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| **Course Name:** | **Digital Image Processing** | **Semester:** | **VII** |
| **Date of Performance:** |  | **Batch No:** |  |
| **Faculty Name:** |  | **Roll No:** |  |
| **Faculty Sign & Date:** |  | **Grade/Marks:** |  |

**Experiment No: 2**

**Title: To study process of Bounding box across Image.**

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| **Aim and Objective of the Experiment:** |
| To study the process developing Bounding box |

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| **COs to be achieved:** |
| 1. **Understand fundamental theory and models of image processing** |

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| **Theory:** |
| Bounding boxes are one of the most popular and recognized tools when it comes to image processing for image and video annotation projects.  Image processing is one of the main reasons why computer vision continues to improve and drive innovative AI-based technologies. From self-driving cars to facial recognition technology computer vision applications are the face of new tech.  But image processing can’t be as simple as drawing rectangles around objects right? How do bounding boxes work, and what are the key elements that make this such a useful tool for annotators looking to create reliable datasets?  A bounding box is an imaginary rectangle that serves as a point of reference for object detection and creates a collision box for that object.  Data annotators draw these rectangles over images, outlining the object of interest within each image by defining its X and Y coordinates. This makes it easier for machine learning algorithms to find what they’re looking for, determine collision paths, and conserves valuable computing resources.  Bounding boxes are one of the most popular image annotation techniques in deep learning. Compared to other image processing methods, this method can reduce costs and increase annotation efficiency.  Implement face detection in a few minutes | by Christophe Ferreira | Medium |

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| **Stepwise-Procedure:** |
| 1. Click selfie through your phone 2. Get image into the PC on which you are working using gmail or any other medium 3. Read image using MATLAB online   A=imread(“Path of the image”)   1. Plot histogram using imhist command 2. Display image 3. Get user input pixel 4. Convert image to grayscale 5. Calculate delta (Difference between pixels) for all four directions (+X,-X,+Y, and-Y) 6. Find bounding box across the object clicked and find value of Delta 7. Repeat the same using Python Thonny |

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| **Output** |
| Upload picture screenshots for all approaches with intermediate steps  Answer the following questions:   1. What is histogram of an image. 2. Calculate aspect ratio of your face |

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| **Conclusions:** |
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| **Post Lab Subjective/Objective type Questions:** |
| 1. What is aspect ratio in digital images 2. What are different camera sizes in MP are available for different commercial mobile phones |

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| **Signature of faculty in-charge with Date:** |