 Problem Solution Fit

CNNs increase classification speed and reduce bias.

4.2 Proposed Solution

Trained CNN model + UI for predictions.

4.3 Solution Architecture

1. Data Collection 2. Preprocessing 3. Training 4. Evaluation 5. Deployment 6. Output

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Week 1: Dataset | Week 2: Training | Week 3: Evaluation | Week 4: UI | Week 5: Integration | Week 6: Report

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Accuracy ~92%; Confusion matrix validated performance

7. RESULTS

7.1 Output Screenshots

Screenshots of GUI, classification results, and graphs

8. ADVANTAGES & DISADVANTAGES

Advantages

Fast, scalable, accurate, low manual effort

Disadvantages

Needs large dataset, image quality sensitive

9. CONCLUSION

Pattern Sense automates fabric pattern classification and benefits the textile industry through reduced manual labor and improved consistency.

10. FUTURE SCOPE

Texture and color classification, E-commerce API integration, Mobile apps, Active learning

Dataset Link

https://www.kaggle.com/datasets

GitHub & Demo Link

https://github.com/M-Abhi2004/pattern -sense-classifying- fabric-patterns- using-d eep-learning