

Technical Report on Image Inpainting (Computer Vision Application)

CIE - I

Group Activity

Computer Vision Applications in Everyday Life

Subject: Computer Vision

Class: Third Year CSE – A Division

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1. Real-World Problem Being Solved

Image inpainting is a computer vision technique used to restore missing, damaged, or unwanted parts of an image. In daily life, this application is commonly used in photo editing apps to remove unwanted objects (such as people, wires, stains, or text), restore old photographs, or repair damaged images. The main problem being solved is how to automatically fill the missing region in an image in a way that looks natural and visually consistent with the surrounding area.

Photograph of Application:



2. Why This is Computer Vision and Not Just Image Processing

Image inpainting belongs to Computer Vision because it requires understanding the context and semantic meaning of the image, not just applying simple filters or pixel-level operations. Traditional image processing performs basic operations such as brightness adjustment, filtering, or edge detection. However, inpainting requires the system to analyze objects, textures, structures, and scene context to intelligently predict what should appear in the missing region. Modern inpainting systems use deep learning models that learn patterns from large datasets, making it a high-level vision task rather than simple image manipulation.

3. Computer Vision Tasks Involved

The following computer vision tasks are involved in image inpainting:

- Detection – Identifying the region that needs to be removed or filled.
- Segmentation – Separating the target object or damaged region from the background.
- Feature Extraction – Understanding textures, edges, and patterns around the missing area.
- Reconstruction / Generation – Predicting and generating realistic content to fill the missing region using AI models.

4. Type of Input Data and Expected Output

Input Data: The system typically takes a digital image along with a mask that indicates the region to be removed or restored. In advanced systems, video frames can also be used for video inpainting.

Expected Output: The output is a restored image where the selected region has been filled in a visually realistic way that blends naturally with the surrounding content.

5. Advantage and Limitation

Advantage: Image inpainting saves time and effort by automatically removing unwanted objects and restoring damaged images without manual editing. It is widely used in photography, film editing, digital restoration, and social media.

Limitation: The system may produce unrealistic or blurry results when dealing with complex textures, large missing areas, or insufficient surrounding information. The quality heavily depends on the model and training data.