National University Of Computer and Emerging Sciences, Karachi, Pakistan

Jeanius Digital

Project Report

Group Members:

Sharjeel Ahmed	20K-0288
Shazim Ali Mughal bhrwa	20K-1032
Sameer Raza bhn ka lora	20K-0420

Instructor:
Miss Sumiyah Zahid

Course:
Deep Learning For Perception

Objective

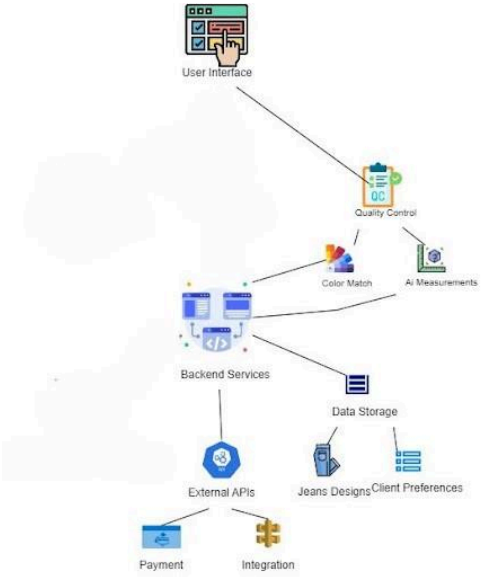
The objective of Jeanius Digital is to revolutionize the jeans industry by developing an AI-powered platform that streamlines production processes, and enhances quality control. We aim to achieve this by automating quality control (ie. Color matching & Measurements procedures).

Problem Statement

1. Manual quality control processes leading to errors and inconsistencies in jeans production.
2. Lengthy design cycles and delays in responding to market trends.
3. Inability to provide personalized experiences and virtual try-ons for customers.

By leveraging AI and CV technologies, Jeanius Digital aims to automate these processes, improve efficiency, and enhance accuracy.

Methodology



1. Data Acquisition and Preprocessing
    - Data Collection: Gather denim images from various sources, including local inventory, manufacturer catalogs, and online databases.
    - Image Preprocessing: Use the OpenCV library to load and resize images to a standard size. Convert images from BGR to HSV color space for color segmentation.
2. Color Segmentation and Object Detection
    - Color Definition: Define HSV color ranges for denim categories.
    - Color Segmentation: Segment denim colors using defined ranges. Apply thresholding and contour detection for object identification.
    - Bounding Boxes and Labels: Draw bounding boxes around segmented objects and add labels for visual identification.
3. User Interaction

- Interactive user dashboard for multiple options, the user can select to run color matching model or measurement model.
- After processing the relevant results are shown to the user.

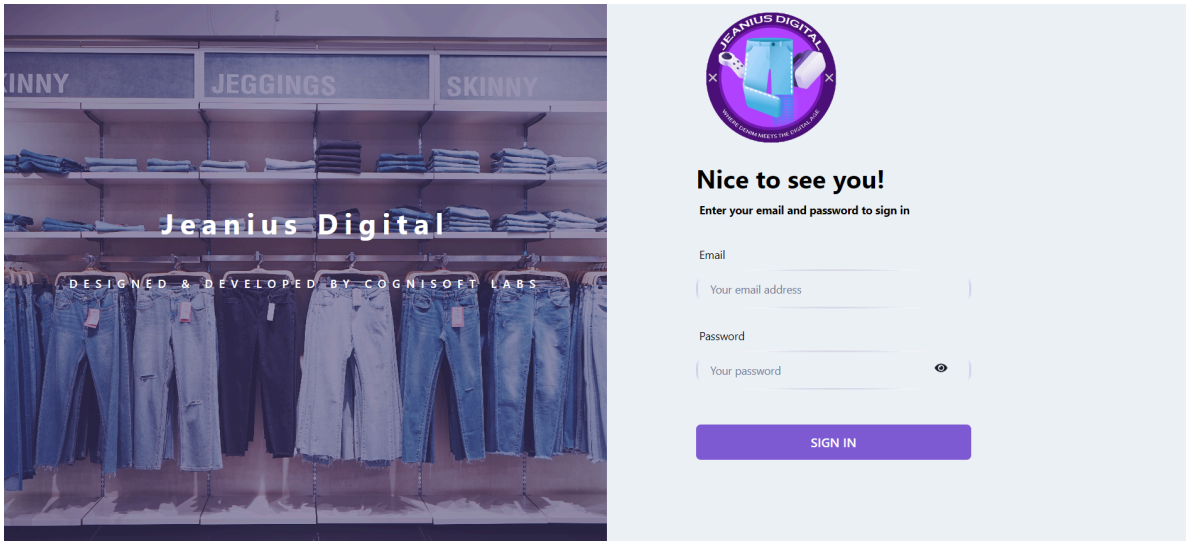
4. System Integration and Testing
   - Integration: Integrate color matching and jeans measurements models into Jeanius Digital's web app.
   - Testing and Validation: Test system performance with sample denim images. Validate accuracy against ground truth data and from a denim manufacturer.

Results

1. **Results Evaluation:** Evaluate system performance in terms of accuracy, speed, and user experience.
2. **Optimization:** Fine-tune color matching and measurements models for improved accuracy. Implement weighted thresholding for better accuracy.

User Interface:

Login Screen:



Measurements Dashboard:

Center Distance:	58.43
Right Length:	58.43
Left Length:	58.49
Right Diagonal Distance:	116.92
Left Diagonal Distance:	116.92
Area:	350638.5
Perimeter:	5814.45

Center Distance:	6.58
Right Length:	6.66
Left Length:	6.53
Right Diagonal Distance:	13.19
Left Diagonal Distance:	13.19
Area:	2572.5
Perimeter:	534.12

Front Right Pocket

Pixel To CM factor:	0.1
Top to Bottom Height:	12.3
Left Width:	6.5
Right Width:	6.5
Top Distance:	7.02
Bottom Distance:	6.98
Center Distance:	6.94
Right Length:	7.02
Left Length:	6.89
Right Diagonal Distance:	13.91
Left Diagonal Distance:	13.91
Area:	6293.5
Perimeter:	355.5

Front Beltwidth

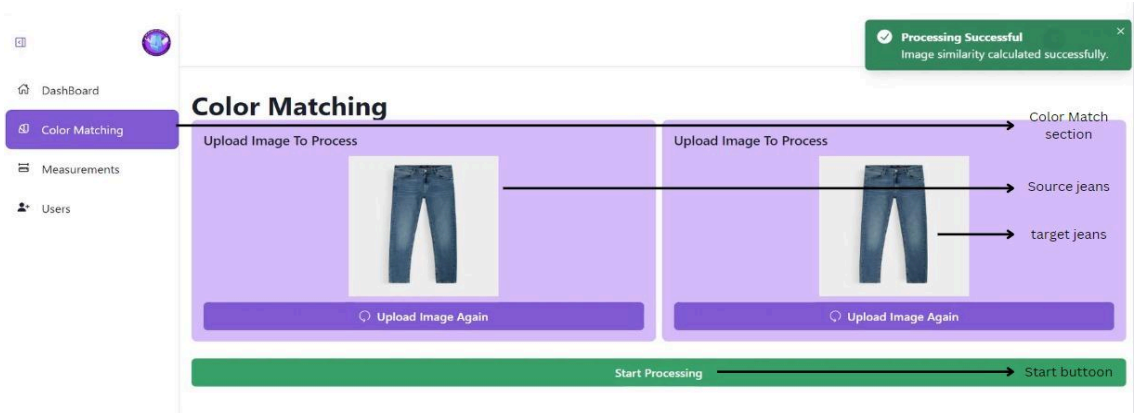
Pixel To CM factor:	0.1
Top to Bottom Height:	41.4
Left Width:	4.3
Right Width:	4.3
Top Distance:	20.82
Bottom Distance:	20.82
Center Distance:	20.81
Right Length:	20.82
Left Length:	20.81
Right Diagonal Distance:	41.62
Left Diagonal Distance:	41.62
Area:	13241
Perimeter:	1337.05

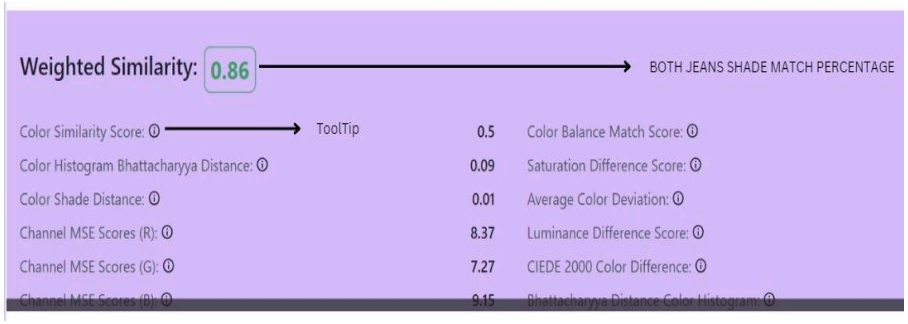
Main Button

Front Fly J

Results of measurements

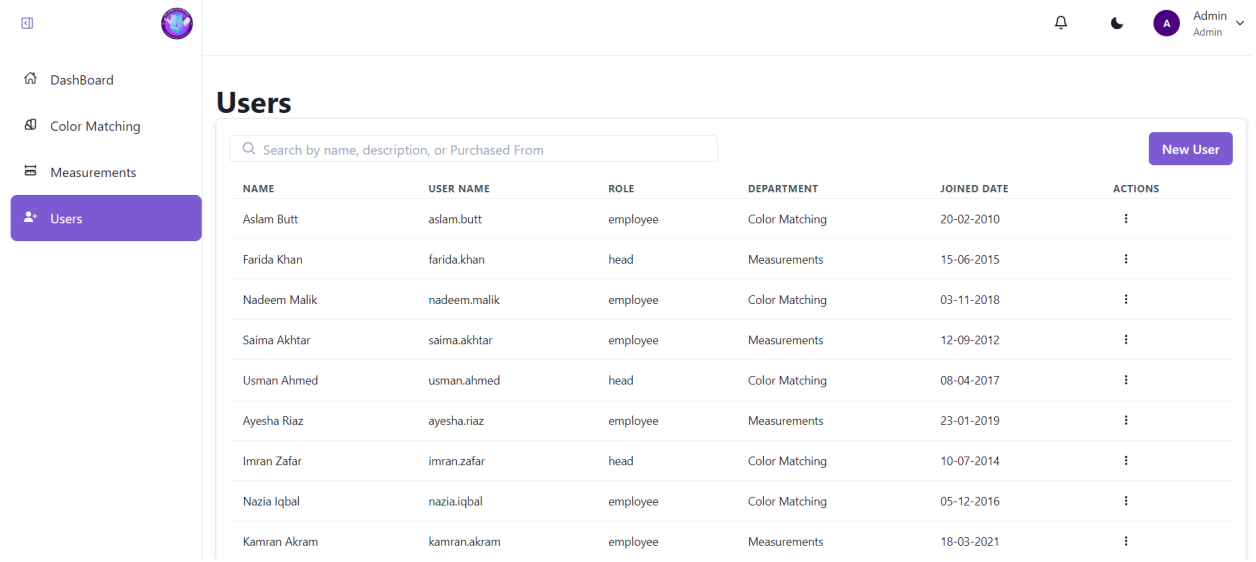
Color Matching Dashboard:





Results of color matching

Users Dashboard:



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