## Contents

A	bstra	ct								
So	Sommario									
$\mathbf{C}$	Contents									
In	trod	uction		1						
1	Related work			4						
	1.1	Image	forgery	4						
		1.1.1	Some famous cases	6						
	1.2	Image	forgery detection techniques	8						
		1.2.1	Active approaches	Ę.						
		1.2.2	Passive approaches	10						
1.3 Methods based on light inconsistencies										
		1.3.1	Inconsistencies in the light setting	12						
		1.3.2	Inconsistencies in the shadows	12						
		1.3.3	Inconsistencies in light color	13						
	1.4	Illumii	nant color estimation	15						
		1.4.1	Illuminant maps	17						
			1.4.1.1 Generalized Greyworld estimation	17						
			1.4.1.2 Inverse Intensity-Chromaticity estimation	19						
	1.5	n faces splicing detection	21							
		151	Method drawbacks	23						

V

	1.6	Region	degion splicing detection					
		1.6.1	Method drawbacks	26				
<b>2</b>	Pro	Proposed approach 2						
	2.1	Overv	view					
	2.2	Face s	splicing detection module					
		2.2.1	Illuminant maps extraction	30				
		2.2.2	Face detection	30				
		2.2.3	Paired face feature extraction	32				
			2.2.3.1 ACC descriptor	33				
			2.2.3.2 BIC descriptor	33				
			2.2.3.3 CCV descriptor	34				
			2.2.3.4 LCH descriptor	34				
			2.2.3.5 Paired features	34				
		2.2.4	KNN models training	35				
		2.2.5	Forgery detection and classification	36				
	2.3	n splicing detection module	37					
		2.3.1	Image segmentation	39				
		2.3.2	Band illuminant estimation	39				
		2.3.3	Reference illuminant color estimation	40				
		2.3.4	Feature vector estimation	41				
		2.3.5	Band classification	41				
		2.3.6	Output detection map	42				
3	Exp	erime	nts and results	44				
	3.1 Evaluation datasets							
		3.1.1	DSO-1	44				
		3.1.2	DSI-1	45				

CONTENTS	vi

		3.1.3	ColorCh	ecker	46	
	3.2	tection module performance	46			
		3.2.1	Color de	escriptors accuracies	47	
		3.2.2	Test case	es	48	
			3.2.2.1	Performance on DSO-1 dataset	51	
			3.2.2.2	Performance on DSI-1 dataset	52	
			3.2.2.3	Cross dataset performance on DSO-1	52	
			3.2.2.4	Cross dataset performance on DSI-1	53	
			3.2.2.5	Forgery detection performance	54	
	3.3	Region	ns forgery	detection module performance	55	
		3.3.1	Creating	the training set	55	
	3.3.2 Evaluating module performance				57	
3.3.3 Test cases			es	58		
			3.3.3.1	Performance without training	59	
			3.3.3.2	Performance with SVM training over $SplicedCC$	59	
			3.3.3.3	Performance with SVM training over $SplicedDSO$	61	
	3.4	Final 1	remarks		62	
Co	onclu	sions			64	
${f A}$	Con	nmand	line too	ol	66	
Bi	Bibliography					