# AI Powered Safety Solutions-Detecting Road Damage and Prevention of Accidents on Ghat Road

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## Abstract

This project focuses on developing a comprehensive Pothole detection Analyzer using advanced computer vision techniques. The system processes a dataset of pothole videos in formats such as .mp4 and .avi. Initially, the input videos are transformed into frames and subjected to pre-processing, which includes resizing, converting to grayscale, and applying bilateral filtering to enhance image quality. Feature extraction is performed to obtain relevant characteristics, such as mean standard deviation and Local Binary Pattern (LBP). The processed images are then divided into training and testing sets to facilitate model evaluation and prediction. Utilizing the YOLO algorithm for object detection, the system identifies vehicles within the video frames. A Convolutional Neural Network (CNN-2D) is implemented for classification tasks. The system's output encompasses lane detection, vehicle counting within bounding boxes, and pothole region identification, along with a calculated caution measurement. Performance metrics, including accuracy and error rates, are analyzed to assess the effectiveness of the system. Additionally, a user-friendly web application is developed, allowing users to register, upload videos, and visualize pothole regions with the click of a button. This project ultimately aims to enhance road safety and infrastructure monitoring through automated analysis.