PROJECT PLANNING PHASE

TECHNOLOGY STACK

Date	06/11/2023
Team ID	Team-592404
Project Name	AI Enabled CAR Parking Using OPENCV
Maximum Marks	4 Marks

AI ENABLED CAR PARKING USING OPEN CV:

AI-enabled car parking systems, harnessing the power of OpenCV, are a game-changer in modern urban mobility. By employing computer vision and machine learning, these systems detect, monitor, and optimize parking spaces. OpenCV facilitates real-time object recognition, space occupancy tracking, and license plate recognition. This not only simplifies the parking process for drivers but also enhances security and revenue for operators. With the ability to guide drivers to available spots and automate payment, these systems reduce congestion, save time, and minimize environmental impact. However, they come with initial implementation costs and privacy considerations. Nevertheless, AI-enabled car parking using OpenCV represents a smart, data-driven solution for efficient and convenient parking management in our increasingly crowded cities.

TECHNOLOGY ARCHITECTURE

A tech stack is the set of technologies used to develop an application, including programming languages, frameworks, databases, front-end and back-end tools, and APIs.

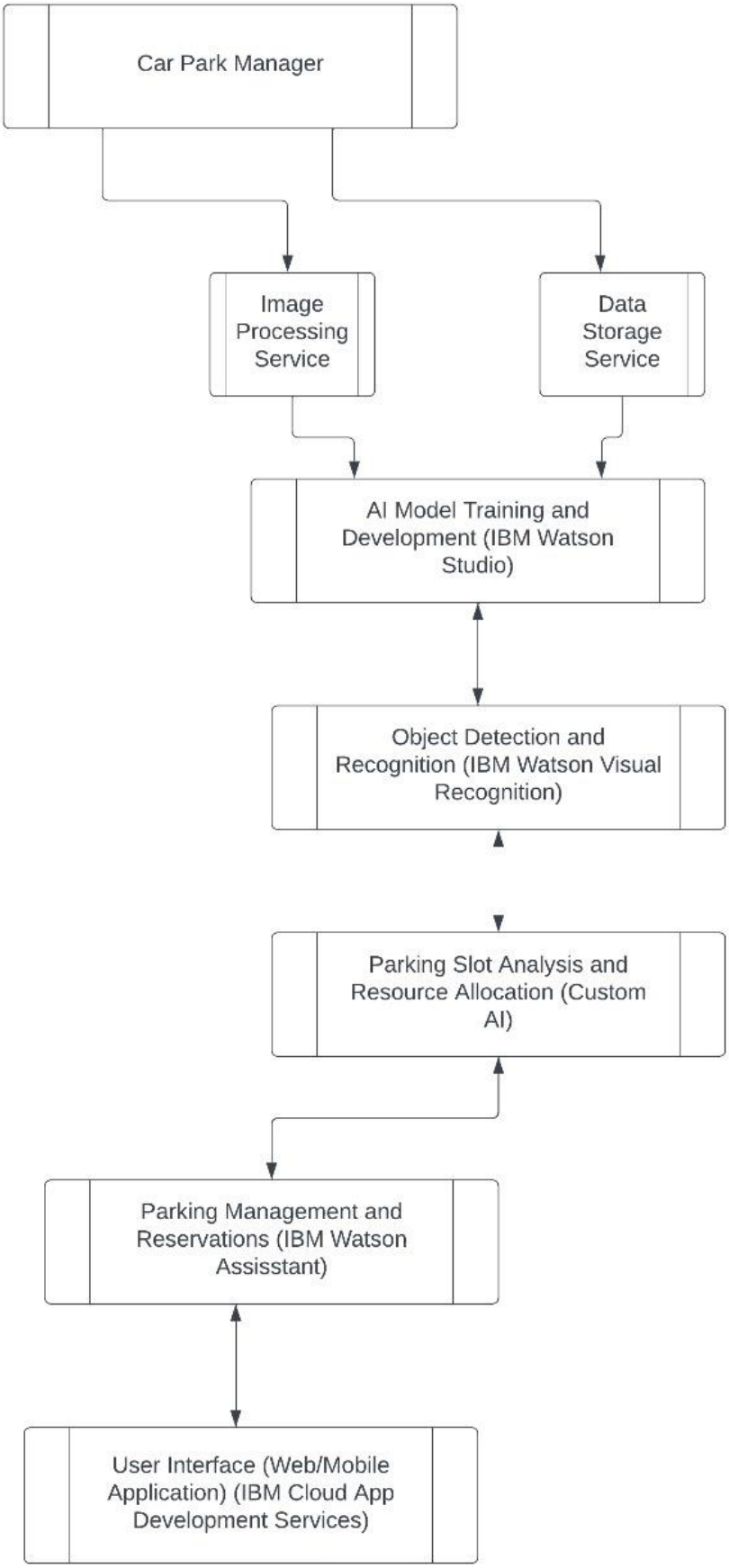
Car Park Manager
Image Processing Service
Data Storage Service
AI Model Training and Development (IBM Watson Studio)
Object Detection and Recognition (IBM Watson Visual Recognition)
Parking Slot Analysis and Resource Allocation (Custom AI)
Parking Management and Reservations (IBM Watson Assisstant)
User Interface (Web/Mobile Application) (IBM Cloud App Development Services)

TABLE 1:

Components & Technologies for AI-Enabled Car Parking System

SL. NO.	COMPONENT	DESCRIPTION	TECHNOLOGY
1.	User Interface	How users interact with the system	Web UI, Mobile App, Chatbot, etc.
2.	Object Detection and Tracking	Logic for car detection and tracking using OpenCV	Python, OpenCV
3.	License Plate Recognition	Logic for license plate recognition	Python, OpenCV, OCR libraries
4.	Database	Data Type, Configurations, etc.	MySQL, NoSQL, etc.
5.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant, etc.
6.	File Storage	File storage requirements	IBM Block Storage, Other Storage Service, or Local Filesystem
7.	External API-1	Purpose of External API used in the application	IBM Weather API, etc.
8.	External API-2	Purpose of External API used in the application	Aadhar API, etc.
9.	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
10.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud	Local Server Configuration, Cloud Server Configuration, Local, Cloud Foundry, Kubernetes, etc.

TABLE 2:

Application Characteristics for AI-Enabled Car Parking System

SL. NO.	CHARACTERSTICS	DESCRIPTION	TECHNOLOGY
1.	Open-Source Frameworks	List the open-source frameworks used	OpenCV, TensorFlow, PyTorch, etc.
2.	Security Implementations	List all the security / access controls implemented	Encryption, Access Controls, etc.
3.	Scalable Architecture	Justify the scalability of architecture (e.g., use of microservices, distributed processing)	Cloud Services, Microservices, etc.
4.	Availability	Justify the availability of the application (e.g., use of load balancers, redundant servers)	Load Balancers, Redundancy, etc.
5.	Performance	Design considerations for system performance (e.g., requests per second, caching, use of CDNs)	Caching, CDN, Load Optimization, etc.