Weekly Report – Content-Aware Image Resizing Using Seam Carving

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I. SEAM REMOVAL AND VALIDATION

We successfully implemented the vertical seam removal module and verified the behavior using progressive removal results. The cumulative DP cost matrix and seam tracing method were employed to remove one seam at a time, allowing for image resizing without scaling distortion.

After validating vertical seams, we extended the method to horizontal seam removal by rotating the image.

II. SEAM VISUALIZATION

We built a visualization module that overlays the selected seam on the image using colored lines. This visual check enabled us to compare seam selections with expected low-energy zones.

Natural scenery images (such as beaches and forests) showed the correct removal of unimportant background, while architectural images suffered from the bending of straight structures.

III. IDENTIFIED LIMITATIONS

- Seams passed through human faces when low-gradient regions existed within the face area.
- Repeated seam removal introduced distortions around objects with a large presence.
- Straight line geometry became wavy over multiple seam iterations.

IV. NEXT STEPS AND IMPROVEMENTS

- Compare multiple energy functions (Sobel, Prewitt, Laplacian)
- Start designing saliency-based object protection masks
- Explore forward energy concept to reduce artifact generation
- Conduct qualitative comparison with standard resizing