Seamless Integration of a Person into a Scene

Assignment Submission

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1. Objective

The goal of this assignment is to generate a photorealistic composite by integrating a person into a new background scene. This involves foreground extraction, shadow simulation, light adjustment, and color harmonization to ensure the final image looks realistic and natural.

2. Tools and Technologies Used

Tool	Purpose
rembg	Background removal from the person image
Pillow (PIL)	Image enhancement and compositing
OpenCV	Gamma correction and image transformation
NumPy	Image array manipulation
Streamlit	User-friendly interface for the process

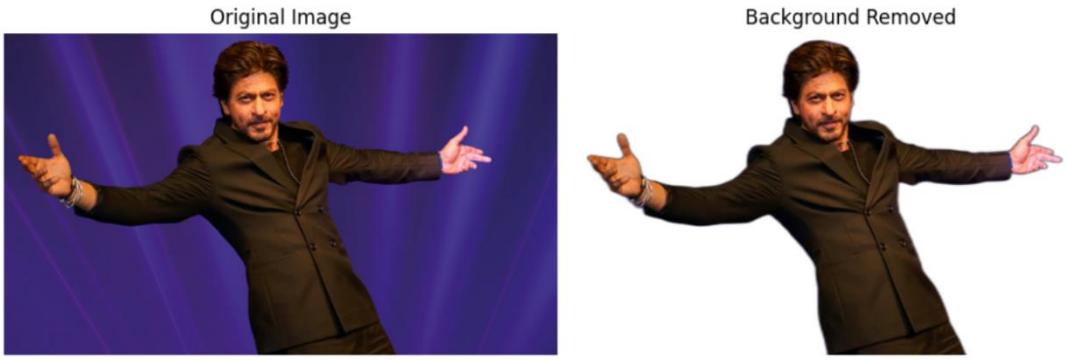
3. Algorithm Overview

Task 1: Preparing the Person's Image

A front-facing photo of a person was taken under even lighting.

The background was removed using a pre-trained deep learning model.

The result is a clean foreground image with transparency.



Task 2: Shadow and Lighting Analysis

A soft shadow was generated by using the transparency mask of the person.

The shadow was blurred based on the height of the subject to simulate natural diffusion.

The shadow was offset slightly to match real-world light behavior.

Without Shadow:

Visual of shadow applied behind the extracted person

Task 3: Light Direction Estimation

Lighting was indirectly adjusted through gamma correction.

This helps blend the brightness and shadows between the person and the background.

Task 4: Coloring and Blending

Enhancements were applied:

Slight increase in contrast and brightness

Saturation and sharpness fine-tuning

These adjustments harmonized the person with the background, making them appear naturally embedded.

Task 5: Final Composite Output

The person and the simulated shadow were composited into the background image.

Image enhancements were applied globally to both the person and background to maintain harmony.

The image was exported at high resolution.

DEPLOYED LINK : https://ai-image-compositor.streamlit.app/

GITHUB LINK : https://github.com/Soha-n/Ai-image-compositor

5. Final Composite Images