



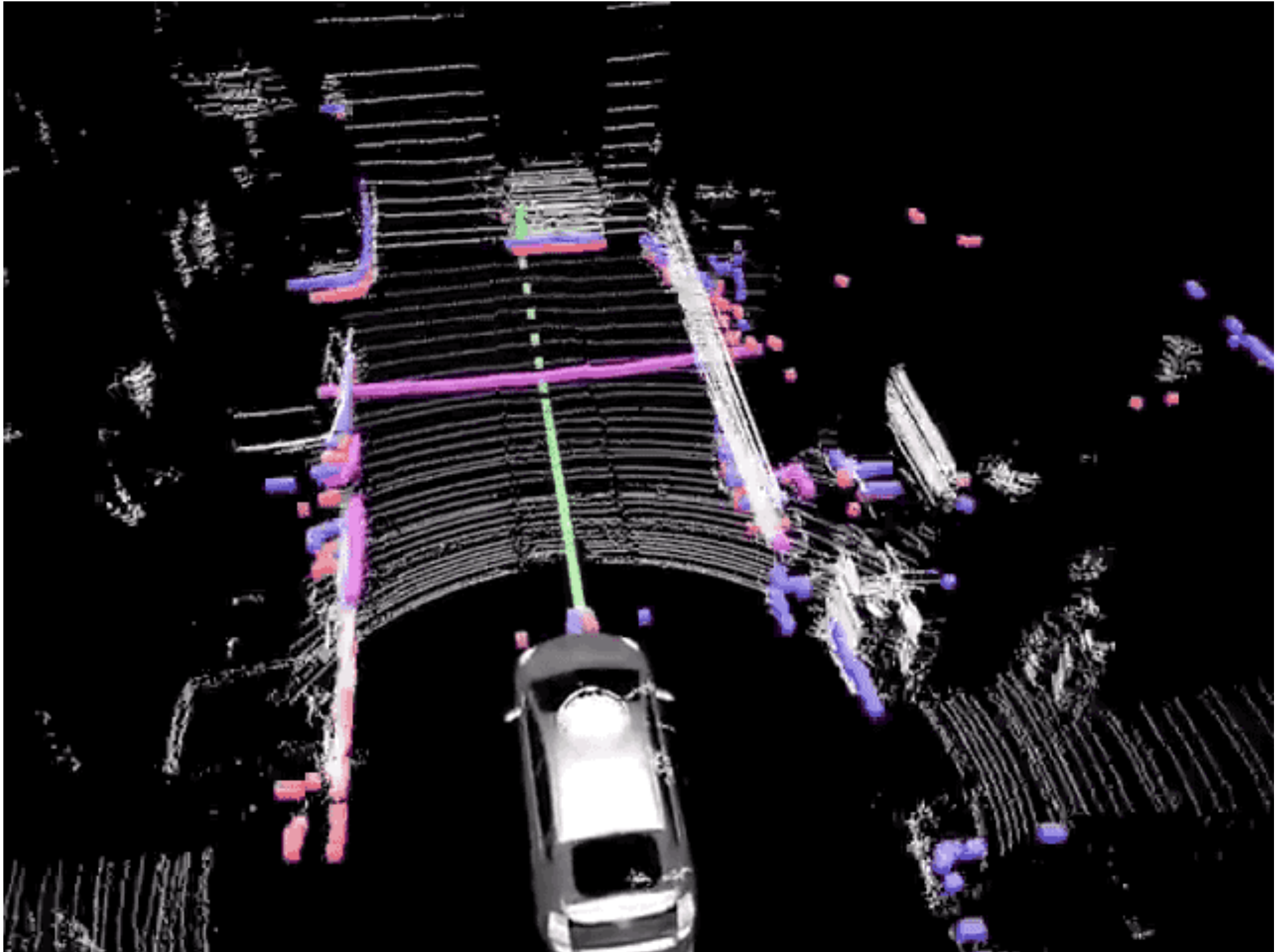
UDEMY COURSE ROBOT OPERATING SYSTEM BASICS, MOTION, AND OPENCV

PROF. ANIS KOUBAA

OpenCV for ROS

<https://www.udemy.com/user/anis-koubaa/>

ROBOT PERCEPTION



OPENCV

- ▶ Open Source Computer Vision Library
- ▶ BSD license
- ▶ Free for both academic and commercial use
- ▶ C++/Python/Java
- ▶ Windows, MacOS, Linux, iOS, Android
- ▶ Strong focus on real-time (written in C++ and optimized)



OPENCV

- ▶ 2D Image Processing
- ▶ Image Input/Output
- ▶ Video Input/Output
- ▶ Camera Calibration
- ▶ Video Analysis (motion extraction, feature tracking, foreground extraction, ...)
- ▶ Object Detection
- ▶ Machine Learning, Deep Neural Networks
- ▶ GPU-Accelerated Computer Vision
- ▶ and much more ...



IMAGE SEGMENTATION



- ▶ the process of partitioning a digital image into multiple segments
- ▶ used to locate objects and boundaries (lines, curves, etc.) in images

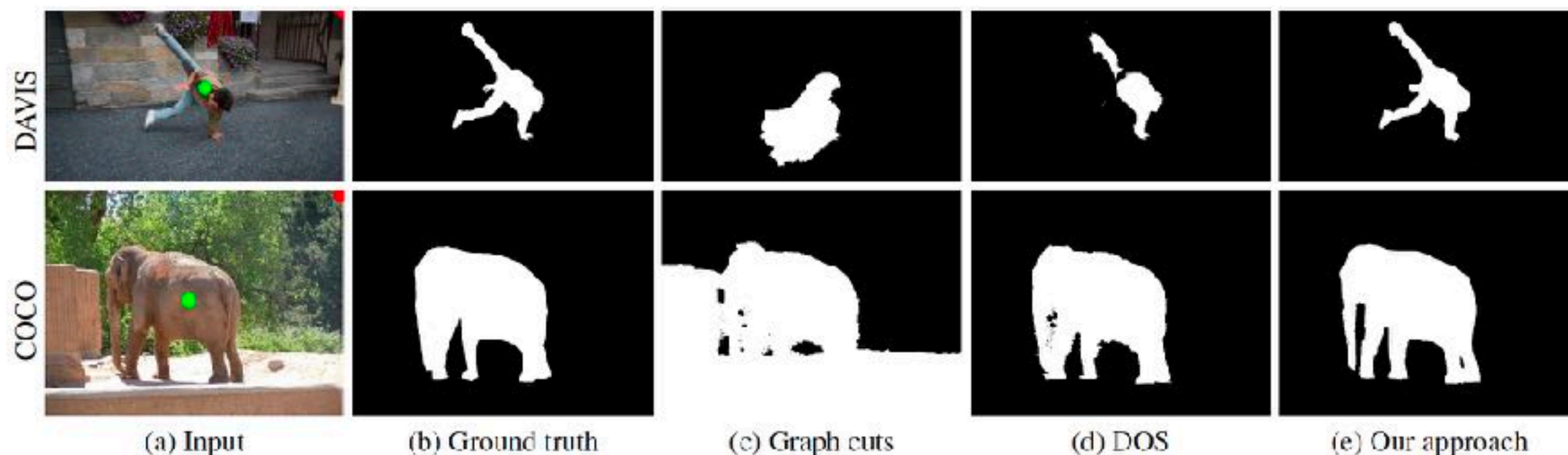


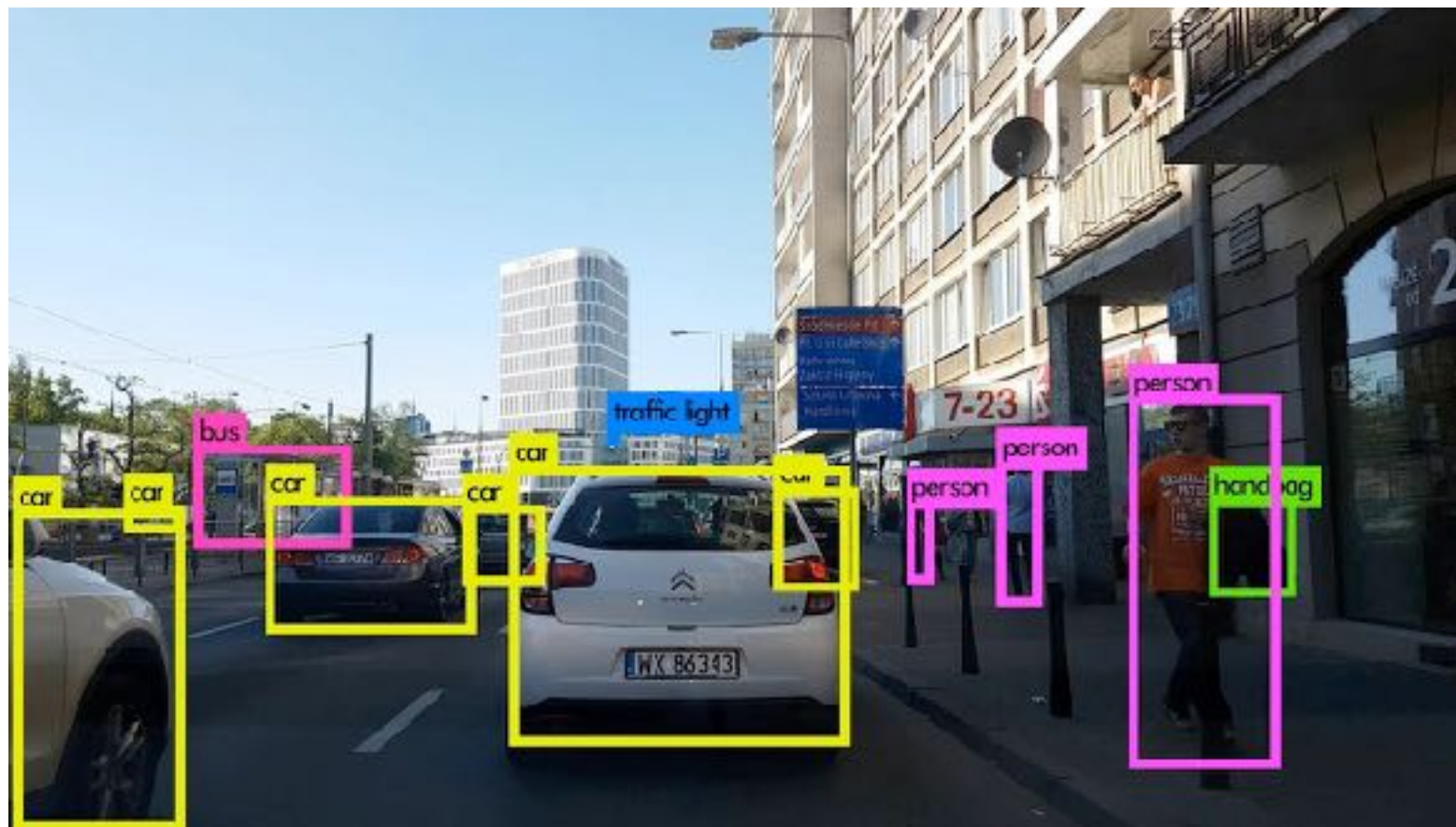
IMAGE THRESHOLDING

- ▶ Thresholding is the simplest method of image segmentation
- ▶ From a grayscale image, thresholding can be used to create binary images(Shapiro, et al. 2001:83).



OBJECT DETECTION AND RECOGNITION

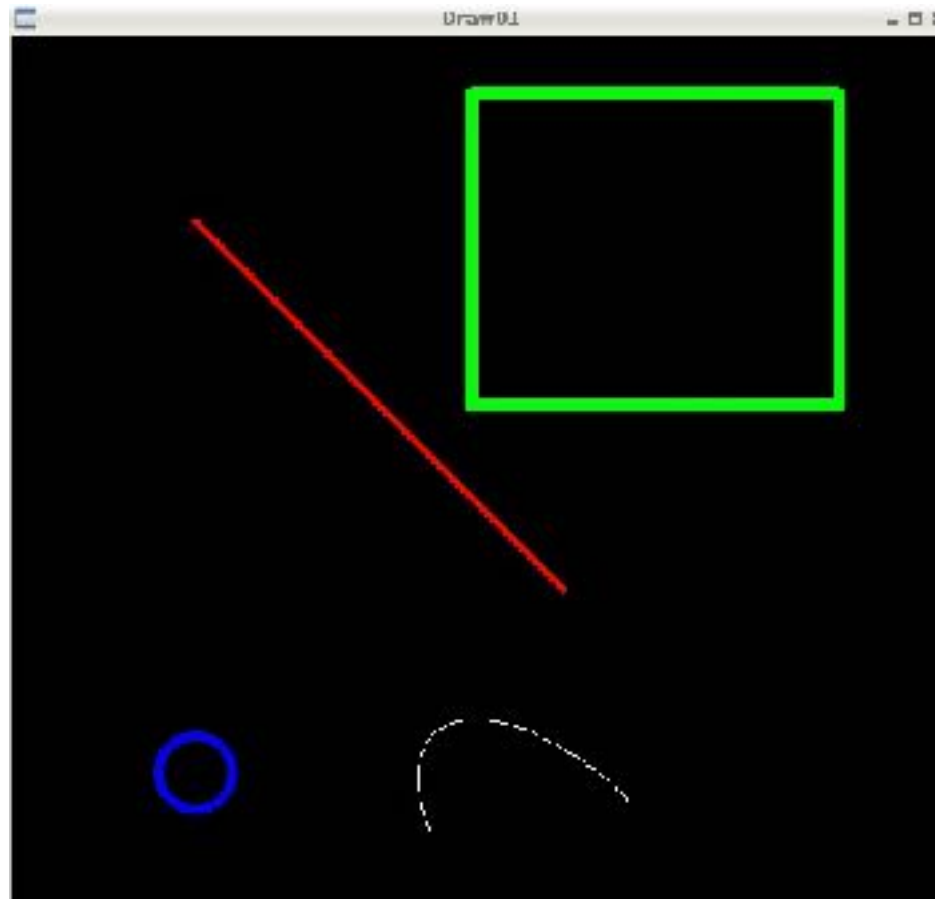
- ▶ Detecting instances of semantic objects of a certain class (such as humans, buildings, or cars) in digital images and videos



DRAWING

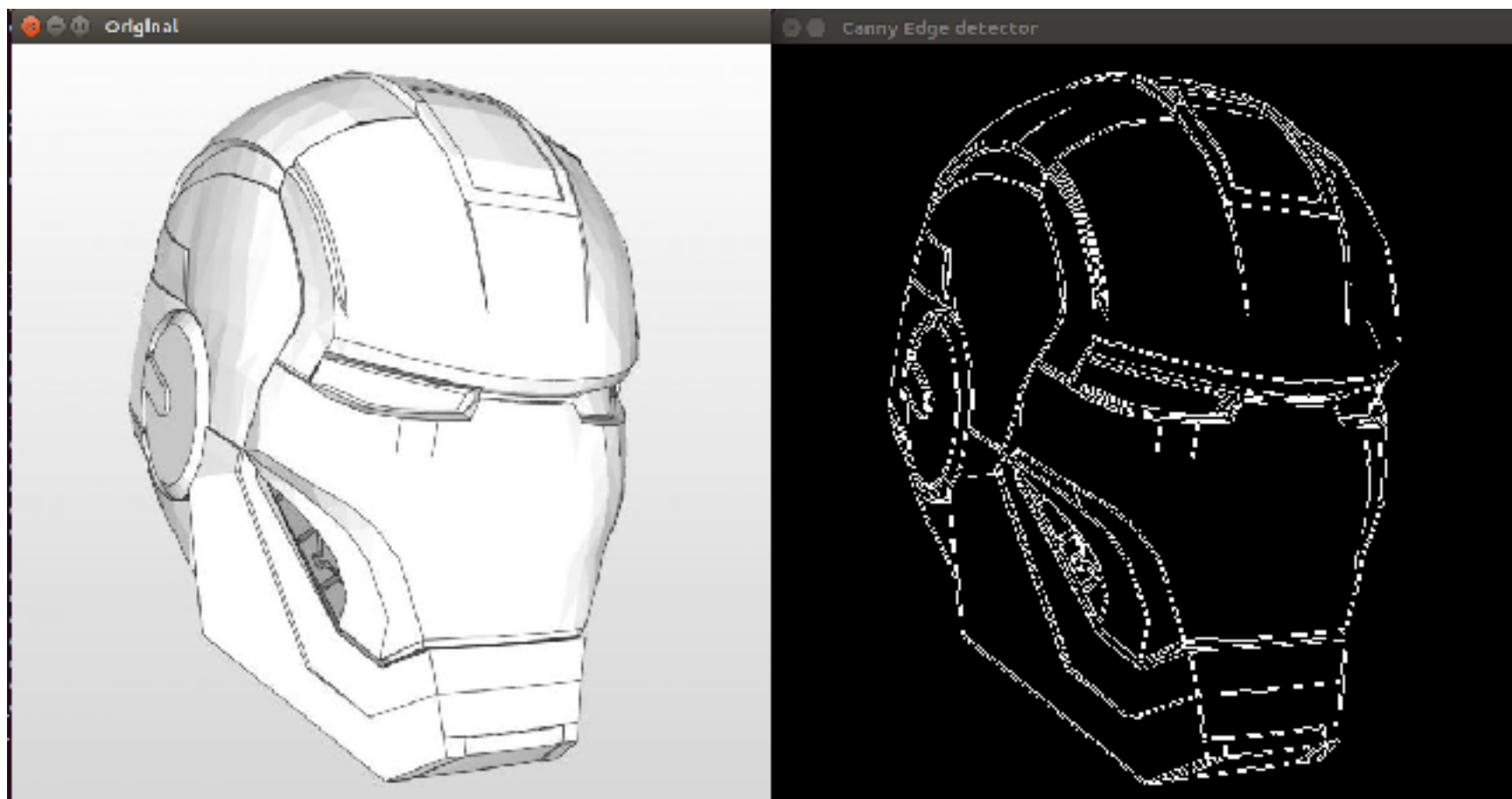


- ▶ Draw different shapes (circles, lines, polygons, text, ...)



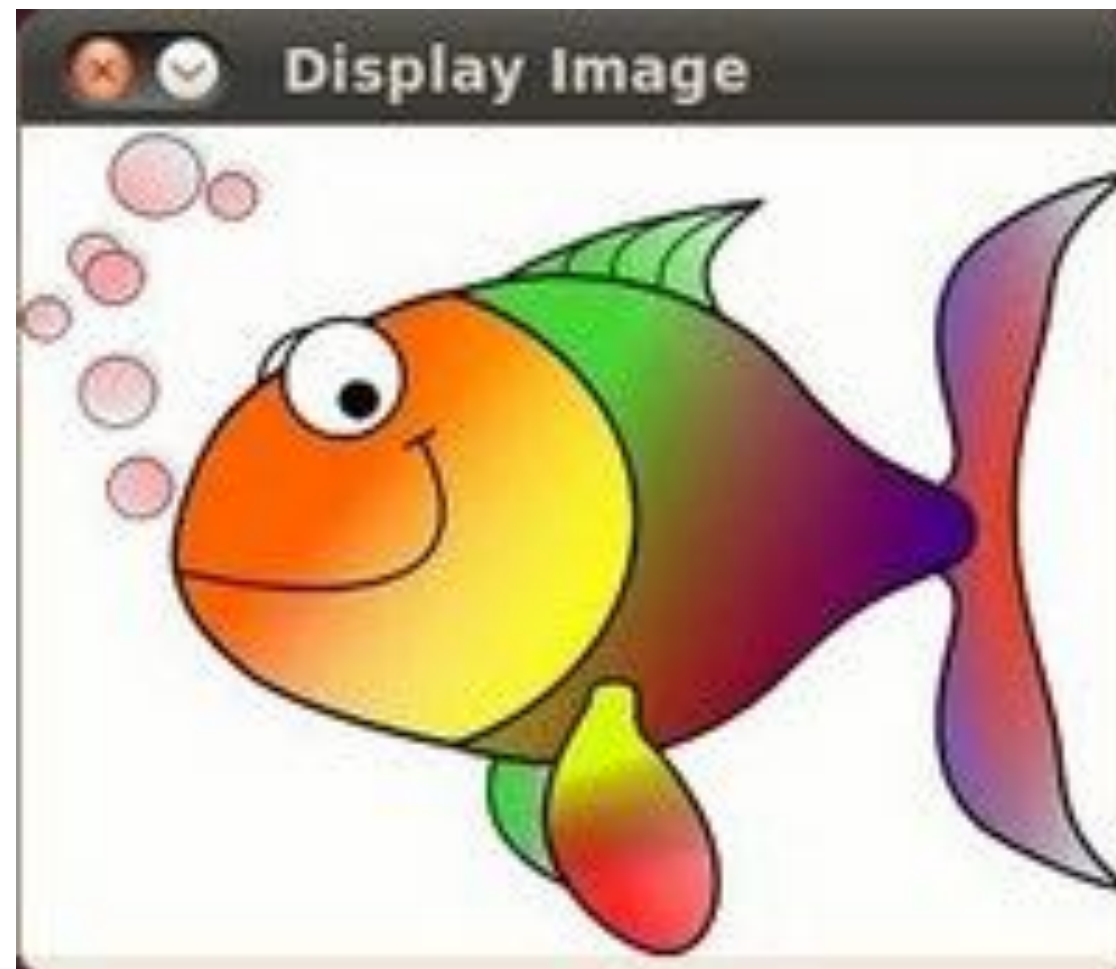
EDGE DETECTION

- ▶ Find the boundaries of objects within images
- ▶ Works by detecting discontinuities in brightness.
- ▶ Used for image segmentation and data extraction



VIDEO/IMAGE INPUT OUTPUT

- ▶ Read/write images and video streams





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