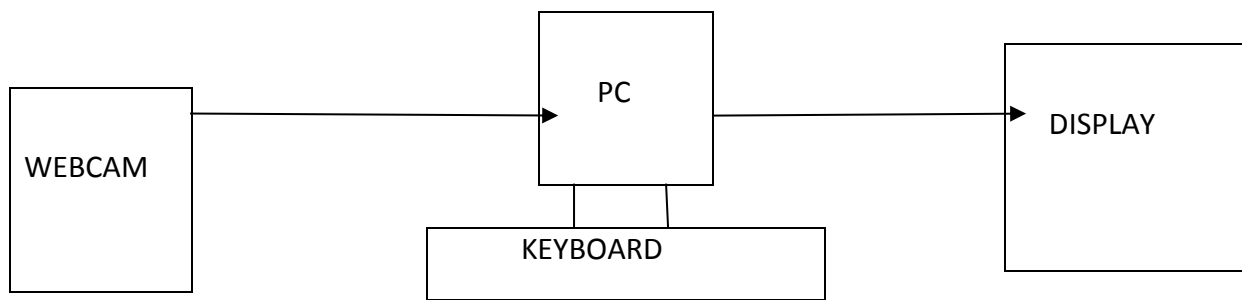# Two storage Car parking based on Image processing

Abstract:

Parking is measure issue in metropolitan cities. In molls and multiplex parking space allotted is huge. The driver, who is going to park his vehicle in the parking lot, gets difficulty for finding the availability of parking space. For finding the empty lot in the parking driver has to roam here and there which is time consuming and cumbersome. This project is one solution to this problem.

Here we will use web cam and pc with MATLAB software. This will check the position of vehicle in the parking lot and status will be display to parking entry. So at the entry level driver will get the confirmation of available slots in the parking lot. So he can easily acquire empty slot in the parking lot.

In this project image processing and image acquisition toolbox of MATLAB is used. Web cam is used to take the image of parking lot. This image is analyzed by code and availability of empty slots will be displayed. After every particular interval snap will be taken and position of vehicle in the parking lot will be displayed. As web cam is used by keeping it in recording mode, activities in the parking lot can be noted. This recording can be used for security purpose.

BLOCK DIAGRAM:-

```
┌──────────────┐              ┌──────────────┐              ┌──────────────┐
│              │              │     PC       │              │              │
│              │─────────────▶│              │─────────────▶│   DISPLAY    │
│   WEBCAM     │              │              │              │              │
│              │              └──────┬───────┘              │              │
│              │              ┌──────┴───────┐              │              │
└──────────────┘              │   KEYBOARD   │              └──────────────┘
                              └──────────────┘
```

Webcam:-

A **webcam** is a video camera which feeds its images in real time to a computer or computer network, often via USB, ethernet or Wi-Fi. In this project webcam is used to take an image of vehicles and convey the information of parking of vehicles to the computer for processing

Computer:-

For processing of images, computer is used. Computer converts the images taken by the webcam into black and white format by using matlab. The surface which is uncovered by vehicle is detected by webcam. Then this information is given to the computer for further processing. The flow of process is given in flowchart below.

Display:-

The result by the computer according to data given by webcam from parking area is displayed on digital board.

FLOWCHART:-

```
              ┌─────────────┐
             (    START     )
              └─────────────┘
                    │
                    ▼
        ┌───────────────────────────┐
        │     INITIALIZE  WEB CAM    │
        └───────────────────────────┘
                    │
                    ▼
        ┌───────────────────────────┐
        │   TAKE IMAGE  OF PARKING LOT│
        └───────────────────────────┘
                    │
                    ▼
    ┌───────────────────────────────────┐
    │ CONVERT IMAGE FROM COLOR TO GRAY   │
    │           SCALE IMAGE              │
    └───────────────────────────────────┘
                    │
                    ▼
    ┌───────────────────────────────────┐
    │ CONVERT GRAY SCALE IMAGE TO BLACK  │
    │         AND WHITE IMAGE            │
    └───────────────────────────────────┘
                    │
                    ▼
    ┌───────────────────────────────────┐
    │ SEGMENT THE IMAGE TO SEPARATE THE  │
    │     CAR FROM   BACKGROUND          │
    └───────────────────────────────────┘
                    │
                    ▼
    ┌───────────────────────────────────┐
    │ COMPUTE THE POSITION OF VEHICLE    │
    └───────────────────────────────────┘
                    │
                    ▼
    ┌───────────────────────────────────┐
    │ DISPLAY THE POSITION OF VEHICLE    │
    │        AT  ENTRY LEVEL             │
    └───────────────────────────────────┘
                    │
                    ▼
```