

Seamlessly Integrating a Person into a Scene

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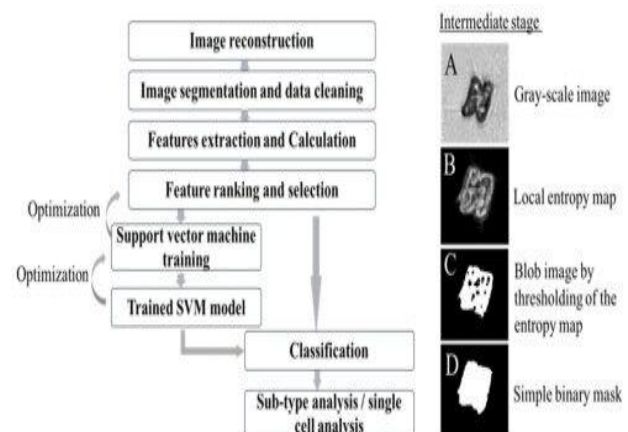
Objective – Implement a step-by-step process to place a person into a given scene and seamlessly blend them to make the result look photorealistic.

Images Used –



STEP 1 - Capture and background removal

- A high-quality full-body image was captured of the subject facing the sunset.
- The background was removed using MODNet (via the rembg library) while preserving the alpha channel for blending. The output is a transparent PNG of the subject.



- **Algorithm Used:** Deep Image Matting (U^2 -Net / MODNet)

STEP 2 – Image Preparation

- The subject was resized proportionally to match human scale in the beach scene.
- The alpha mask was corrected to ensure full opacity where necessary. This prevented any ghost-like transparency.
- **Algorithm Used:** ImageResizing + Alpha Thresholding

STEP 3 - Background Analysis

- The beach image was studied to determine lighting direction: the sun is setting near the horizon on the right side, casting long soft shadows to the left.
- Sky colors are warm and golden near the horizon with blue and violet hues above. The sand has reflective wet properties.

STEP 4 – Shadow Generation

- **Directional Soft Shadow:** A blurred, low-opacity replica of the subject mask was transformed diagonally to simulate sunset shadows.
 - **Algorithm Used:** Affine Transform + Gaussian Blur
- **Contact Shadow:** A denser, short-range shadow was added directly under the subject's feet to ground them.
 - **Algorithm Used:** Cropped Mask + Localized Gaussian Blur

STEP 5 – Lighting Integration

- **Light Wrap:** A blurred crop of the background behind the person was blended into their outline to simulate rim lighting.
 - **Algorithm Used:** Background Crop + Composite + Blend

- **Color Harmonization:** The person was enhanced using contrast and color boosting to match the golden hue of the scene.

STEP 6 – Reflected Silhouette

To match the wet sand, a vertically flipped, blurred, low-opacity reflection of the subject was added just below the feet.

- **Algorithm Used:** Vertical Flip + Alpha Scaling + Blur

STEP 7 – Layered Compositing

- Final image was assembled in this order:
 1. Original beach background
 2. Reflected silhouette
 3. Soft long shadow
 4. Ambient foot shadow
 5. Subject with light wrap applied
- **Algorithm Used:** RGBA Pasting with Alpha Mask

Result –



Flowchart of the experiment -

