Task 05

Explanation of code:

Images Processing:

Loading and Displaying Images:

Your notebook loads images from files and shows them in a graphical window. It waits for input from the user before closing the window so that the image is visible.

Color Manipulation:

- Transforms images from one color representation to another.
- Changes images from colored to grayscale for processing.
- Converts OpenCV's default BGR format to RGB for proper color display in Matplotlib.

Resizing Images:

- Adjusts image dimensions while maintaining aspect ratio or using custom dimensions.
- Useful for preparing images for processing or display in different layouts.

Blurring and Smoothing:

- Utilizes a method to suppress noise and make pictures smoother.
- Assists in preprocessing for applications such as edge detection and object recognition.

Thresholding (Black & White Conversion):

- Transforms images into black-and-white depending on brightness.
- Applies a fixed or adaptive technique to compensate for varying light levels.

Finding and Drawing Contours:

- Identifies objects and their boundaries in an image.
- Highlights boundaries and shapes to examine various objects.

Detecting Circles:

- Identifies circular shapes in an image.
- Frequently applied for detecting objects such as coins, eyes, or circular objects in real images.

Adding Text to Images:

- Adds text labels to images for annotation.
- Assist in overlaying descriptions, titles, or instructions on images directly.

Summary of images processing:

- Reads and shows images.

- Changes colors between various formats.
- Resizes images to display and process them more efficiently.
- Blurs images for noise removal.
- Applies thresholding to convert images to black and white.
- Detects and marks objects on images.
- Detects circles in an image.
- Places text on images for labeling.

Video Processing:

Video Capture from a Camera or File:

- Opens a file with a video or captures real-time video from a webcam.
- Reads the video frame by frame for processing.
- Displays a frame in a window.
- Awaits a key press to terminate the video loop and close the window.

Purpose:

Facilitates real-time video recording from a camera or playback of a pre-recorded video file.

Saving Video Output:

- Saves video and writes it to a file.
- Specifies the video format and codec to properly play it.
- Writes each processed frame to the output file.

Purpose:

It assists in saving edited videos, like those with effects added or objects found.

It's also performing Cartoon Effect, Vehicle Detection and Face Detection.

Summary of Video Processing:

- Reads video from file or webcam.
- Shows video frame-by-frame in a window.
- Outputs processed video to a new file.
- Cartooning is only partially done.
- Vehicle detection is not included.
- Face detection is not included