SYNOPSIS

Title: Empty Parking Spot Detection using CNN and OpenCV

Abstract:

This project develops an automated system to detect empty parking slots using Convolutional Neural Networks (CNNs) and OpenCV. The CNN model, trained on labeled parking slot images, classifies slots as empty or occupied based on grayscale inputs, aiming to optimize parking resource utilization and reduce urban traffic congestion.

Objectives:

- Develop an automated parking slot detection system using CNNs and OpenCV.

- Enhance detection accuracy through image preprocessing techniques.

- Provide real-time analysis of parking slot occupancy.

Technologies Used:

- Keras

- OpenCV

- Python

- CNN (Convolutional Neural Network)

Methodology:

1. Image Preprocessing: Convert images to grayscale and apply filters to enhance features.

2. Model Training: Train CNN on labeled parking slot images to classify empty or occupied slots.

3. Detection: Use the trained model to identify and mark empty parking slots in real-time images.

Results:

- Achieved high accuracy in detecting empty parking slots.

- Training accuracy: 94.24%, Validation accuracy: 97.11%

This project contributes to smart city applications by improving parking management efficiency and urban mobility.

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