

# **ENHANCED CAMSHIFT KALMAN FILTER FOR OBJECT TRACKING**

**WADUGE SHEHAN PRIYANGA FERNANDO**

**118705M**



University of Moratuwa, Sri Lanka.

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## Declaration of the Candidate and Supervisor

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

Waduge Shehan Priyanga Fernando

Date

I endorse the declaration by the candidate,



University of Moratuwa, Sri Lanka.  
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## ABSTRACT

In this thesis an enhanced Cam-shift Kalman object tracking algorithm for video surveillance and object tracking was developed. And this new algorithm was based on a modified Cam-shift tracking algorithm and the Kalman filter. This modified Cam-Shift algorithm solves a major drawback in the classical Cam-Shift algorithm such that the search area for the next frame was optimized, so that the time taken to track the object was minimized. The classical Cam-Shift algorithm for tracking performs well under perfectly maintained conditions such as light condition and without partial occlusions that constitute a good tracking method. However, under different environment conditions and with occlusions the algorithm fails. To test the performance of the enhanced Cam-Shift algorithm color of the object was selected as the feature for identifying the object, and was compared with the performance of the classical Cam-Shift algorithm. Also mean-shift algorithm was also incorporated for the comparison. In order to enhance the performance and accuracy under cluttered environment, the presence of noise and occlusions Kalman filter was combined. When the object disappears from the scene partially or fully the algorithm is capable of tracking the object. The experimental results verifies the ability of the enhanced Cam-shift Kalman object tracking algorithm in comparison to the classical Cam-Shift, which can locate the target object more effectively.

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## Table of Contents

<b>Declaration of the Candidate and Supervisor .....</b>	<b>i</b>
<b>Abstract.....</b>	<b>ii</b>
<b>Acknowledgement.....</b>	<b>iii</b>
<b>Table of Contents .....</b>	<b>iv</b>
<b>List of Figures.....</b>	<b>vi</b>
<b>List of Tables .....</b>	<b>vii</b>
<b>List of Abbreviations.....</b>	<b>viii</b>

## Chapters

<b>1 Introduction.....</b>	<b>1</b>
1.1 Autonomous Vehicles .....	1
1.1.2 Difficulties in tracking.....	1
1.2 Objective .....	2
1.3 Motivation .....	2
1.5 Organization of the Thesis .....	4
<b>2 Literature Review .....</b>	<b>5</b>
2.1 Related Work.....	5
2.1.1 Tracking Methods.....	6
2.1.2 Hierarchy of tracking algorithms .....	7
2.2 Visual Tracking .....	8
2.2.1 Overview of Existing Tracking Algorithms .....	8
2.2.2 Mean shift tracking algorithm and its limitations.....	9
2.2.3 Extensions of mean shift tracking algorithm .....	10
<b>3 Tracking Object with Mean-Shift and Kalman Filter.....</b>	<b>11</b>
3.1 Introduction .....	11
3.2 Mean-Shift Algorithm .....	12
3.2.1 Common Kernels used.....	13
3.2.2 Build target and candidate models.....	14
3.3 Kalman Filter.....	17
3.3.1 The Linear Kalman Filter .....	17
3.3.2 Kalman Processing steps .....	18
3.4 Experimental Results.....	19
<b>4 Tracking Object with CAM-Shift.....</b>	<b>21</b>
4.1 CAMSHIFT Algorithm .....	21
4.1.1 Object representation by use of an appearance based approach .....	21
4.1.2 Developing the back projection image .....	23
4.1.3 Position Localization .....	25

4.2 Adaptive target size .....	26
4.3 Outline of the CAMSHIFT Algorithm .....	27
<b>5 Enhanced CAMSHIFT Kalman Filter.....</b>	<b>29</b>
5.1 Methodology .....	30
5.2 Enhanced Camshift.....	31
5.3 Visual Investigation.....	31
5.3 Limitations of the Algorithm.....	35
5.4 Performance Evaluation .....	35
5.4.1 Precision plot .....	35
5.4.2. Success plot .....	36
5.5 Analytical Evaluation of Results and Discussion.....	36
<b>6 Conclusion and Future Work .....</b>	<b>39</b>
6.1 Conclusion.....	39
6.2 Future Work .....	39
<b>References.....</b>	<b>41</b>
<b>APPENDIX.....</b>	<b>43</b>



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## List of Figures

<b>Figure 2.1:</b> The Hierarchy of Tracking Algorithms .....	7
<b>Figure. 3.1:</b> Flow Chart of Mean-shift Algorithm .....	16
<b>Figure 3.2:</b> Tracking a Vehicle using the Mean-shift Algorithm.....	19
<b>Figure 3.3:</b> Comparing the Tracking of an Identified Vehicle using Mean-shift under Partial Occlusion .....	20
<b>Figure 4.1:</b> An Object being Tracked and its Corresponding Color Histogram Appearance Model.....	23
<b>Figure 4.2:</b> An Object and its Corresponding Search area's Histogram Backprojection.....	25
<b>Figure 4.3:</b> Localized Object in Backprojected Search Area.....	26
<b>Figure 4.4:</b> Block Diagram of CAMSHIFT algorithm .....	28
<b>Figure 5.1:</b> Flow of the Tracking Algorithm.....	29
<b>Figure 5.2:</b> An object and its corresponding search area's histogram backprojection.....	31
<b>Figure 5.3:</b> Algorithm for Camshift Kalman Filter.....	31
<b>Figure 5.4:</b> Comparing the Tracking of a Identified Vehicle using Camshift and Camshift ..	32
<b>Figure 5.5:</b> Comparing the Tracking of a Pedestrian using Camshift Kalman Filter.....	33
<b>Figure 5.6:</b> Comparing the Tracking of a Identified Vehicle using Cam-shift and Cam-shift Kalman under Partial and Full Occlusion.....	34
<b>Figure 5.7:</b> Success Plots for the Tracking Algorithms .....	38



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## List of Tables

<b>Table 5.1:</b> AUC of Success Plots Calculated for Different Tracking Algorithms .....	38
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## List of Abbreviations

CAM-Shift	Continuously Adaptive Meanshift
LIDAR	Light Detection and Ranging
DoG	Difference of Gaussian
AUC	Area Under Curve
FPGA	Field Programmable Gate Array
GPU	Graphical Processing Unit



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