A Dissertation On

**Camera Based Traffic Monitoring**

Submitted in Partial fulfillment of the requirement

for the award of Degree of

**MASTER OF ENGINEERING**

**(Electronics & Communication Engineering)**

Submitted By:

**PALLA DASTHAGIRAIAH**

College Roll No: 17/E&C/08

University Roll No: 10053

Under the Guidance of:

**Mrs. S. INDU**

**ASSOCIATE PROFESSOR**

Dept. of Electronics & Communication

Delhi Technological University

[formerly Delhi College of Engineering]



**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**DELHI COLLEGE OF ENGINEERING**

**DELHI UNIVERSITY**

**2008-2011**

**CERTIFICATE**



**DELHI COLLEGE OF ENGINEERING**

(Govt. of National Capital Territory of Delhi)

BAWANA ROAD, DELHI – 110042

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This is to certify that the work contained in this dissertation entitled **“Camera based Traffic Monitoring”** submitted by **Palla Dasthagiraiah,** University Roll No- 10053in the requirement for the partial fulfillment for the award of the degree of **Master of Engineering** **in Electronics & Communication Engineering**, Delhi College of Engineering is an account of his work carried out under my guidance and supervision in the academic year 2010-2011.

The work embodied in this major project has not been submitted to any other Institute/University for the award of any other degree to the best of my knowledge.

**Mrs.S.INDU**

(Project Guide)

**Associate Professor**

Department of Electronics and Communication.

Delhi College of Engineering,

University of Delhi, India

**I**

# ACKNOWLEDGEMENT

It is a great pleasure to have the opportunity to extend my heartiest felt gratitude to everybody who helped me throughout the course of this project.

It is distinct pleasure to express my deep sense of gratitude and indebtedness to my learned supervisor **Mrs. S.Indu** Associate Professor, Department of Electronics & Communication, Delhi College of Engineering Delhi, for her invaluable guidance, encouragement and patient reviews. I am very thankful to **Prof. Rajiv Kapoor**, H.O.D Department of Electronics & Communication, Delhi College of Engineering Delhi, and **Prof. Ashok Bhattacharyya**, former H.O.D Electronics & Communication Department who allow me to do project under the Guidance of Mrs. S.Indu on Image Processing. With their continuous inspiration, valuable guidance in carrying out this work under her effective supervision, encouragement, enlightment and cooperation, it becomes possible to complete this dissertation and all of them kept on boosting me with time, to put an extra ounce of effort to realize this work.

I would also like to take this opportunity to present my sincere regards to all the faculty members of the Department for their support and encouragement.

I am grateful to my wife and children for their moral support all the time; they have been always around to cheer me up, in the odd times of this work. I am also thankful to my classmates for their unconditional support and motivation during this work.

**PALLA DASTHAGIRAIAH**

M.E. (Electronics & Communication Engineering)

College Roll No. 17/E&C/08

University Roll No. 10053

Department of Electronics & Communication Engineering

Delhi College of Engineering, Delhi-42

**II**

# ABSTRACT

Due to heavy traffic congestion in city roads, commuting became a very difficult task for the common man. Hence we developed a traffic monitoring and classification system using visual sensors for implementing an efficient traffic management system.

The approach in this project is on appropriate methods of image processing and computer vision algorithms to be applied to road traffic flow and monitoring. The system involves extracting and analyzing the spatial and spatial temporal interest points. The traffic patterns are identified, classified using Gaussian Mixture Model (GMM), Expectation Maximization (EM) algorithms.

Traffic flow monitoring and traffic analysis is based on computer vision techniques in a real-time mode invoke precious and complicated demand of efficient computer algorithms and technological solutions. Real time traffic flow analysis then leads to generate reports of traffic volume count (without identifying and tracking vehicles) which helps in efficient designing of roads and transport system.

Traffic monitoring and classification using a distributed camera network is presented in this work. The activities on each road link are monitored and features are derived to identify the pattern. Then it is learnt, classified and communicated to neighboring road links. We used GMM-EM based classification. The proposed method is neither based on tracking nor on vehicle detection. Apart from this, the method is flexible, adaptive, robust and computationally light. Unlike the existing methods it does not assume or draws analogies of traffic moving as particles, neither does it impose restriction on road conditions or road tributaries and distributaries.

**III**