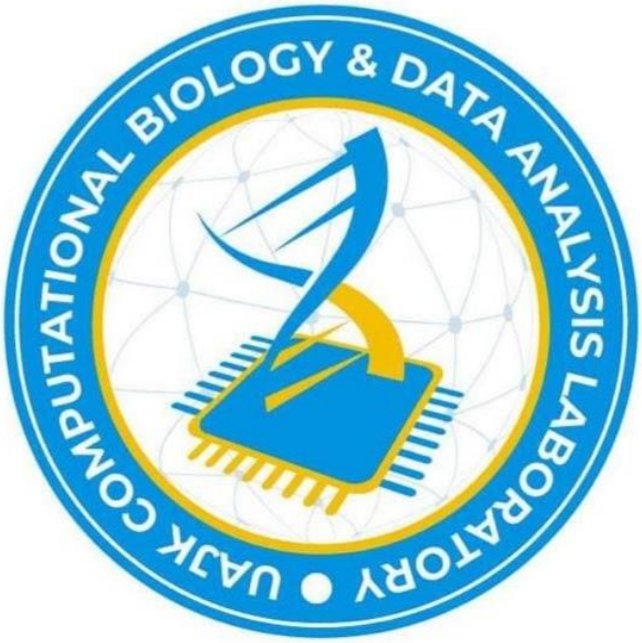


# DIGITAL IMAGE PROCESSING
# LAB MANUAL

COURSE NAME: DIGITAL IMAGE PROCESSING

COURSE CODE: CS-3202

YEAR: 2024

DEPT: COMPUTER SCIENCES & INFOMAATION TACHNOLOGY

# List of Experiments

| Labs | Experiment | Objectives |
|---|---|---|
| 1 | Write a python program to perform Basic Operations load, display and save the images with skimage library.<br>For help:<br>https://medium.com/@betulmesci/image-processing-tutorial-using-scikit-image-basic-operations-on-images-7a53cbc26971 | • Scikit-image Brush-up<br>• Image basics<br>• Creating and understanding image histograms |
| 2 | Write a python program to perform Transformations like resize(), rotate() or rescale() on the Images with skimage library.<br>For help:<br>https://medium.com/@betulmesci/image-processing-tutorial-using-scikit-image-basic-operations-on-images-7a53cbc26971 | |
| 3 &4 | Manipulating pixels:<br>• Python script to ignore low intensity pixels in an image<br>• Python script to load a color image as grayscale<br>For help:<br>https://datacarpentry.org/image-processing/03-skimage-images.html | |
| 5 -7 | Write python programs to perform Connected Component Analysis of images with skimage library.<br>• Turn the image into grayscale, denoise it and apply a threshold so we can obtain a binary mask<br>• Counting Objects and Removing the Ones with Smaller Areas<br>For help:<br>https://medium.com/@betulmesci/image-processing-tutorial-using-scikit-image-connected-component-analysis-5a687293503b | |
| 8 & 9 | • Write a python program to Create and display grayscale and colour histograms for entire images using scikit-image<br>• Write a python program to Create and display for certain areas of images, via masks using scikit-image<br>For help: | |

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| | https://datacarpentry.org/image-processing/05-creating-histograms.html | |
| 10 | Write a python program to apply a low-pass blurring filter smooths edges and removes noise from an image using scikit-image<br><br>For help:<br>https://datacarpentry.org/image-processing/06-blurring.html#other-methods-of-blurring | |
| 11 | Write python programs to implement Filtering images with scikit-image<br>• Max Filter<br>• Convolutional Filters<br>• Gaussian filtering<br>For help:<br>https://github.com/TheJacksonLaboratory/Basic_skimageJAX/blob/master/lessons/2-Filters_and_convolutions.md | • Understading and implementing basic concepts of filtering in digital image processing |
| 12 | a) Write a python program to Use histograms to determine appropriate threshold values to use for the thresholding process.<br>b) Write a python program to Apply automatic thresholding to an image using Otsu's method<br>For help:<br>https://datacarpentry.org/image-processing/07-thresholding.html | Explain what thresholding is and how it can be used |
| 13 | • Use scikit-image in python to find and label connected objects in an image<br>• Use scikit-image in python to measure properties of labeled objects<br>For help:<br>https://datacarpentry.org/image-processing/08-connected-components.html | • Understand the term object in the context of images.<br>• Learn about pixel connectivity.<br>• Learn how Connected Component Analysis (CCA) works.<br>• Use CCA to produce an image that highlights every object in a different colour.<br>• Characterise each object with |
| 14 & 15 | • Use scikit-image in python to to mask small objects and remove artifacts from an image.<br>• Display the labeled image to view the objects coloured by label<br>For help:<br>https://datacarpentry.org/image-processing/08-connected-components.html | |

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| | | numbers that describe its appearance. |
| 16 | • Take image files from data/colonies-01.tif, data/colonies-02.tif, and data/colonies-03.tif.<br>• automatically count bacterial colonies with image analysis using python and acikit-image.<br>For guidelines: https://datacarpentry.org/image-processing/09-challenges.html | • Bring together everything you've learnt so far to solve a problem |

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