

Midterm Exam 1/2

Machine vision algorithms

doc. dr. sc. Filip Šuligoj
fsuligoj@fsb.hr



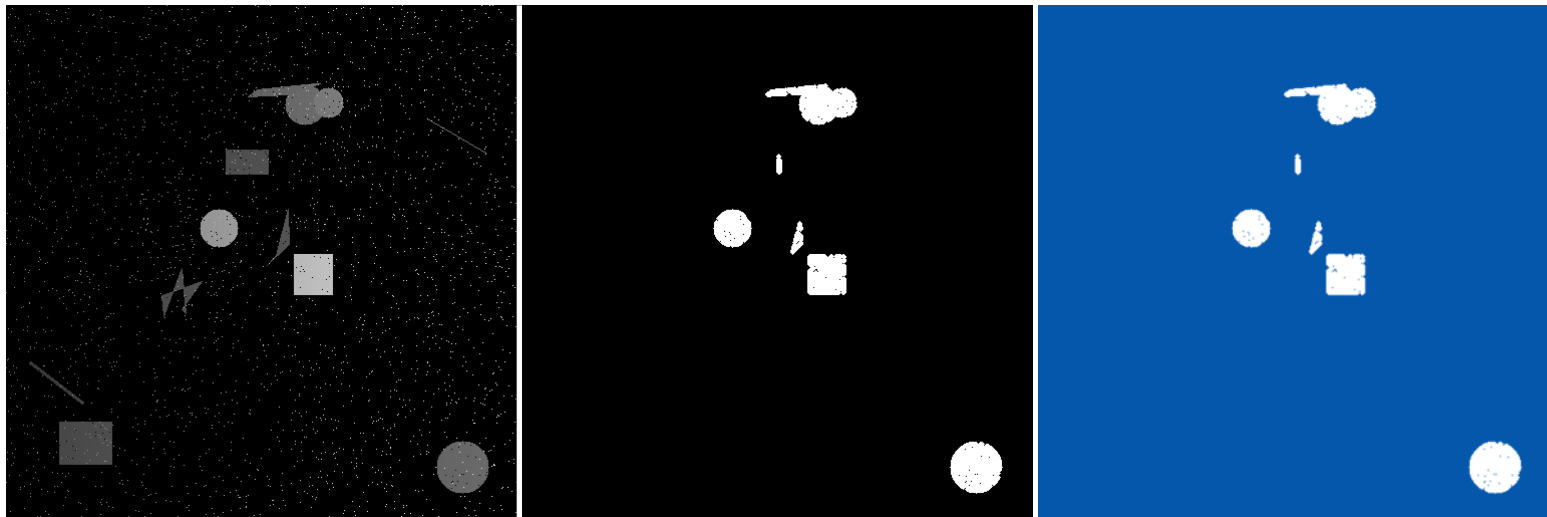
University of
Zagreb



Faculty of mechanical
engineering and naval
architecture

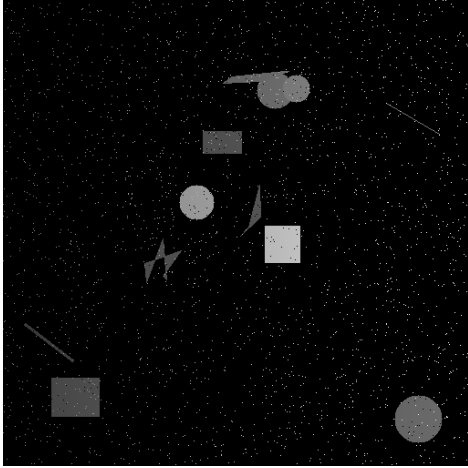
Practical task 1 – image processing and binary mask extraction

1. Apply appropriate image processing methods to reduce noise, with additional credit awarded for preserving the original structure of larger objects.
2. Apply suitable thresholding or alternative methods to segment the target parts or shapes. Display the resulting binary mask image.
3. Use the binary mask to highlight the segmented parts against a blue background.
4. Save the resulting images using the `imwrite()` function, and display them in a window.
5. Each student will work with a unique input image.
6. Capture a screenshot showing both the result window and the terminal output. Save the source code as a text file. Upload all required files (code and images). Refer to the example provided below.

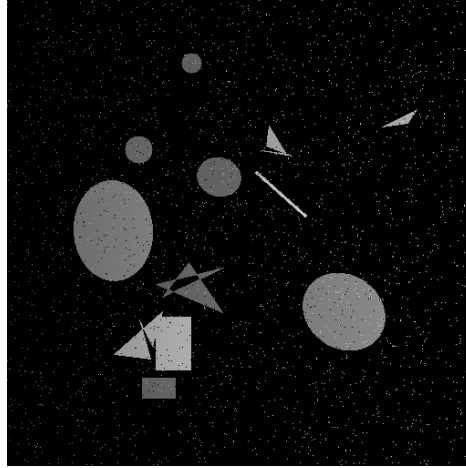


Practical task 1 – image processing and binary mask extraction

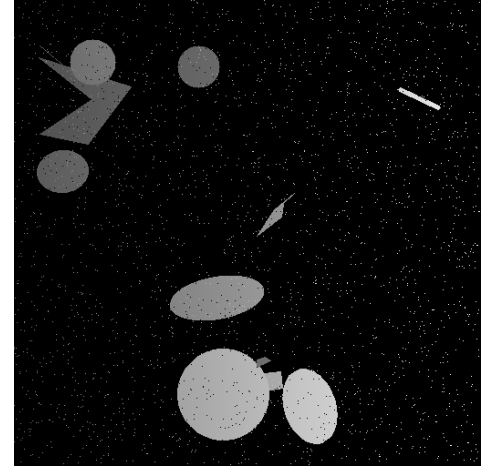
synthetic_shapes_1.png



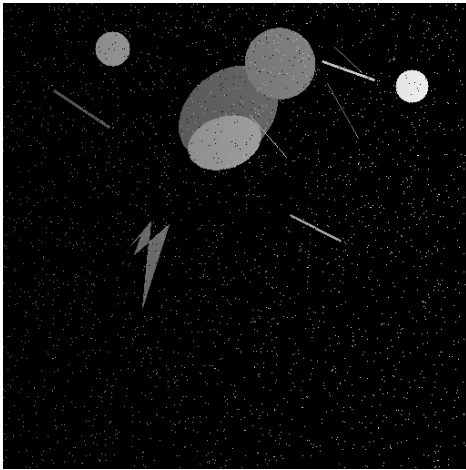
synthetic_shapes_2.png



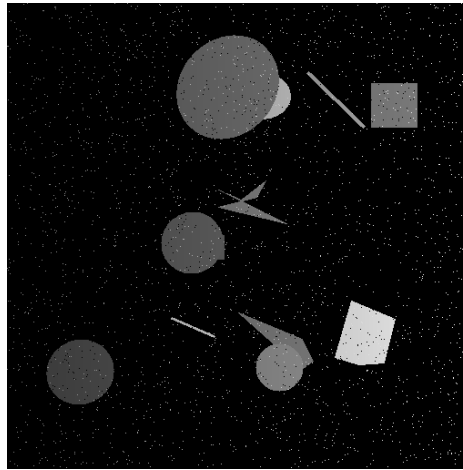
synthetic_shapes_3.png



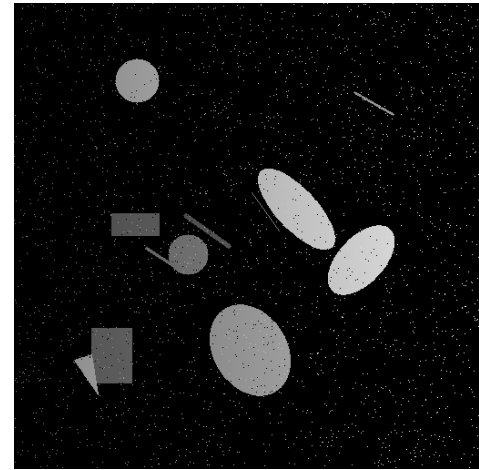
synthetic_shapes_4.png



synthetic_shapes_5.png

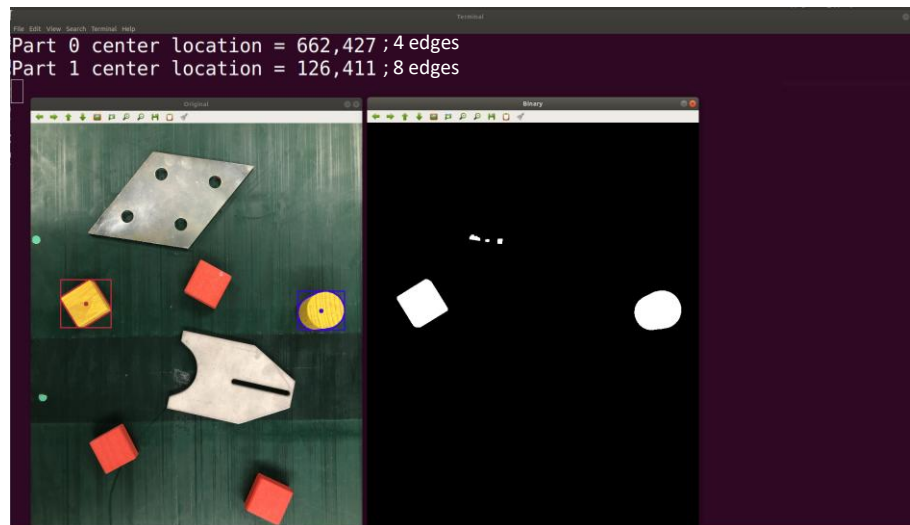


synthetic_shapes_6.png



Practical task 2 – part detection

1. Apply appropriate image processing techniques to reduce noise.
2. Apply suitable thresholding or alternative methods to detect the ***SPECIFIED** parts, compensating for non-uniform lighting conditions.
3. For each ***SPECIFIED** detected part, draw a contour, a rectangular bounding box, and a small circle at the center (display these on a color image).
4. Output the center coordinates and an approximation of the number of edges of each shape to the terminal. Additionally, display the corresponding binary image.
5. Save the resulting image using the `imwrite()` function and display the result in a window.
6. Each student will work with their own set of images and specified tasks.
7. Capture a screenshot showing both the result window and the terminal output. Save the code as a text file. Upload both the code and the images. Refer to the example provided below.



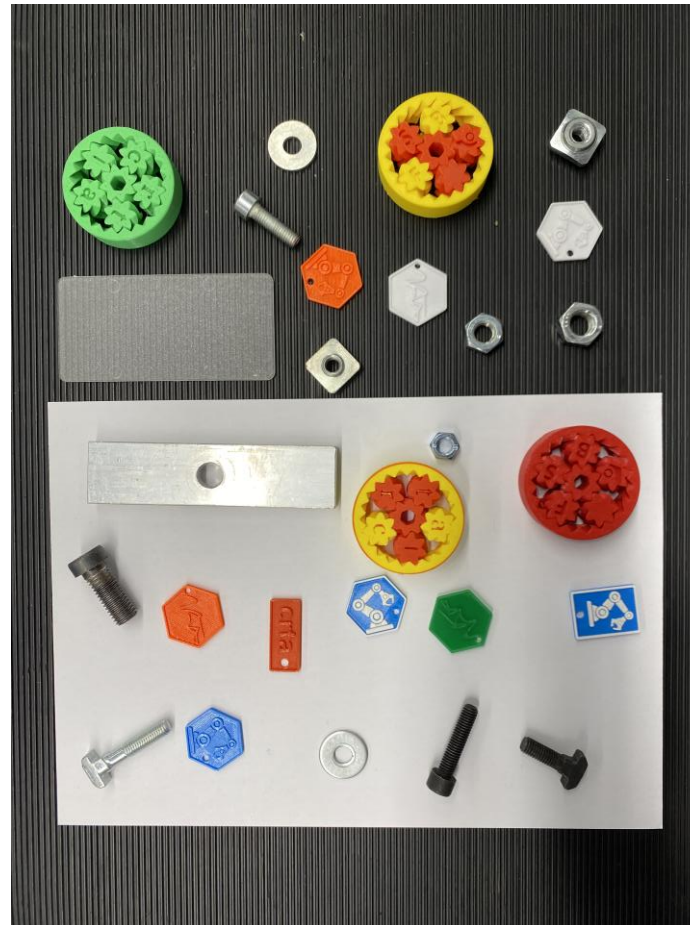
Practical task 2.1. - Image 8.jpg

**SPECIFIED objects – all hexagon shaped 3D prints*



Practical task 2.2. - Image 12.jpg

**SPECIFIED objects – all circular objects*



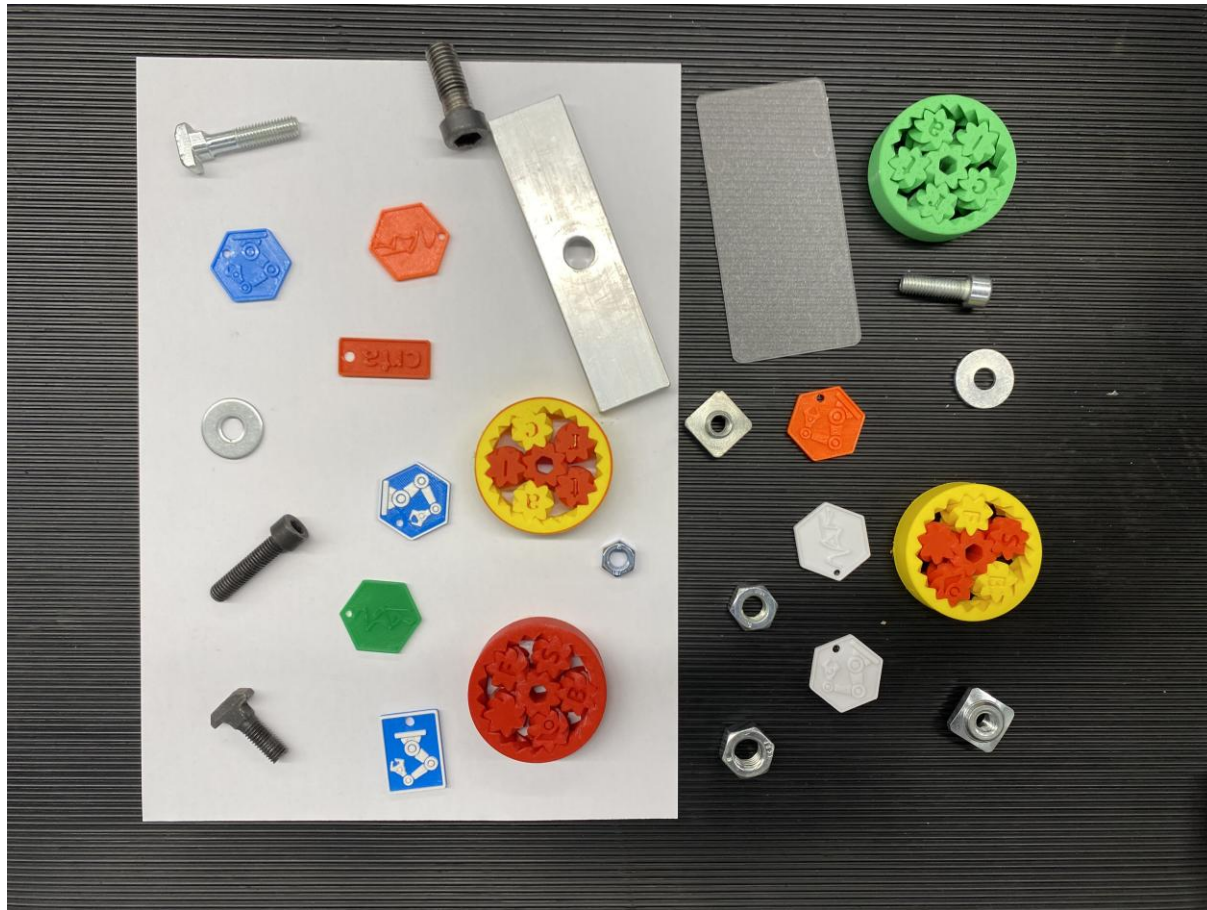
Practical task 2.3. - Image 9.jpg

**SPECIFIED objects – all metal nuts and washers*



Practical task 2.4. - Image 10.jpg

**SPECIFIED objects – all 3D printed circular objects*



Practical task 2.5. - Image 11.jpg

**SPECIFIED objects – all bolts*



Practical task 2.6. - Image 12.jpg

**SPECIFIED objects – all rectangular objects*

