A
MAJOR PROJECT-II REPORT
On

ROBUST TRACKING USING MULTIPLE FEATURES

Submitted in the partial fulfillment of the award of the degree of

MASTER OF TECHNOLOGY

In

SIGNAL PROCESSING AND DIGITAL DESIGN

Submitted by

AMIT KUMAR SHARMA

ROLL NO. 2K11/SPD/04

Under the guidance of

MR. RAJESH ROHILLA

ASSOCIATE PROFESSOR

DEPARTMENT OF ELECTRONICS & COMMUNIACTION ENGINEERING

DELHI TECHNOLOGICAL UNIVERSITY

BAWANA ROAD, DELHI - 110042

JULY 2013

DECLARATION BY THE CANDIDATE

July 2013

Date: _____

I hereby declare that the work presented in this dissertation entitled **"Robust tracking using multiple features"** has been carried out by me under the guidance of **Mr. Rajesh Rohilla**, Associate Professor, Department of Electronics & Communication Engineering, Delhi Technological University, Delhi.

I further undertake that the work embodied in this major project has not been submitted for the award of any other degree to the best of my knowledge.

Amit Kumar Sharma
2K11/SPD/04
M.Tech. (SP&DD)

CERTIFICATE

It is to certify that the above statement made by the candidate is true to the best of my knowledge and belief.

Mr. Rajesh Rohilla
Associate Professor
Electronics & Communication Department
Delhi Technological University, Delhi-42

Dated:——————

ACKNOWLEDGEMENTS

At this point I would like to thank the people that helped me producing this dissertation. First, I thank **Dr. Rajiv Kapoor** Head of Department (Electronics and Communication Engineering, DTU), and **Mr. Rajesh Rohilla** for giving me the opportunity to write this dissertation and supporting me along the way. Next, I would like to say thanks to all my seniors and friends for their goodwill and support that helped me a lot in successful completion of this dissertation.

Special thanks to Fouad Bousetouane, Ph.D. Scholar, at Badji Mokhtar University, Algeria for providing help in implementing the target representation using texture.

Amit Kumar Sharma
2K11/SPD/04
M.Tech. (SP&DD)

Abstract

Mean shift is a kernel based widely used algorithm for tracking the location of object robustly. Classical mean shift uses color histogram to represent the object. However, the use of only color restricts the algorithm to track the object only in simple cases and it fails in complex situations like illumination changes, occlusion, and abrupt changes in the location of object. To improve the performance of mean shift, some authors have added some features to basic mean shift. As color based target representation is combined with texture-based target representation, based on spatial dependencies and co-occurrence distribution within interest target region for invariant target description, which is computed through so-scaled Haralick texture features, is an efficient mean shift for target tracking in some real world complex conditions. But it still fails, if there are some abrupt changes in the location of object. So a novel algorithm is presented in this thesis work, which is robust to track the object in above mentioned complex situations. It is the combination of color and gray level co-occurrence matrix based texture features along with the use of frame differencing for abrupt motion changing target detection.

Many experimental results demonstrate the successful of target tracking using the proposed algorithm in many complex situations, where the basic mean shift tracker obviously fails. The performance of the proposed adaptive mean shift tracker is evaluated using the VISOR video Dataset, creative common dataset and also some proprietary videos.

Keywords Visual tracking, Mean shift tracker, Color histogram, Haralick texture features, Co-occurrence matrix, Frame differencing, Abrupt motion changing object extraction.

Contents