Project

1. Project Title

"Detecting and Analyzing Edges in Digital Images"

2. Project Overview

This project focuses on identifying and highlighting the edges within an image. Edges represent the boundaries or transitions between different regions in an image, such as the outlines of objects. The goal is to process a given image to extract and visualize its edges, providing insights into the underlying structure and features of the scene.

By implementing edge detection, students will explore how images are represented in computers and how mathematical operations can be used to extract meaningful patterns.

3. What We Aim to Do

The project involves taking an input image and transforming it into a representation that highlights only the edges. The resulting output will clearly show the transitions or boundaries, which are often invisible in the original image.

Students will:

1. **Process the Image**: Analyze the image pixel-by-pixel to detect areas where there are sharp intensity changes. These changes typically indicate edges.
2. **Identify Key Features**: Extract lines, curves, or boundaries in the image, which are essential for understanding the structure of objects in the scene.
3. **Visualize Results**: Present the detected edges as an output image or visualization that simplifies the original image to its most essential components.

4. Phase Two - Optional: Adding Edges to Boundaries

In this additional phase, students will have the opportunity to extend the functionality of the basic edge detection by highlighting the boundaries of the detected edges. This phase focuses on not only detecting edges but also marking the surrounding areas with visual boundaries to give a clearer sense of structure.

Objective:

After detecting the edges in the image, students will enhance the boundaries by drawing them on the object contours. The goal is to make the edges stand out by outlining them with a distinct color (such as red or any other chosen color) to help in better visualization of the shapes and structures within the image.