

DECLARATION BY THE CANDIDATE

July 2014

Date: _____

I hereby declare that the work presented in this thesis entitled “**An Approach to Track Multiple Objects**” has been carried out by me under the guidance of **Mr. Rajesh Rohilla**, Associate Professor, Department of Electronics & Communication Engineering, Delhi Technological University, Delhi and hereby submitted for the partial fulfilment for the award of degree of Master of Technology in Signal Processing & Digital Design at Electronics & Communication Engineering Department, Delhi Technological University, Delhi.

I further undertake that the work embodied in this thesis has not been submitted for the award of any other degree elsewhere.

Chetna Sachdeva

2K12/SPD/06

M.Tech (SPDD)

CERTIFICATE

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

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ACKNOWLEDGEMENT

The successful completion of the thesis would be incomplete without the mention of the people who made it possible and whose constant guidance and encouragement crown all the efforts with success.

I express my sincere gratitude to my guide **Mr. Rajesh Rohilla, Associate Professor**, Electronics and Communication Department (DTU), for giving valuable advice during the course of the investigation, for his ever encouraging and moral support. His enormous knowledge and investigation always helped me unconditionally to solve various problems. I would like to thank him for suggesting me the problem of M.Tech thesis and providing valuable suggestions and improvements throughout the course of this thesis work. I truly admire his depth of knowledge and strong dedication to students and research. I am glad that I was given an opportunity to work with him. He surely brings out the best in his students.

I am greatly thankful to **Prof. Rajiv Kapoor, Professor and Head, Department of Electronics & Communication Engineering**, entire faculty and staff for their continuous support, encouragement and inspiration in the execution of this thesis work.

I would like to thank my parents for their years of unyielding love and encouragement.

I am thankful to the Almighty who bestowed upon his grace on me and was always with me whenever I felt lonely. I am also thankful to my classmates for their continuous support and goodwill that helped me a lot in successful completion of this thesis.

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ABSTRACT

Object Tracking is one of the most important processes in the area of computer vision. Its objective is to locate a moving object or several objects in video sequences, using a single camera or multiple cameras. A tracking algorithm is used, whose purpose is to analyze the video frames in isolation and predict the location of moving targets in the video frames. So, we can define tracking as the task of localizing an object of interest from a video scene by means of segmentation and afterwards keeping track of its motion, orientation, occlusion etc. in the successive frames. This is done to extract useful information from the video sequences which can be used for various purposes, for example, traffic surveillance, crowd monitoring, robot navigation and many such applications.

There are three key steps in object tracking: detection of interested moving objects, tracking of such objects from frame to frame, and analysis of object being tracked to recognize their behavior. A myriad of algorithms has been developed to implement these subtasks but each one has its own strengths and weaknesses. Extensive research has been carried out in this field over the last years to find optimal tracking systems for specific applications. Many approaches to track objects have been proposed in the literature, however, they are not completely accurate for all kinds of scenarios and just provide good results when a certain number of assumptions are verified. This is because sufficient information about object dynamics and features is generally not available beforehand in real time applications of object tracking. This causes errors in tracking and reduces the reliability of robustness of the tracking system.

Different authors have tried different methods for object tracking like particle filters, background-foreground segmentation approaches and so on. This thesis aims to provide a graph cut based technique for tracking multiple objects in the presence of occlusions to get optimal results in terms of accuracy, robustness and reliability as compared to existing techniques.

Keywords: Object tracking, Multiple objects, Graph cuts, Graph cut segmentation, Kalman filter.