Smart Parking Solutions

Under the Supervision of

Dr. Navneet Yadav

Anmol Deepak (08114802813)
Ashutosh Mishra (01714802813)
Gaurav Singh (01814802813)
Ronak Lalani (00714802813)

Smart Parking Solutions using Digital Image Processing

Software used : MATLAB

IBM Global Parking Survey 2011

- 8,042 commuters in 20 cities on six continents surveyed
- Over 30 percent of traffic in a city is caused by drivers searching for a parking spot.
- Bangalore tops the list for maximum number of tickets issued for illegal parking.
- Drivers in New Delhi, Bangalore, Nairobi and Milan argue most over parking spaces
- Globally, drivers spent an average of nearly 20 minutes in pursuit of a coveted spot

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 the parking lot.
- Using sensors on every parking space not economically feasible.
- Driver needs to sail through all the filled parking slots just to find an available parking space. Which can be very time consuming for a huge parking space.

Objective

- Capture real time image and detect filled parking locations in the parking lot using image processing
- Count and display the number of available parking slots in parking lot
- Real time tracking of the moving vehicles in the space.

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

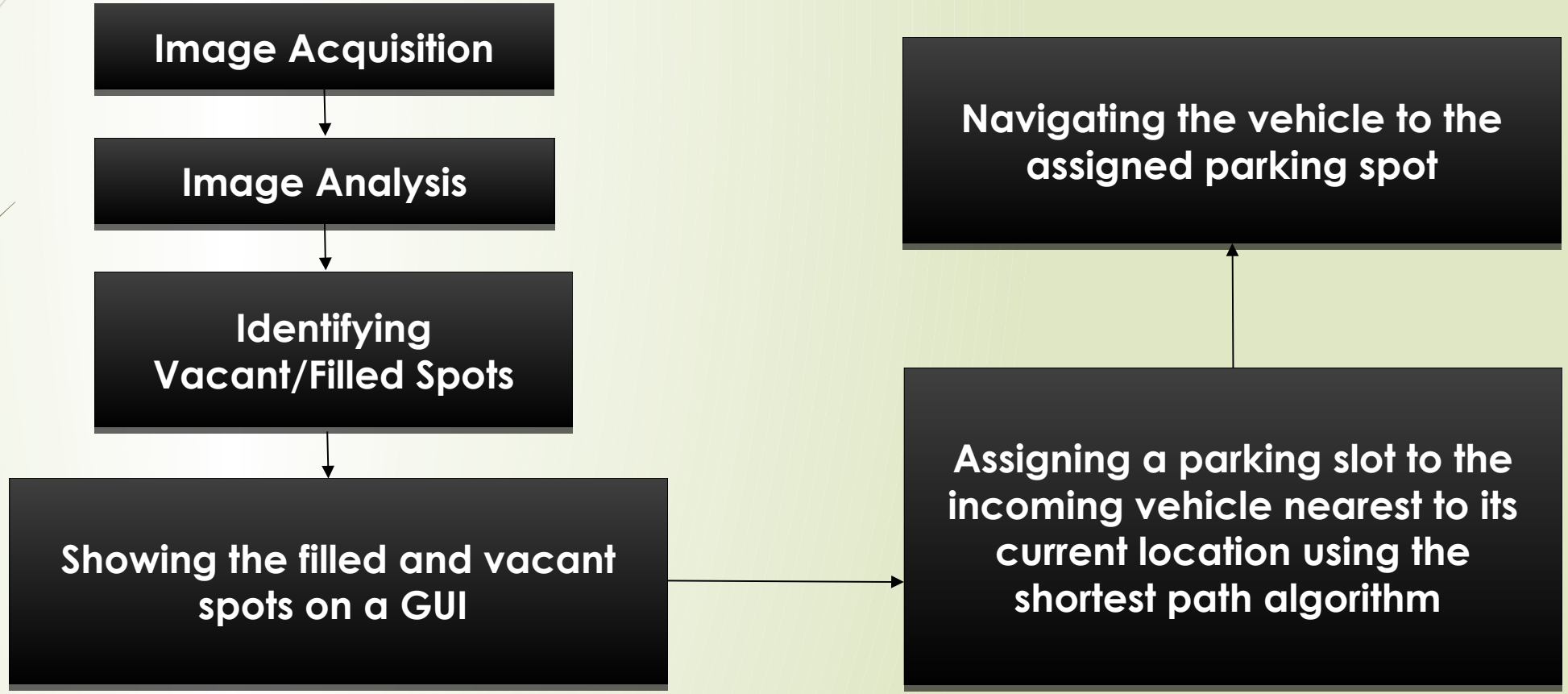
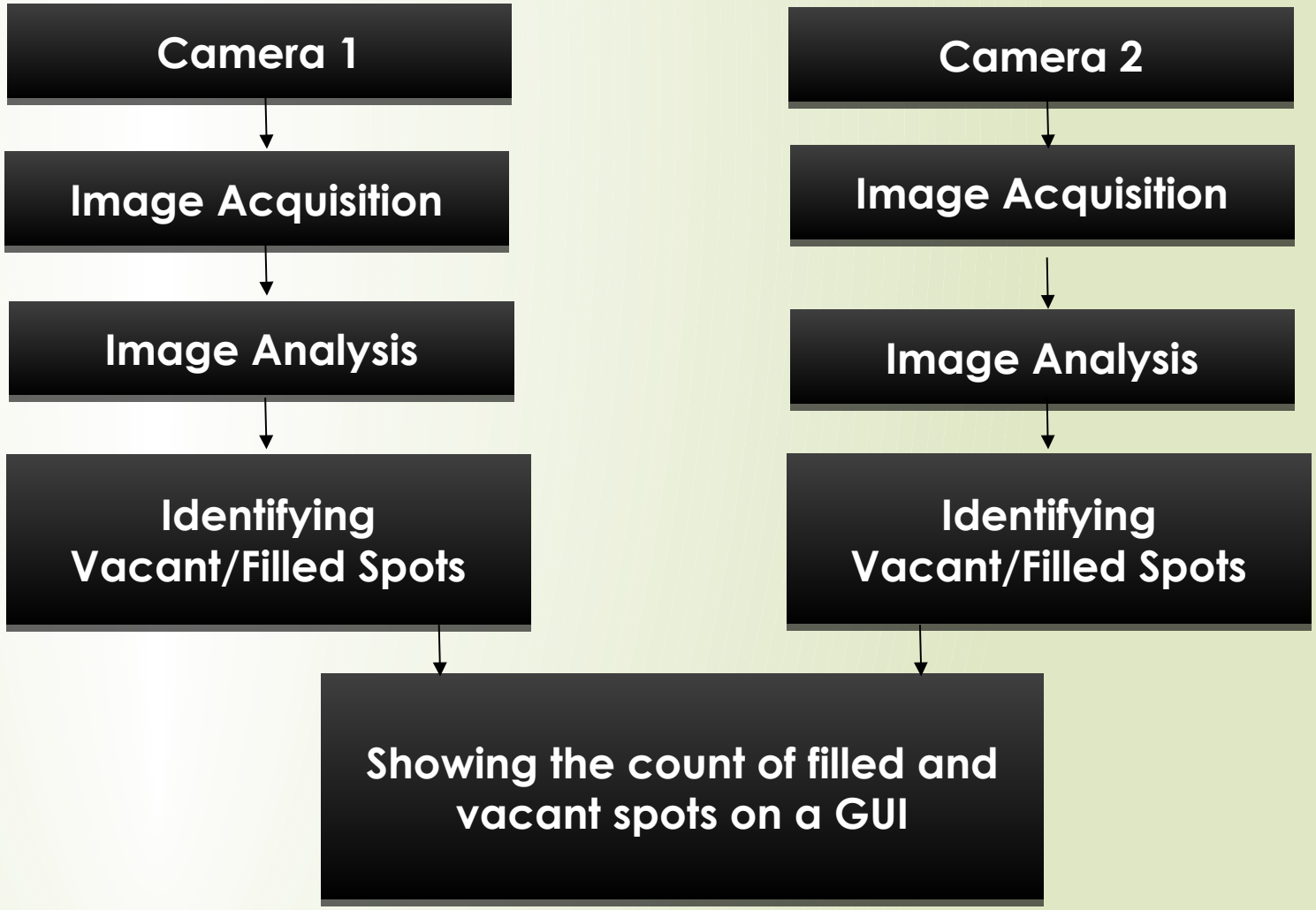


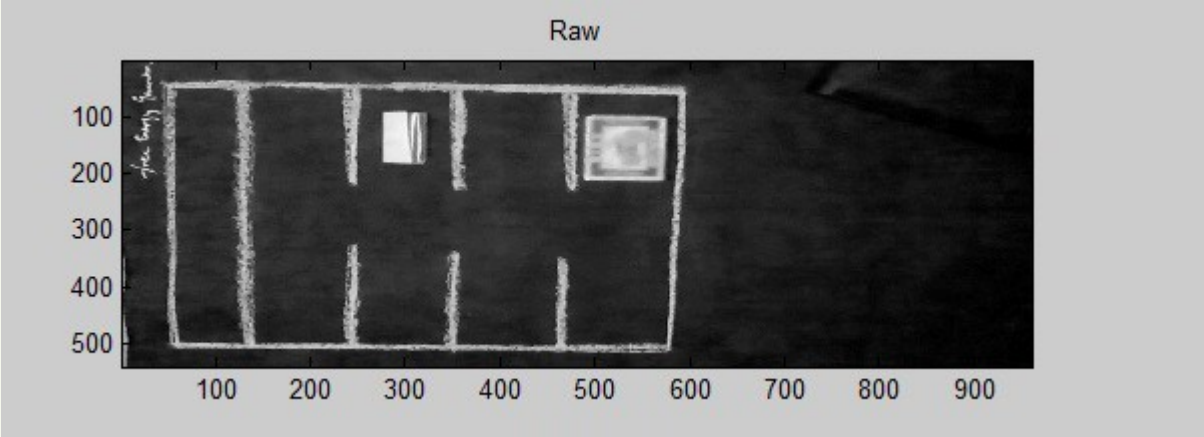
Image Acquisition
Image Analysis
Identifying Vacant/Filled Spots
Showing the filled and vacant spots on a GUI
Assigning a parking slot to the incoming vehicle nearest to its current location using the shortest path algorithm
Navigating the vehicle to the assigned parking spot

Multiple Cameras

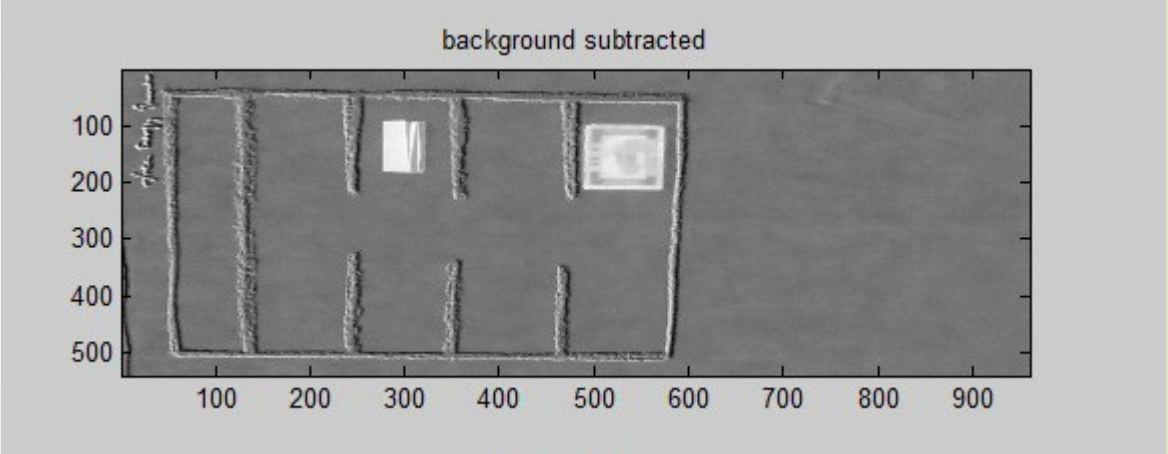


Working

Step 1
(Raw Image)

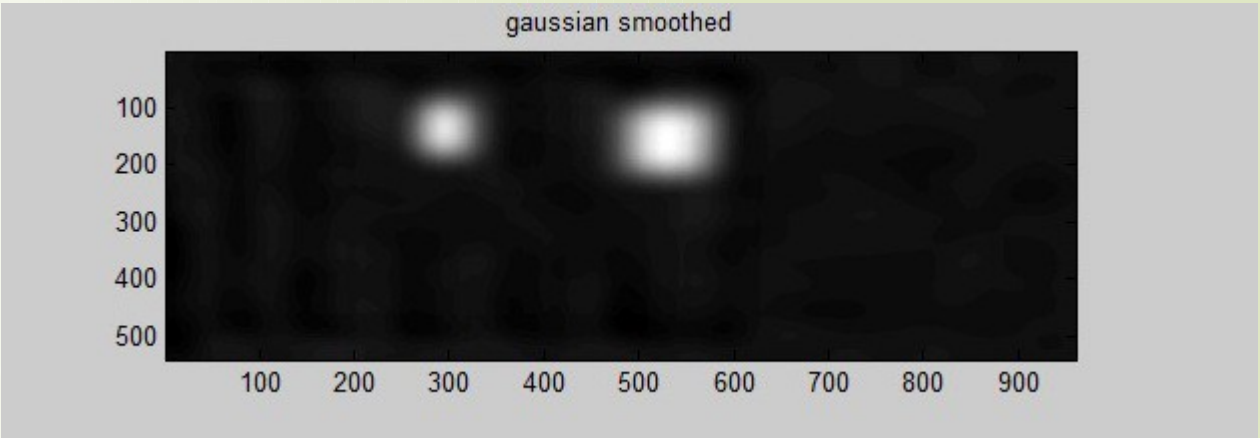


Step 2
(Reference Subtracted Image)

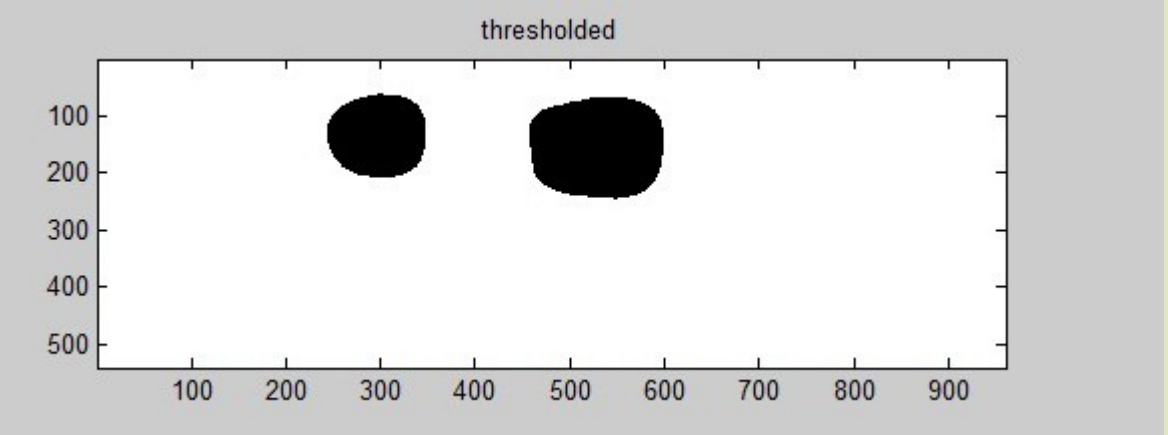


Working (Contd.)

Step 3
(Gaussian Smoothed)



Step 4
(Threshold Image)

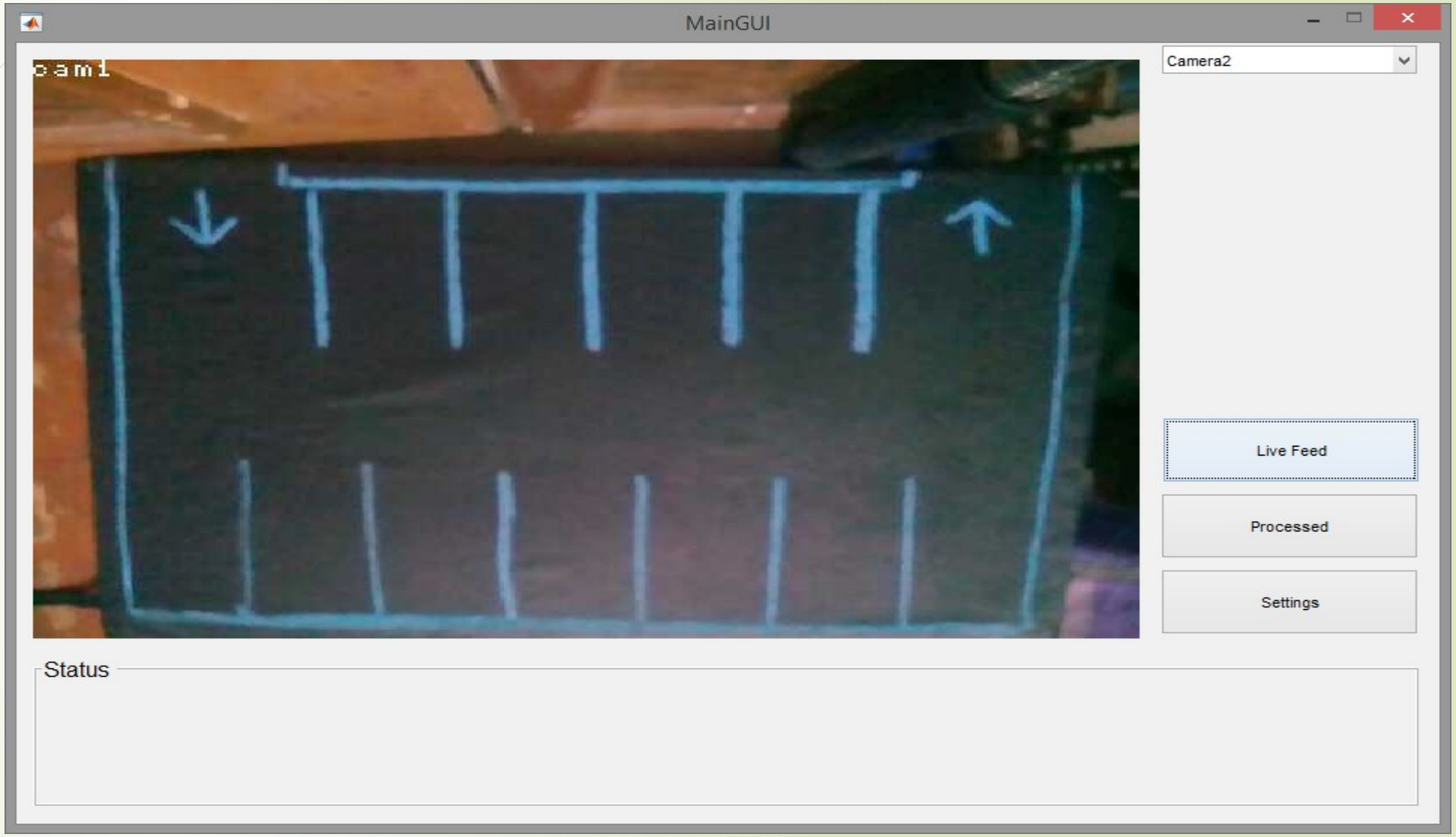


Working

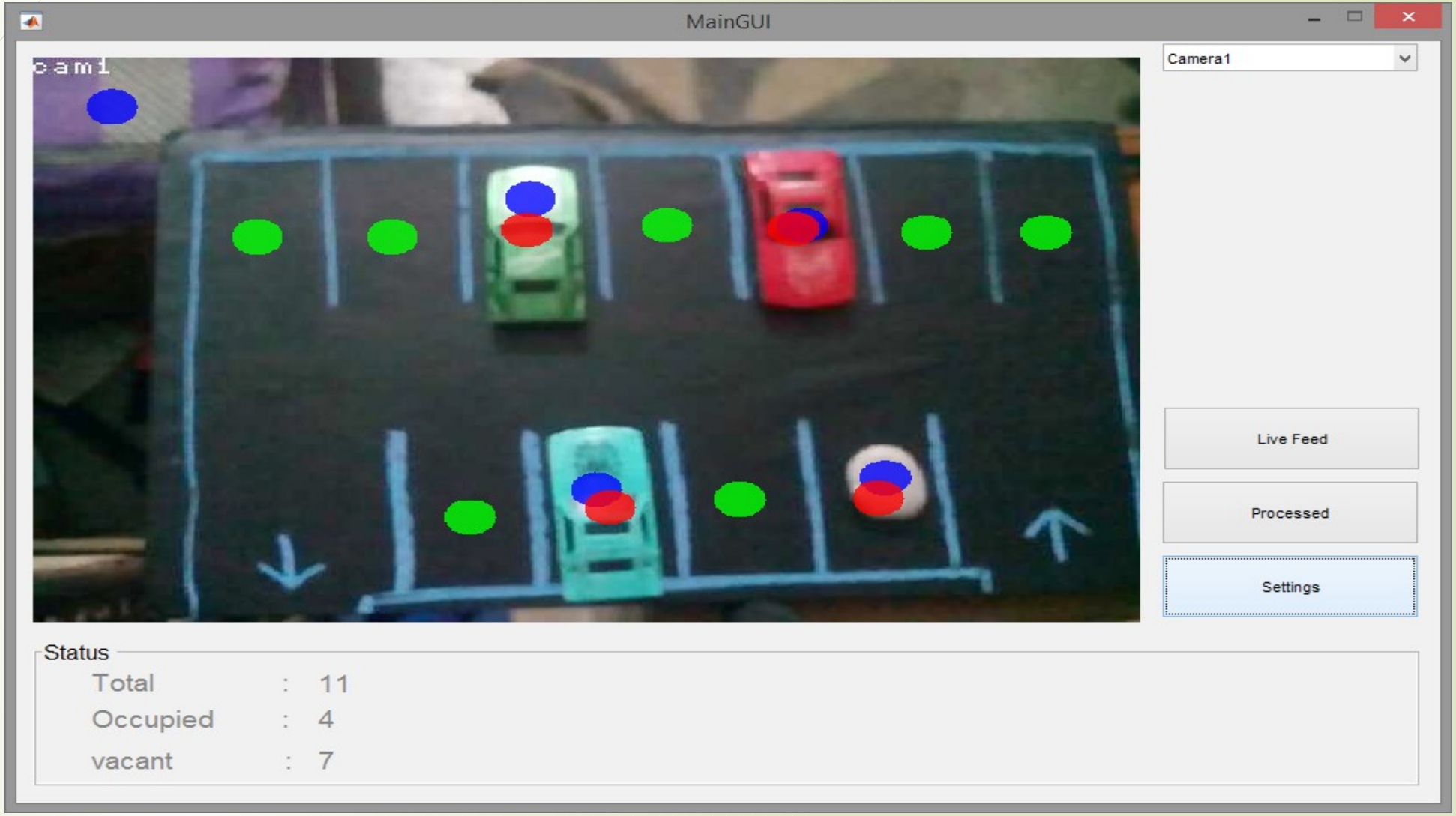

Figure 1
File Edit View Insert Tools Desktop Window Help
Raw
background subtracted
gaussian smoothed
thresholded
Total parking spaces : 8
filled parking spaces : 2
vacant parking spaces : 6
coordinates :
point 1 : 297.458457 , 134.632627
point 2 : 529.297025 , 154.690702
Occupied slots : 2 4 >>
OVR
07:55
15-09-2016

Graphic User Interface (GUI)

Reference Image



Processed Image



Future prospects

- The count of filled and vacant spaces can be displayed on an android or web App.
- Users can download the App and reserve a parking spot well in advance.
- Payment can be made cashless using by the same app using the card or wallet details of user.

Thank You!