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Intelligent Car Parking Management System

**A thesis presented in partial fulfilment of the requirements for the
degree of**

Master of Engineering

in

Electronic and Computer System Engineering

at Massey University, Palmerston North

New Zealand

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2014

Abstract

Due to the increasing number of vehicles on the roads, traffic problems always exist. The current unmanaged car parks and transportation facilities make it difficult to accommodate the increasing number of vehicles in a proper, convenient manner so it is necessary to have a car parking management system in big car parks. This study is aimed at analysing a car parking management system. This system allocates available parking space to a given driver to park their vehicle, renews the availability of the parking space when the car leaves and computes the charges due. Implementing this system will increase parking utilization. The system does this by providing more efficient and effective parking enforcement. An image processing technique is used to implement an intelligent car parking management system at the Massey University car park. In this project a camera is used as a sensor to take photos to show the occupancy of car parks. The reason a camera is used is because with an image it can detect the presence of many cars at once. Also the camera can be easily moved to detect a different car park. By having this image, the particular car parks vacant can be known and then used to guide a driver to a car park. Software processes these images so that a driver or operator can know the vacant car parks.

Since most of the cars at Massey University are in one parking area, video cameras could be used efficiently to detect many of them. This Thesis presents how a system could be made that would detect the availability of car parks and tell a driver where the available car parks are.

Green circles are placed on car parks so that cameras can easily differentiate whether a car is parked in a spot or not. If there is a car on the spot then the green circle will not be seen. First an excel spreadsheet with test data was used to test, displaying where empty and full car

parks are. Then a program that created random data was used to quickly see how the display would look in different conditions.

Acknowledgements

In completing this thesis for master degree in Electronics and Computer System Engineering, I would like to give my sincere appreciation and thanks to:

My supervisor Dr Ibrahim Al-Bahadly, who encouraged me at times of failure, gave useful advice, corrected errors, guided and supported me to the completion of my project, accompanied me through the entire project, providing useful advice and encouraging me when progress was slow.

The administration staff in the School of Engineering and Advanced Technology for their cheerful and friendly support in all the administrative matters needed in my project.

Table of Contents

Abstract.....	i
Acknowledgements	iii
List of Figures.....	vii
List of Tables.....	xii
List of Abbreviations.....	xiii
Chapter 1: Introduction	1
1.1 Research topic.....	1
1.2 Scope of research.....	1
1.3 The organisation of the thesis.....	3
Chapter 2: Literature review.....	5
2.1 Advantages of a car parking management system.....	5
2.2 Safe, secure and easy for drivers.....	6
2.3 Economical and efficient space utilization.....	6
2.4 Environmentally friendly parking system.....	7
2.4.1 Deciding how to use the system.....	7
2.4.2 Categories of the car parking management system.....	8
2.5 Requirements.....	12
2.6 Conclusion.....	13
Chapter 3: Investigation of the technology used for intelligent car park management	15

3.1 Categorises of vehicle detection technology:.....	15
3.1.1 Intrusive sensors:.....	15
3.1.2 Non-intrusive sensors	21
3.2 Signal processing device.....	26
3.3 Data processing devices.....	27
Chapter 4: Proposed method	28
4.1 Case study for four car parks in three different conditions.....	28
4.1.1 Processing of template images.....	30
4.1.2 Processing of template images.....	35
4.1.3 Processing for decision.....	40
4.2 Case study for 30 car parks.....	44
4.2.1 System initialization	44
4.3.1 Spreadsheet with manually entered data displayed by a program.....	61
Chapter 5: Case study for a car park at Massey university.....	67
5.1 Loading and converting images to HSV	67
5-2 Complete morphological processing.....	69
5.3 Loading template image.....	73
5.4 Extraction and calculation of the green circle.....	76
5.5 Detect vacant parking lot and display the vacant parking lot.....	78
5.6 Showing the closest car park.....	79

Chapter 6: Communication system, architecture and components.....	85
6.1 video camera with wireless transmitter and receiver.....	86
6.2 Image pre-processing module.....	87
6.3 Power sources.....	88
Appendix.....	94

List of Figures

Figure 1-1 Intelligent car parking system management.....	2
Figure 2-1 Categories of the car parking management system.....	8
Figure 2-2 The counter based system	9
Figure 2-3 Image based system [4].....	10
Figure 2-4 Wired sensor based system [5]	11
Figure 2-5 Wireless based system [6]	12
Figure 2-6 Example of large car park	13
Figure 3-1 Inductive detector [4].....	17
Figure 3-2 Pneumatic tubes [6]	18
Figure 3-3 Magnetometer sensors [7]	19
Figure 3-4 The difference a metal object makes to the earth's magnetic field [8]	20
Figure 3-5 Weight in motion detector system [9]	21
Figure 3-6 Explanation of the operation of a microwave radar sensor [4]	22
Figure 3-7 Ultrasonic sensors [10]	23
Figure 3-8 Video image processor line of sight detection geometry [11]	25
Figure 4-1 system module	28
Figure 4-2 Parking image.....	29

Figure 4-3 Processing steps of template image.....	31
Figure 4-4 Template image.....	32
Figure 4-5 Template image converted to HSV.....	32
Figure 4-6 Red segment of image.....	33
Figure 4-7 The green circle, showing their centre and middle obtained from circle detection.....	34
Figure 4-8 Processing steps of edge images.....	35
Figure 4-9 Parking image converted to HSV image.....	36
Figure 4-10 HSV image showing how the background can be clearly found by looking at the red value.....	37
Figure 4-11 Colour segmented image.....	37
Figure 4-12 Grey segmented image.....	38
Figure 4-13 Images after morphological process.....	39
Figure 4-14 Binary image.....	39
Figure 4-15 picking a circle and relative position.....	40
Figure 4-16 Available and occupied car slots.....	41
Figure 4-17 Cloudy Weather.....	42
Figure 4-18 Raining weather	43
Figure 4-19 Sunny weather.....	43
Figure 4-20 Empty car park used to initialize the location of car parks.....	45
Figure 4-21 HSV image of empty car park.....	45
Figure 4-22 Grey scale format of the HSV image.....	46

Figure 4-23 Black and White images for empty car park.....	47
Figure 4-24 Eroded image for empty car park.....	48
Figure 4-25 Empty car park showing different colours for each object.....	49
Figure 4-26 Output for empty car park.....	50
Figure 4-27 Car park with green dots for car park spaces.....	51
Figure 4-28 Three dimensional graph of samples of RGB values from four images.....	52
Figure 4-29 HSV image of a car park with cars.....	52
Figure 4-30 Black and white image of HSV image.....	53
Figure 4-31 Left- real car park; right- black and white image for a light colours.....	54
Figure 4-32 Car park image for dark cars.....	54
Figure 4-33 Combination of HSV, dark and light images.....	55
Figure 4-34 Dilated image.....	56
Figure 4-35 Eroded image.....	56
Figure 4-36 Output for a car park with cars showing the park that was not detected.....	57
Figure 4-37 Undetected car.....	58
Figure 4-38 Comparison between the RGB image and the output produced from the HSV image.....	58
Figure 4-39 GUI for car park image reader.....	59
Figure 4-40 Images showing various modifications of an image.....	60
Figure 4-41 Excel spread Sheet of Massey car park using numbers to describe the areas.....	62

Figure 4-42 Car Park Reader program showing approximately 50% of the car park being full	64
Figure 4-43 Car Park Reader program showing approximately 5% of the car park being full	65
Figure 4-44 Car Park Reader program showing approximately 95% of the car park being full	66
Figure 5-1 Processing steps of detecting car lots in a car park	67
Figure 5-2 Car Park with some cars	68
Figure 5-3 Image in HSV colour with some cars	68
Figure 5-4 Image after morphological	69
Figure 5-5 Masked image with some cars	69
Figure 5-6 Binary image with some cars	70
Figure 5-7 Black and white image for parking	70
Figure 5-8 Grey image	71
Figure 5-9 Grey Segmented image	72
Figure 5-10 Segmented images	72
Figure 5-11 Template image for empty car park	73
Figure 5-12 HSV of template image	74
Figure 5-13 Black and white of template image	74
Figure 5-14 Eroded image of template image	75
Figure 5-15 Grey image of template image	75
Figure 5-16 Red segment of image	76

Figure 5-17 Adaptive histogram of red.....	77
Figure 5-18 Colour segmented image.....	77
Figure 5-19 GUI for operators	78
Figure 5-20 GUI for users.....	79
Figure 5-21 Image showing car park closest to entrance.....	79
Figure 5-22 The locations of the cameras in Massey Universtiy car park.....	80
Figure 5-23 The field and angle of view for the camera at the lamp-post.....	81
Figure 6-1 Process of transferring images to the computer.....	85
Figure 6-2 Video transmitter and receiver [24].....	86
Figure 6-3 The design flow of an Image pre- processing module	88
Figure 6-4 Solar panel [27].....	89
Figure 6-5 Outdoor power source for the car park	89
Figure 6-6 Indoor power source for car park	90

List of Tables

Table 3.1 The strengths and weakness of intrusive and nonintrusive sensor technologies.....	26
Table 4.1 Experiment for four car parks in three different conditions.....	29
Table 4.2 Representation of car park using numbers and colours.....	63
Table 5.1 Total cost for the car park at Massey university for a fixed camera.....	83
Table 5.2 Total cost for the car park at Massey university for a Movable camera.....	83
Table 6.1 Features of the wireless video transmitter and receiver [25].....	87

List of Abbreviations

FPGA	Field-Programmable-Gate-Array
GUI	Graphical User Interface
HSV	Hue Saturation Value
IDL	Inductive Detector Loop
PAN	Personal Area Network
PC	Personal computer
RFID	Radio Frequency Identification
RGB	Red, Green and Blue
WIM	Weigh-In-Motion
WSN	Wire Sensor Network