Fabric Defect Detection
Product Requirement Document (PRD)

Introduction

This document outlines the requirements and expectations for the Fabric Defect Detection project aimed at automating the inspection process in the textile industry.

Project Overview

The Fabric Defect Detection project utilizes machine learning and computer vision to automate defect detection in fabrics. Defects include holes, starting marks, and missing wefts. The goal is to improve inspection accuracy and efficiency, reducing reliance on manual labor.

Objectives

- Build a robust dataset of labeled images covering various fabric defects.
- Develop a model capable of real-time defect detection and localization.
- Improve operational efficiency in textile manufacturing through automated quality control.

Scope

The project includes data collection, model training, and evaluation. Initially, it will cover five defect types provided by the industry partner, with plans to expand to real-time integration in textile manufacturing workflows.

Target Audience

- **Primary Users**: Textile manufacturing companies using quality control systems.
- **Secondary Users**: Machine Matic, who will integrate the model into their machinery.

Features and Requirements

1. **Data Collection**:
   - Image capture system setup.
   - Collection and labeling of defect data.
2. **Model Requirements**:
   - Detection and classification of defects in static images.
   - Real-time defect detection capabilities.
3. **Deployment Requirements**:
   - Integration with Machine Matic's roller-based machinery for real-time detection.
   - Easy-to-use reporting interface for operators.

User Stories

1. As a **textile inspector**, I want a real-time view of detected defects so that I can promptly address quality issues.
2. As a **manufacturing operator**, I want defect classification reports to ensure high-quality standards.
3. As a **quality manager**, I want an accurate log of detected defects to monitor production line performance.

Success Criteria

- Achieve >95% accuracy in defect detection.
- Consistent detection speed within 1 second per frame.
- Integration of defect detection model with the Machine Matic machinery.