Smart Parking Solutions

Under the Supervision of

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Smart Parking Solutions using Digital Image Processing

Software used : MATLAB

Why do we need Smart parking?

- To reduce the time spent on finding a parking spot.
- To substantially reduce traffic jams which are caused due to vehicles parked on the streets.
- To decrease the number of tickets issued for illegal parking.
- For efficient usage of limited parking space.
- Better revenues generation.

Problem Statement

- Driver do not have relevant information before entering.
- Sensors not economically feasible.
- Time wasted in sailing through the parking space to find a vacant spot
- Time wasted standing in the queue while the operator is struggling to generate a receipt/payment issues.

Objective

- Capture real time image and detect filled parking locations in the parking lot using image processing
- Count and display the number of available slots
- Number plate recognition at the entrance
- Automated receipt generation
- Online payments

Assumptions

- This is just a prototype system using Digital Image Processing.
- Image captured from smart phone camera (0.5 Megapixels) is used.
- The system can be used in daytime only without having a strong shadow.

FLOW CHART

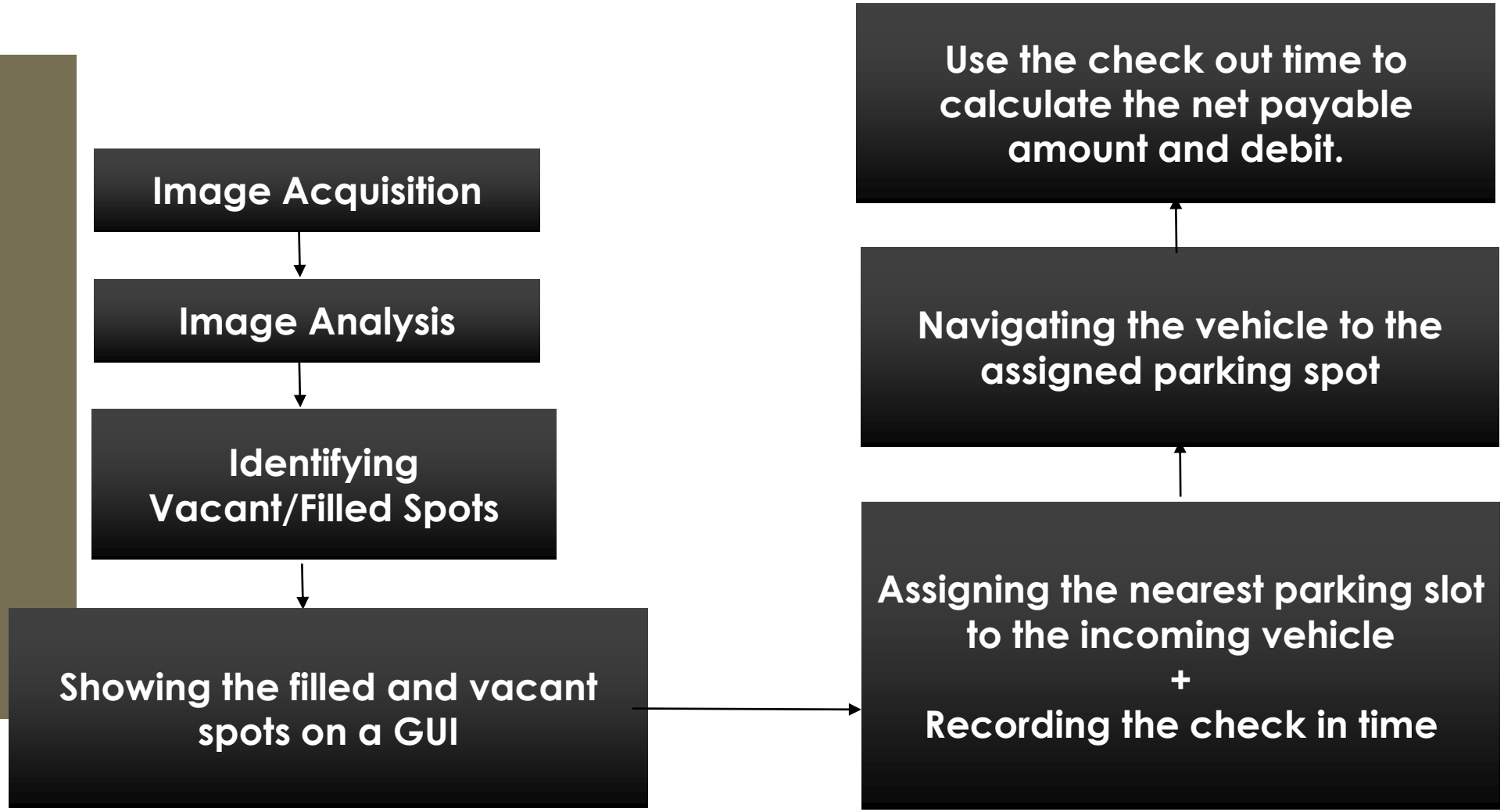
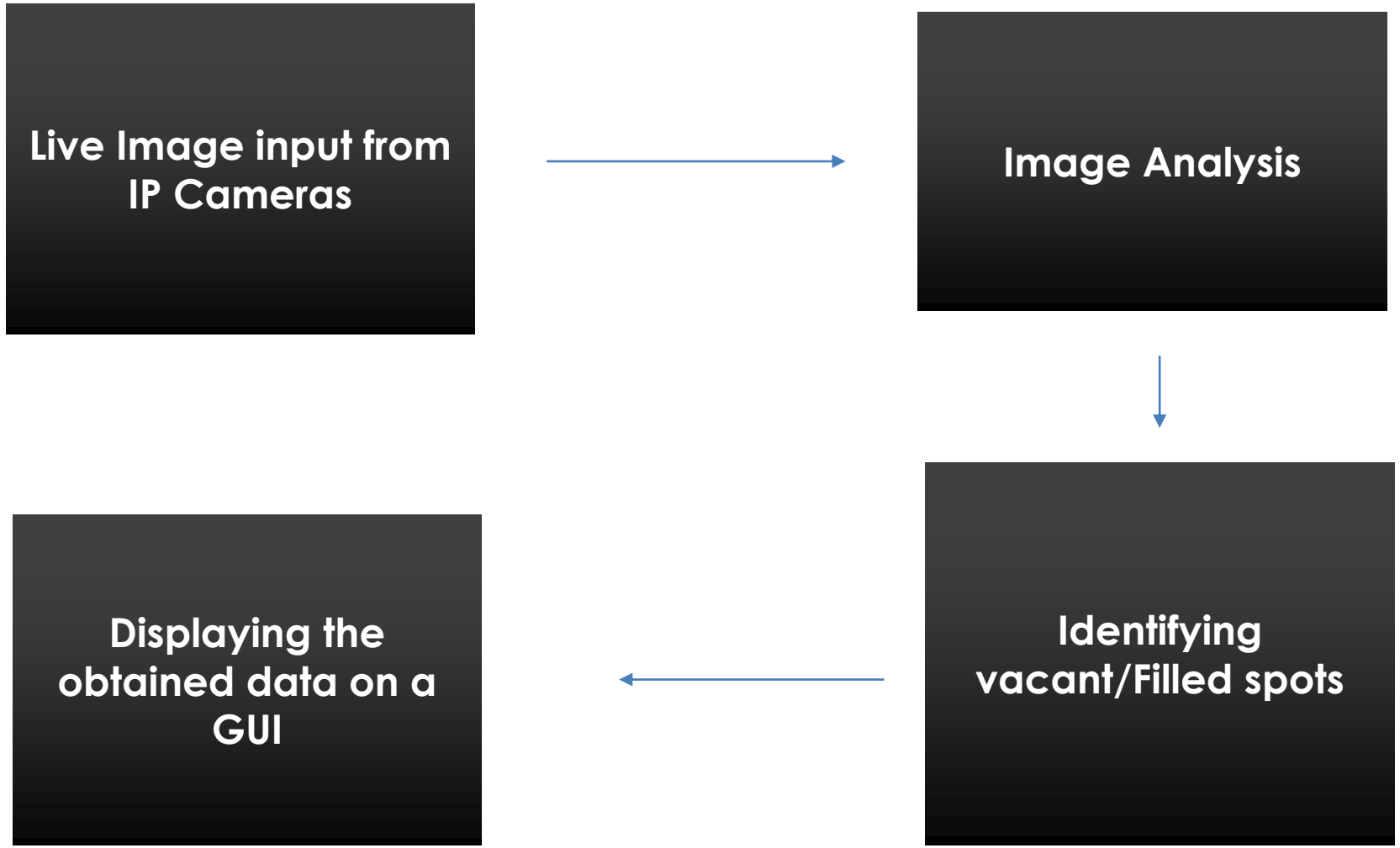


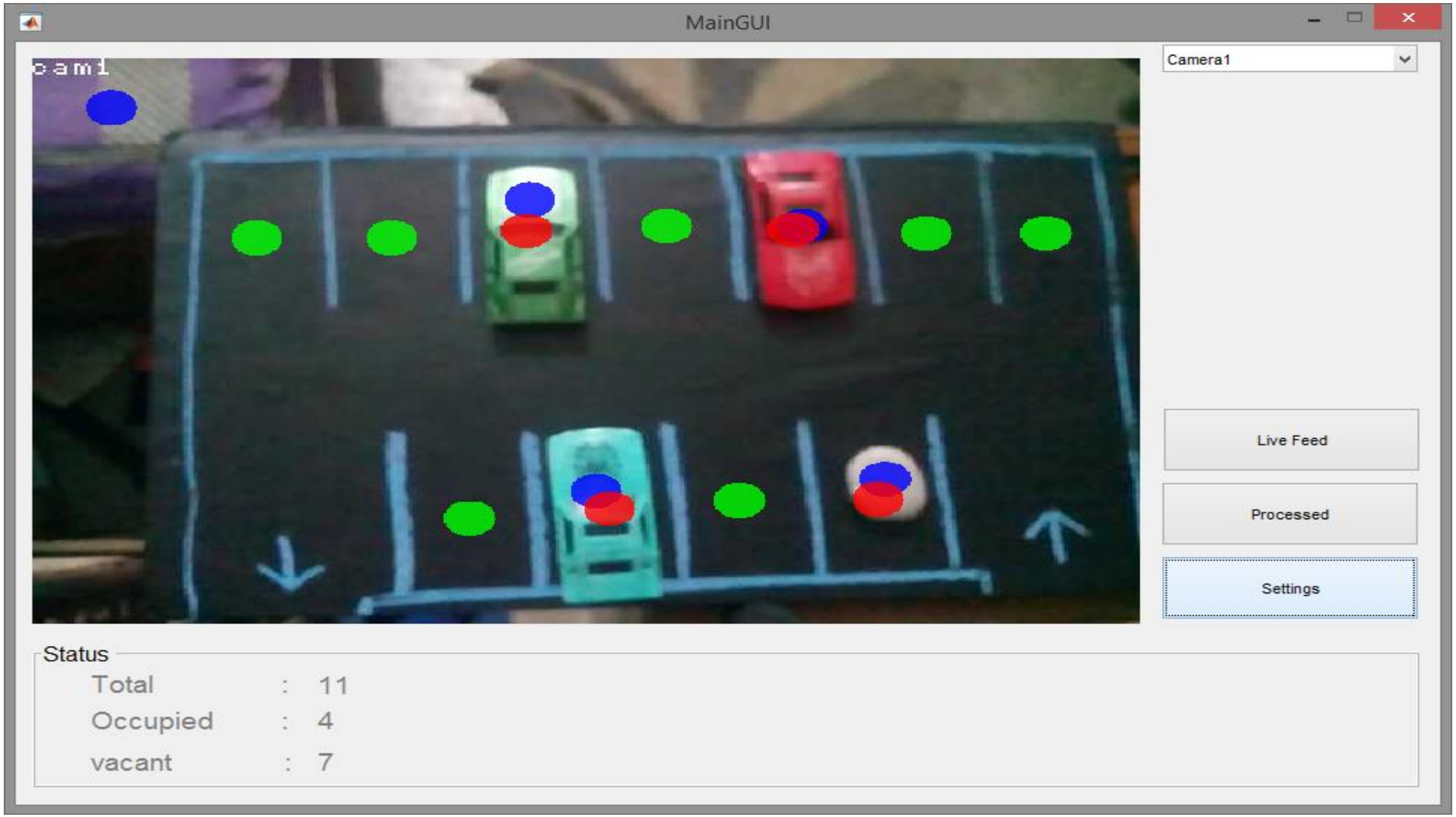
Image Acquisition
Image Analysis
Identifying Vacant/Filled Spots
Showing the filled and vacant spots on a GUI
Assigning the nearest parking slot to the incoming vehicle + Recording the check in time
Navigating the vehicle to the assigned parking spot
Use the check out time to calculate the net payable amount and debit.

Module-1 Flow chart

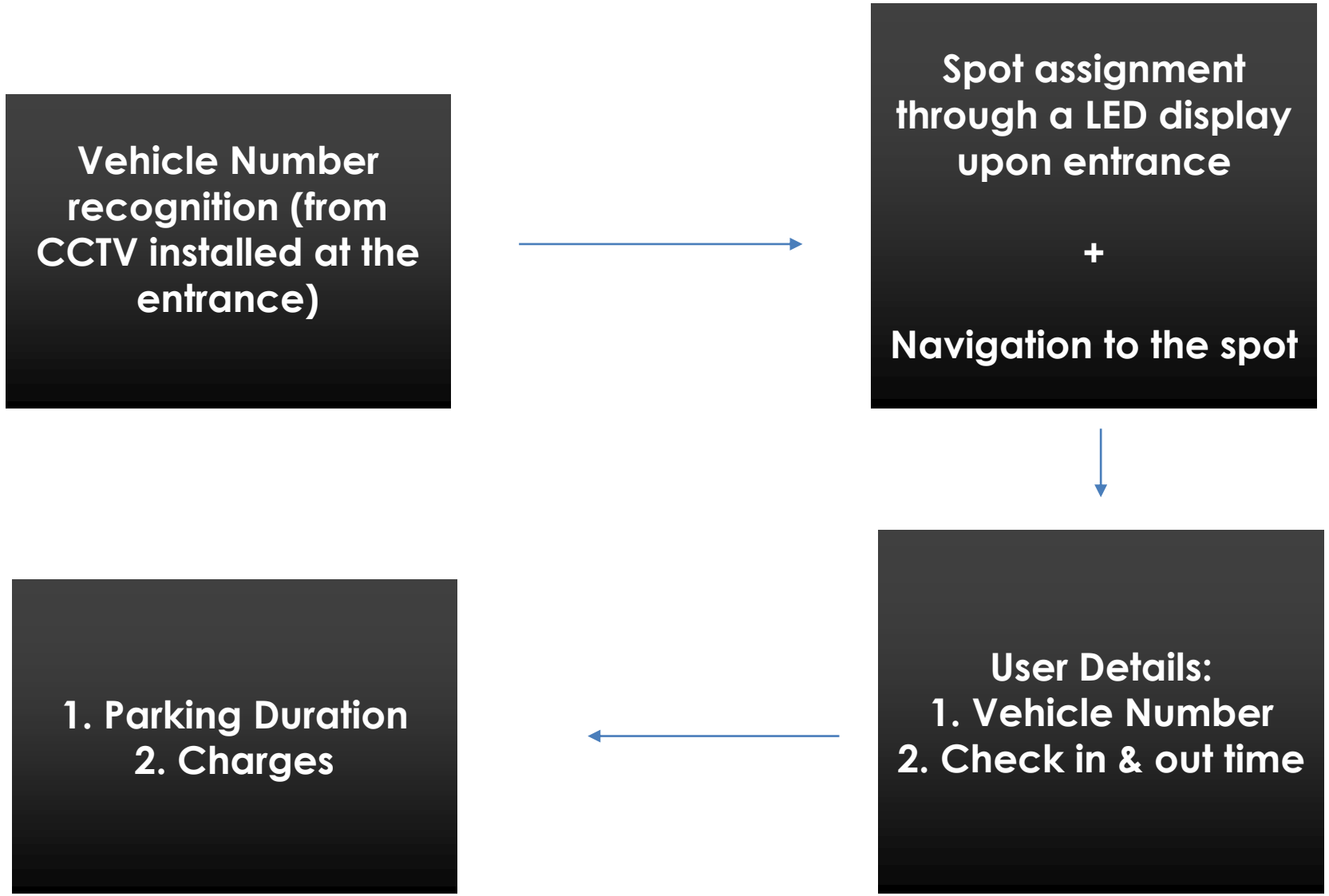


Graphic User Interface (GUI)

Live Feed


MainGUI
cam1
Camera1
Live Feed
Processed
Settings
Status
Total : 11
Occupied : 4
vacant : 7

Module-2 Flow chart



Number Plate Recognition

- Vehicle Image Captured By Camera
- Extraction of Number Plate Location
- Segmentation and Recognition of Plate Character
- Display Vehicle Number

Number Plate Recognition

Databases

Sr. No	Vehicle Number	Type of vehicle	Check- in/out time	Final Amount
1.	DL 3C 1995	Car	2017-03-15 16:42/17:58	90

Thank You!