Pattern Sense: Classifying Fabric Patterns using Deep Learning

Category: Artificial Intelligence

Introduction

Pattern Sense: Classifying Fabric Patterns using Deep Learning is a project designed to automate the process of identifying and categorizing fabric patterns using advanced deep learning techniques. The system can be used in various industries such as fashion, textiles, and interior design to streamline pattern recognition tasks.

Ideation Phase

The idea originated from the need to automate fabric pattern identification in large-scale industries. The manual process is slow and prone to human error. The solution leverages deep learning to improve accuracy and speed in pattern recognition.

Requirements Analysis

The project requires knowledge and use of Python, TensorFlow, and deep learning concepts. Additionally, skills in data preprocessing are critical for preparing the dataset of fabric patterns. Industries like fashion and textiles require accurate classification of patterns such as stripes, polka dots, floral prints, and geometric designs.

Project Design

The system design includes a data pipeline for preprocessing images, a convolutional neural network (CNN) model for pattern classification, and a user interface for interacting with the results. Training data includes labeled fabric images across multiple pattern types.

Project Planning and Schedule

1. Week 1-2: Dataset collection and labeling
2. Week 3: Data preprocessing and augmentation
3. Week 4-5: Model building and training

4. Week 6: Model evaluation and tuning

5. Week 7: Deployment and user interface integration

6. Week 8: Final testing and documentation

Functional and Performance Testing

The model was tested using accuracy, precision, and recall metrics. Performance was evaluated on unseen test data to ensure generalization. Functional testing included ensuring the correct classification of known patterns and detecting anomalies for quality control in textiles.