Project Documentation: Closet Canvas

Project Summary
Closet Canvas is an AI-powered styling platform that analyzes your unique body shape and coloring from a photo to provide truly personalized clothing recommendations. It eliminates the widespread frustration of finding clothes that fit and flatter, making personal style accessible to everyone. It's ultimately intended to boost user confidence, simplify the shopping experience, and reduce waste in the fashion industry by enabling more informed purchasing decisions.

Project Executives
Manager: Ajay Sudhir - asudhir@charlotte.edu
Project Lead: Ajay Sudhir - asudhir@charlotte.edu
Technical Lead / Co-Lead: Bruh Lemma Yadecha - byadecha@charlotte.edu
Full Stack Lead: Abishek Arulkumar Padmapriya - aarulkum@charlotte.edu

Project Information
Background/Motivation:
Closet Canvas addresses the modern fashion dilemma where endless online choices lead to consumer frustration, high return rates, and a loss of confidence due to impersonal sizing and poor fit. Motivated by a desire to empower users, the project leverages AI to analyze an individual's unique body shape and coloring, providing truly personalized recommendations. This approach aims to foster body positivity and create a more sustainable fashion ecosystem by reducing waste, ultimately transforming the user's closet from a source of stress into a canvas for confident self-expression.

Objectives/Goals:
Final Goal: Launch a functional app that proves our core value: analyzing a user's body shape from images to deliver personalized clothing recommendations with clear "why it works" explanations.
Key Objectives:
1. Build Foundational Dataset:
- Ingest and process an initial 10,000+ item clothing catalog from public datasets and retail partners.
- Develop a robust attribute tagging system for the recommendation engine.
2. Develop Body Analysis Model:
- Train a computer vision model to accurately process user images (front/side profiles).
- Reliably extract a body shape embedding or key measurements to drive recommendations.
3. Build MVP Recommendation Engine:
- Create a content-based engine that uses the body analysis model's output to match user

characteristics with clothing attributes and generate recommendations.

4. Build Core User Interface:

- Develop an intuitive UI for a simple user journey (account, upload, recommendations).

- Ensure the UI prominently features the "why it works" rationale for each item.

5. Integrate and Test System:

- Integrate the UI, body analysis model, and recommendation engine into a single functional app.

- Conduct end-to-end testing to ensure a reliable user flow for a closed beta launch.

Methodology/Tasks:

Our methodology is to develop and integrate core components sequentially, focusing on a streamlined user journey.

1. Dataset & Backend Setup:

- Task: Ingest and process public fashion datasets into a structured database with a clear attribute schema.

- Task: Develop the initial API framework to serve this data.

2. Computer Vision Model Development:

- Task: Select and fine-tune a pose-estimation model to extract body key points from user images.

- Task: Convert these key points into a stable body shape embedding for analysis.

3. Recommendation Logic Implementation:

- Task: Implement the content-based filtering algorithm to match body embeddings with clothing attributes.

- Task: Create a "rationale generator" that provides simple explanations for matches.

4. Frontend & UI Development:

- Task: Build the frontend screens for user onboarding, secure image upload, and the recommendation display.

- Task: Connect the UI to backend API endpoints.

5. System Integration & Testing:

- Task: Deploy all components to a staging environment.

- Task: Conduct rigorous end-to-end testing to ensure functionality and prepare for a closed beta release.

Scope:

The full scope of Closet Canvas is to create a comprehensive AI personal stylist, beginning with an MVP that analyzes body shape from static images to provide content-based recommendations. The project will then expand to incorporate advanced features including user-uploaded wardrobe management for outfit mixing, collaborative filtering based on user feedback, real-time social media trend analysis, and a natural language search interface. The long-term vision includes sophisticated virtual try-on capabilities and video analysis, all supported by a scalable ML-OPs infrastructure to deliver an increasingly personalized and interactive styling experience.

Team Size:

8 - 10

GitHub:

https://github.com/Charlotte-AI-Research/closet_canvas