

# **AUTOMATIC IMAGE ANNOTATION**

Enrolment Number - 14102235  
Name of the Student - Eshan Gaur  
Name of Supervisor(s) - Dr. Richa Gupta



May 2018

Submitted in partial fulfilment of the Degree of  
Bachelor of Technology

DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY,  
NOIDA

**(I)**  
**TABLE OF CONTENTS**

<b>Chapter No.</b>	<b>Topics</b>	<b>Page No.</b>
	Certificate	II
	Acknowledgment	III
	Summary	IV
	List of figures	V
	List of tables	VII
<b>Chapter 1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 The Pre-Processing	3
<b>Chapter 2</b>	<b>MATLAB 2017b</b>	<b>5</b>
	2.1 History	5
	2.2 Interface	6
	2.3 Syntax	7
	2.3.1 Variables	7
	2.3.2 Vectors and Matrices	7
	2.3.3 Structures	8
	2.3.4 Functions	8
	2.4 Interfacing with Other Languages	9
<b>Chapter 3</b>	<b>FEATURE DETECTION</b>	<b>10</b>
	3.1 Definition of a Feature	10
	3.2 Types of Features	11
	3.2.1 Edges	11
	3.2.2 Corners / Interest Points	11
	3.2.3 Blobs / Regions of Interest Points	12
	3.2.4 Ridges	12

	3.3 SURF Detector	13
	3.4 MSER Detector	16
	3.5 FAST Detector	18
	3.6 Harris Detector	20
<b>Chapter 4</b>	<b>REGION SEGMENTATION</b>	22
	4.1 Thresholding	23
	4.2 Clustering	23
	4.2.1 K - Means Clustering	24
<b>Chapter 5</b>	<b>BAG-OF-FEATURES</b>	26
	5.1 Representation of an Image	26
	5.2 Representation of Features	27
	5.3 Generation of Codebook	27
	5.4 Recognition based on BoF	28
	5.5 Confusion Matrix	28
<b>Chapter 6</b>	<b>SUPPORT VECTOR MACHINES (SVMs)</b>	29
	6.1 Linear SVM	29
	6.1.1 Hard Margin	30
	6.1.2 Soft Margin	31
<b>Chapter 7</b>	<b>RESULTS AND ANALYSIS</b>	32
	<b>CONCLUSION</b>	48
	<b>REFERENCES</b>	49
	<b>CURRICULUM VITAE (CV)</b>	50