



PARSHVANATH CHARITABLE TRUST'S
A. P. SHAH INSTITUTE OF TECHNOLOGY
Department of Information Technology
(NBA Accredited)



IOT and ML based Cross Platform Application for Smart Parking System

Group No. 13

Snehal Shanbhag	19104008
Pranjali Shimpi	19104017
Akansha Rawat	19104007

Prof. Sonal Jain
Prof. Charul Singh

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Abstract

- The term parking management system usually refers to the custom built hardware intensive systems installed in buildings and malls.
- We intend to build a cross platform smart parking system which aims to mitigate the parking problems by reducing time for drivers to look for vacancy positions in car parking lots and providing efficient parking space utilization.
- This project focuses on developing a parking management system based on image processing to detect vacant parking slots in our college premises where automated systems are not installed.

Introduction

Problem Identified :

With the continuous development of economy, personal vehicles have become an important part of our daily lives. Vehicle drivers find it difficult to get real time information about an available parking slot and managing the parking of the vehicle as size of parking slot is getting reduced.

Introduction

Solution Proposed :

- We propose a solution based on Artificial Intelligence, Machine learning and image processing which is very cost-effective as it requires just cameras and an efficient software system.
- The smart parking occupancy detection system is a technology which aims to mitigate the traffic congestion problems by reducing time for drivers to look for vacancy positions in car parking lots and providing efficient parking space utilization.

Objectives

- To identify and locate one or more vacant parking slots for vehicles detected through camera after entering a certain parameter using geolocation through google map Api.
- To have a maximum number of vehicles which can be parked in an organized manner into the temporary parking lot.
- To enable drivers to locate any available parking spots and reserve a particular spot through the App GUI.
- To train and test data using CNN algorithm for maintaining high accuracy.
- To display the count of vacant and reserved parking on App dashboard as well as LCD dashboard using MQTT protocol.
- To monitor parking availability based on high precision and detection of parking space using machine learning and image processing.

Literature Survey

1. A Multi-storey Garage Smart Parking System based on Image Processing

In this paper[1], the authors state that Car drivers and motorcycle riders spend a large amount of time finding an available parking space where slots are spread throughout multiple storeys which causes traffic congestion and long queues. The proposed system design described in the paper uses Python IDLE and the OpenCV library. For the testing, of the accuracy and reliability of the parking space identification system, sample videos of actual indoor parking garages were used. With this study, real-time image processing and updating of the parking slot availability offers an increased efficiency to the parking system and lower cost than installing individual car sensors in each parking space.

2. Smart Vehicle Parking Management System using Image Processing.

In this paper[2], the authors state that sophisticated systems detect the exact location of the empty spaces and guide the incoming drivers accordingly. Some advanced vehicles have their own parking systems installed but still hard for the system itself to confirm whether a vacant parking area truly exists or not. Despite all these systems, there are still places where parking facilities need to be set up on temporary or urgent bases; their application provides a cost-effective, image proceeding-based solution for such scenarios. It just needs to install cameras on the location to take images at regular intervals. Images are then processed to mark virtual parking slots of appropriate sizes, which are then used to keep track of the vacant spaces and can guide the incoming drivers accordingly through a mobile app.

Problem Definition

- In order to reduce hustle at peak time i.e. time-saving, reduce frustrations, enable accurately sensing vehicle occupancy in real-time, simplify the parking experience, and add value for parking stakeholders.
- This project introduces Smart Parking Management System using image processing providing a modern & innovative solution for temporary parking places, where no specific approach is used to park a vehicle.

Technology Stack

Software -

Frontend : Flutter

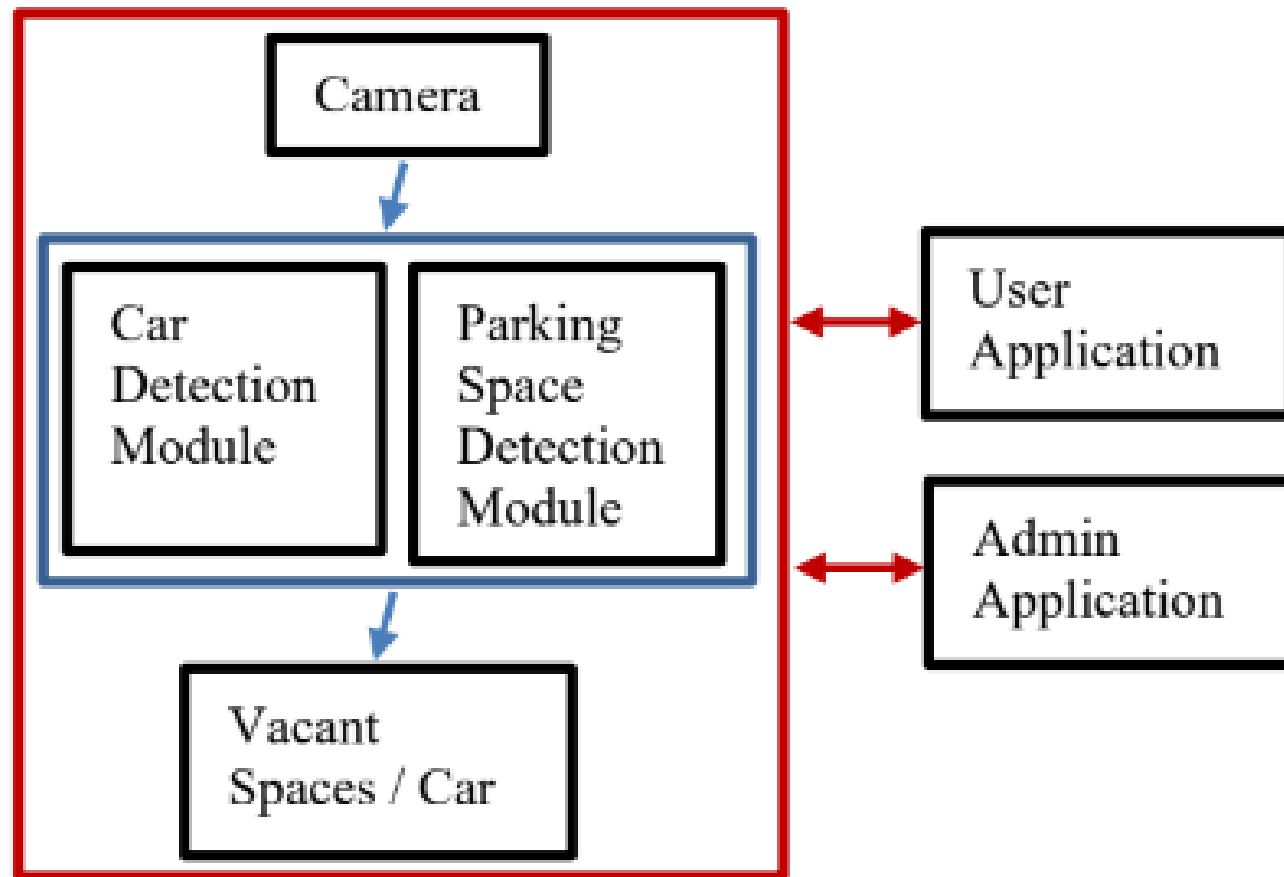
Backend :

- Python- version 3.9.13
- Cloud Platform - AWS
- Machine learning algorithm - CNN
- Image Processing

Hardware -

- IoT - LCD
- CCTV Camera

Proposed System Architecture/Prototype



Thank You...!!