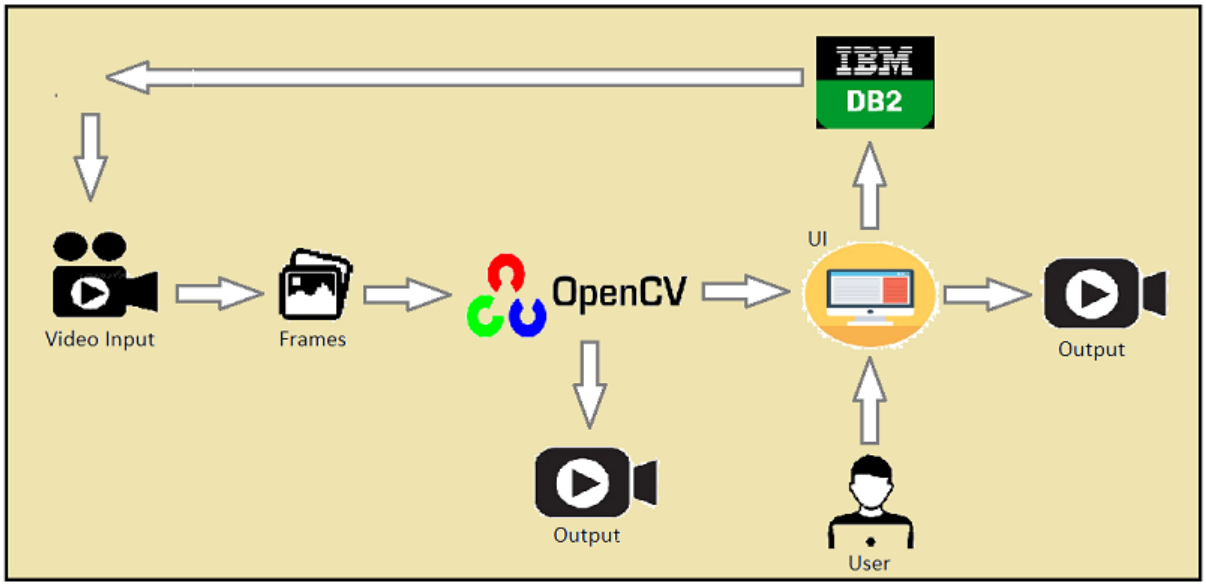
Project Design Phase-I
Solution Architecture

Date	07/MAY/2023
Team ID	IBM--18527-1682584903
Project Name	AI Enabled Car Parking Using OpenCv
Maximum Marks	4 Marks

Solution Architecture:

Solution Architecture Diagram:



High-level overview:

1. Data Collection: In this phase, the parking lot data is collected using a camera. The data is then preprocessed and stored in a database.
2. Object Detection: The next phase involves using OpenCV to detect cars in the parking lot images. This can be done using a pre-trained object detection model, such as Haar cascades.
3. Space Classification: Once the cars are detected, the parking spaces can be classified as vacant or occupied using image segmentation or machine learning algorithms.
4. Parking Guidance System: The final phase involves providing parking guidance to drivers using a mobile app. The app uses the classification results to display real-time availability of parking spaces and guides drivers to available spots.

The architecture of the solution can be divided into the following components:

1. **Data Collection and Preprocessing:** This component is responsible for collecting parking lot data using a camera and preprocessing it to enhance the quality of images. The data is then stored in a database.
2. **Object Detection:** This component is responsible for using OpenCV to detect cars in the parking lot images. It can use a pre-trained object detection model, such as Haar cascades, or a custom-trained model.
3. **Space Classification:** This component is responsible for classifying the parking spaces as vacant or occupied using image segmentation or machine learning algorithms.
4. **Parking Guidance System:** This component is responsible for providing real-time parking guidance to drivers using a mobile app. The app uses the classification results to display available parking spaces and guide drivers to available spots.

The solution architecture should also include the following specifications:

1. **Hardware Requirements:** The hardware requirements for the system, including the camera and server infrastructure.
2. **Software Requirements:** The software requirements for the system, including OpenCV, database software, and mobile app development frameworks.
3. **Development Phases:** The development phases for the system, including data collection, preprocessing, object detection, space classification, and parking guidance system development.
4. **Testing and Deployment:** The testing and deployment plan for the system, including testing methodologies, acceptance criteria, and deployment procedures**.**

Overall, the solution architecture should provide a clear and detailed overview of the system's structure, characteristics, behavior, and other aspects to project stakeholders. It should also define the features, development phases, and solution requirements and provide specifications according to which the solution is defined, managed, and delivered.

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Written and submit by.

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