

CVIT Workshop Day 1

Image Processing vs. Computer Graphics vs. Computer Vision

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Image Processing

Pixel to Pixel Transformation

Modify or enhance images with algorithms

Goals

Improve quality, extract specific image info

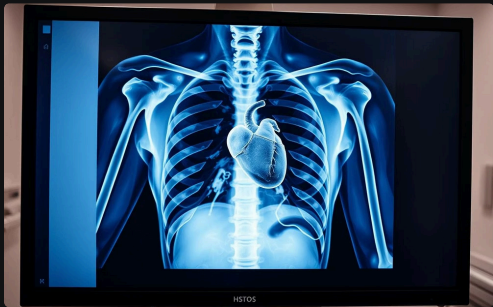
Inputs & Outputs

Input: Image; Output: Enhanced image

Example Tasks

Noise reduction, contrast improvement, sharpening

Image Processing Examples



Medical Imaging

Enhancing MRI and X-rays for diagnosis



Fingerprint Enhancement

Improving clarity for identification

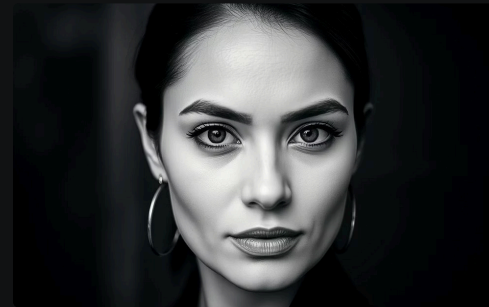


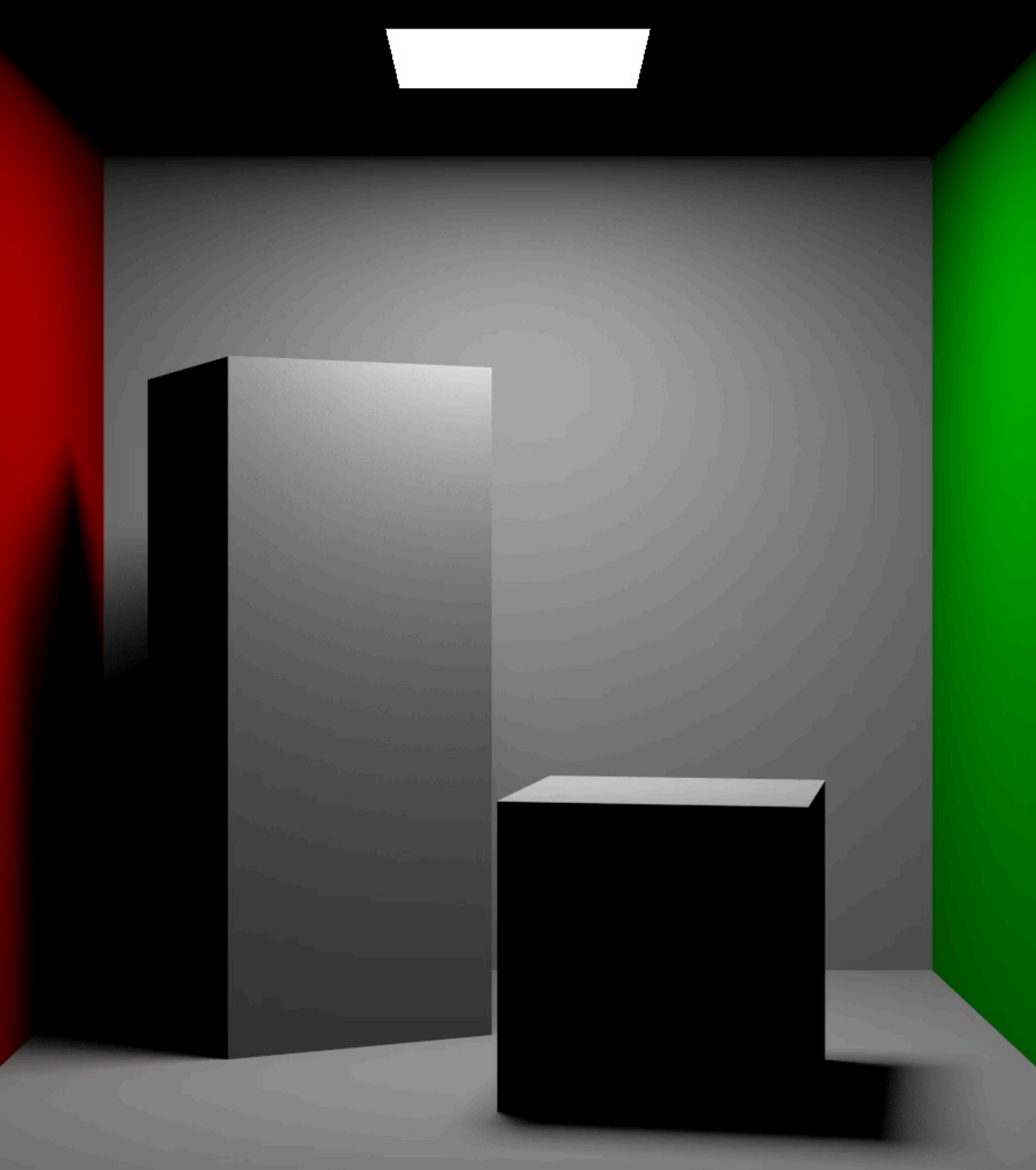
Photo Editing

Applying creative filters like in Photoshop



Edge Detection

Canny algorithm highlighting image edges



Computer Graphics

Symbol to Pixel Transformation

Convert models or scenes into images

Inputs & Outputs

Models, instructions → Rendered images

Goals

Generate realistic or stylized visuals

Examples

3D rendering, animation, video games

Computer Graphics Examples



Video Game Development

Designing characters and immersive worlds



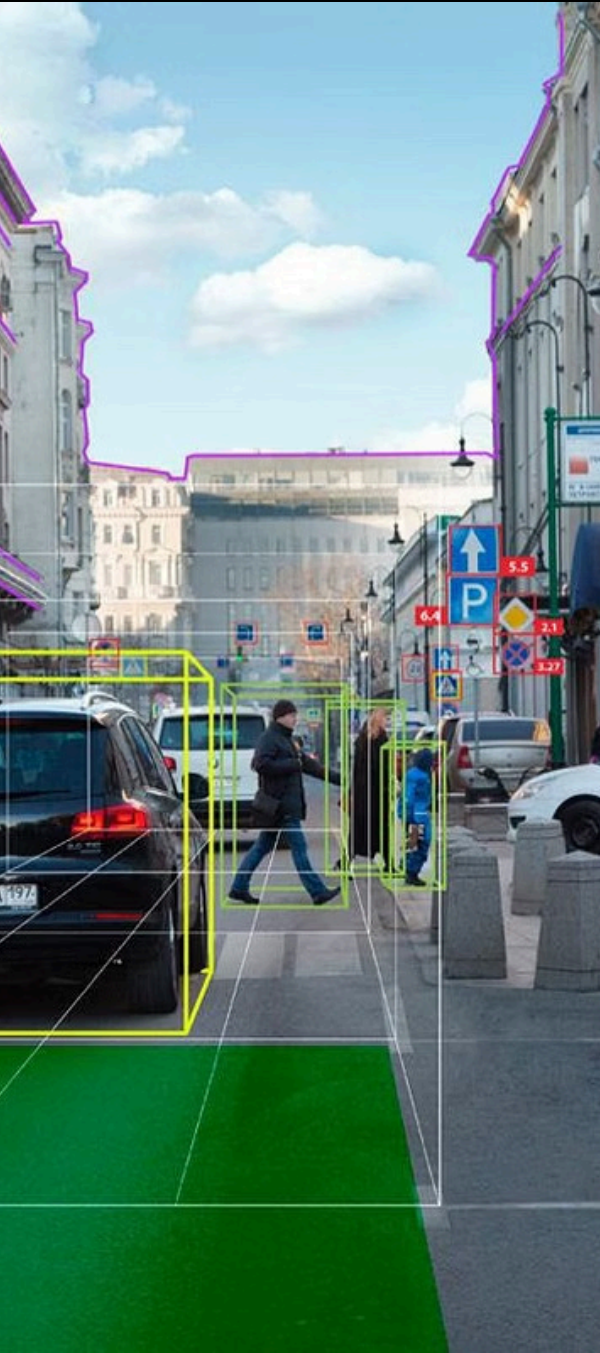
Special Effects in Movies

Enhance scenes with visual effects



Computer-Aided Design

Modeling and simulation of complex objects



Computer Vision

Pixel to Symbol Transformation

Convert images into understandable info

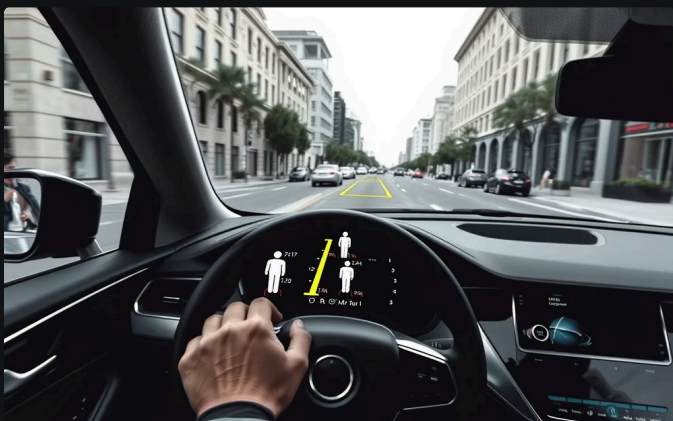
Inputs & Outputs

Images or video → Data interpretation

Goals

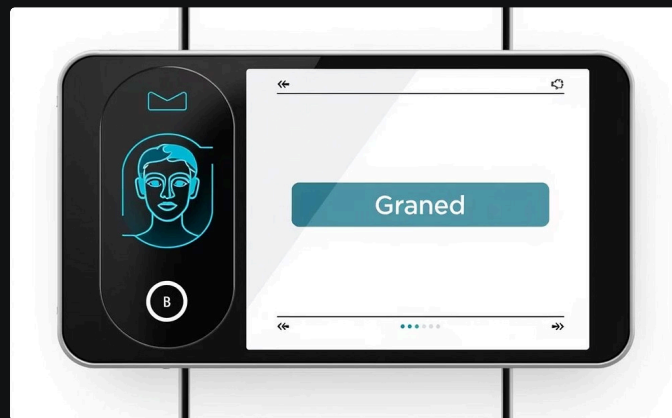
Extract meaningful insights to inform decisions

Computer Vision Examples



Autonomous Vehicles

Lane and pedestrian detection for safety



Security Systems

Facial recognition for controlled access



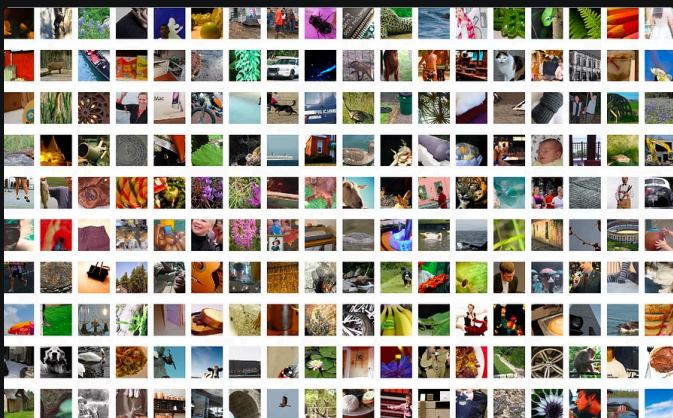
Text Segmentation & OCR

Digitizing printed documents accurately

Differences

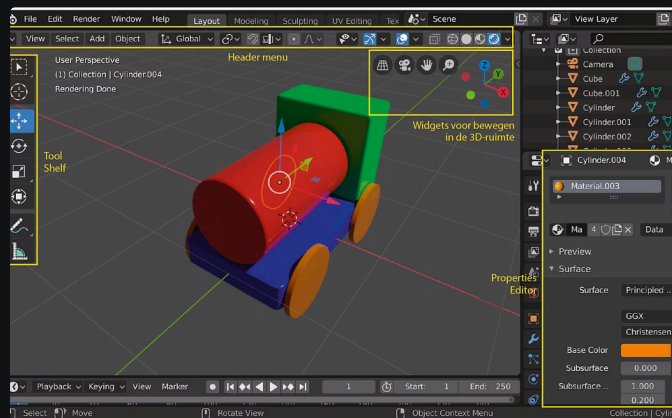
| | Image Processing | Computer Graphics | Computer Vision |
|--------|-------------------------|-------------------|-----------------------|
| Input | Image | Models, scenes | Image or video |
| Output | Enhanced image | Rendered image | Interpreted info |
| Goal | Improve/extract details | Create visuals | Understand and decide |

Overlap and Integration



Dataset Pre-processing

Prepares images for training in computer vision tasks.



Synthetic Data Generation

Uses graphics for generating data for CV training.



Augmented Reality

Enhances images with rendered virtual objects.

