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| IMAGE PROCESSING | | | |
| Day/Session | Topic | Description | Task |
| 1 | **INTRODUCTION** | * Why image processing? * The key features in image processing * Present level in image processing * History of image processing |  |  | |
| 2 | **CAMERA** | * Basic mechanism of camera * Types of camera –stereo camera * Data from camera * Detailed explanation on colour spectrum |  |  | |
| 3 | **Stereo camera** | * What is stereo? * A detail explanation about stereo graphic geometry * Working of stereo camera * Problems and limitation of stereo camera |  |
| 4 | **PYTHON** | * Basic introduction to python * Introduction to opencv * Installation of python and cv2 |  |
| 5 | **CAMERA CALIBRATION** | * Why camera calibration is required? * Types of distortion * File access in python | Find the required constant matrix to calibration |
| 6 | **Basic operation** | * There some photo edit can be done perfectly without using MS paint and adobe photo shop * Methods to Draw circle, triangle and other shape * Creating a track bar for mixing of colour | Create an info graphics of your  own |
| 7 | **ARITHMETIC OPERATION** | * **Addition –subtraction of image** * **Background and foreground extract** | Set track bar to adjust image opacity |
| 8 | **FILTER** | * Types of noise * Filter process | Remove the noise on a given image |
| 9 | **Colour space** | * What is colour space * Types of colour space | Convert image from RGB to YCBCR |
| 10 | **Masking** | * Introduction to masking colour   from the converted colour space   * Calibration to find correct threshold | Find the red colour in the given image |
| 11 | **Threshold** | * What is threshold * Binary threshold * Colour space threshold * Methods to bring perfect threshold value | Find the threshold level to find the red colour in real time video |
| 12 | **Contour** | * Brief explanation about contour * Shapes and size estimation * Region of interest of an object * Problems and limitation of contour | Find the location of a red circle ball in live video stream |
| 13 | **Machine learning** | * Intro to machine learning * Explanation of naive Bayes * Support vector machine introduction * Decision tree separation | **Task13**: Creating a Contact Manager using Database |
| 14 | **Machine learning in vision** | * Introduction to traditional vision and deep learning * Type of method in traditional vision * Limitation and difficulties in machine   learning | **Task14:** working with various sensor to perform a particular task |
| 15 | **FEATURE EXTRACTION** | * Edge detection in image * Need for feature extraction * Introduction to colour histogram | Find the edges in and print the number of edges |
| 16 | **classifier** | * Explanation on classifier * HOG classifier * Haar cascade * SIFT * SURF | Find human faces using haar cascade classifier |
| 17 | **Histogram** | * Mathametical modeling in image processing * objective of histogram * feature extraction using histogram | Plot histogram for red green and blue in the provided image |
| 18 | **Histogram of oriented gradient** | * Intro to gradient in image * feature extraction and combining two features | Find the Human in the given image |
| 19 | **Deep learning & neural network** | * Brief explanation on deep learning * intro to convolutional * Convolutional neural network * alexnet,googlenet,resnet | Train a number and find the number in a image |  |
| 21 | **Imagenet** | * Imagenet classifier handling * method to use a pretrained classifier | Find the catagory of the object in the provided  image |