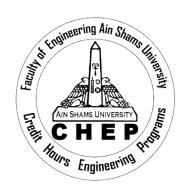
Ain Shams University
Faculty of Engineering
Credit Hours Engineering Program (CHEP)
Computer Engineering and Software
Systems (CESS)



CSE365: Computer Vision

Bubble Sheet Recognition

Submitted by:

16P8162 Ayman Yasser Shabana 16P6048 Ahmad Ashraf Mounir

Algorithm:

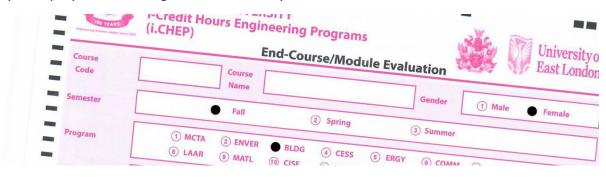
1-Apply median blur to original image.

Course	I-Credit Hours Eng	End-Course			1000	MI	nive
Code		End-Course/Mo	dule Eval	uation	1	E	ast I
-	Course					.,	more I
Semester				Gender	-		
-	Fall	② Spring			① M	lale	Female
Program	① MCTA ② Store			① Summer			
	O ENALE						
Market	MATL	(1) CISE (1) HAUG		€ COM	M (7) A	IANE	
Mark as shown:	CORRECT Please use						
		a ball-point pen or a thir w the examples shown o out this course/module	felt tip. This	form			
It is important to i	is to get feedback from you abx identified, so please take the time ox for each question that best r fy any includes.	coamples shown o	on the left has	nd side to h	e processe	d automatic	ally.
comments are not	is to get feedback from you ab identified, so please take the til module and to plan for the futu- ox for each question that best r fy any individuals (including st.	Out this co		101	eip optimi	ze the read	ng re
Please	module and to please take the til	me to answer all as	The results of	the supre-			
Please select one b	module and to plan for the future for for each question that best refy any individuals (including st.	ure. The que	estions as fully	as you can	are anonyr	nised and in	ndivia
riease do not ident	fy any individual that best r	eflects your only		as you car	. Your feed	back will be	e ura
	ox for each question that best r fy any individuals (including sta	aff names) in your com-					usec
1. Teaching Session		your comm	ients.				
117	PINS		Stre	ingly			
1.1 The teaching on	this course/module is intellectual	The second second	Ag	ree Agree	e Neutra	Disagree	Strong
1.2 Matters are expla	ined well in as	ally stimulating.					Disagn
the teaching men	session	ls.	0	(2)	(1)		
1.4 Lecturers were	neiped me to learn.		0		-	•	(\$)
1.5 The course/modul	od at explaining things. I was academically challenging.		1	(2)	•	•	(8)
	was academically challen		0		(1)	•	1
2. Course/Module Se	Innova.		1	•	3	4	3
2.1 I am aware at it	pport		0	2	•		0
2.2 The	urse/module learning outcome	The state of the s					0
2.2 The assessment requ	irements were class	š.					
2.3 I feel well supported 2.4 Feedback on summa	on this course/modul			2	1	0	
2.5 The world	tive work was provided		1	(2)	(3)	0	1
2.6 The assess	on this course/module. tive work was provided within to course/module is manageable.	he time specified	0	(2)	(3)		
com	pleted so far stime		•	(2)	3	0	
3. Course		ning.	0	2	(3)	10	
- Course/Module Ora-	nization		0	•	(1)	-	
- or or ga		The state of the s				0	
.1 The course/module	well organized and	hly.					
1.1 The course/module wa	s well organized and ran smootl						
1.1 The course/module wa	s well organized and ran smootl used on what was set out in the lact staff when i	student guide.	0	•	0		
.1 The course/module wa .2 The course/module foc 3 I have been able to con	act staff when I peeded	student guide.	•	()			
.1 The course/module wa .2 The course/module foc 3 I have been able to con . Course/Module Page	act staff when I needed to.	student guide.	0	(1)	0	(3)	
.1 The course/module wa .2 The course/module foc .3 I have been able to con . Course/Module Resour	tact staff when I needed to.	student guide.	•	(1)	0	3	
.1 The course/module wa .2 The course/module foc .3 I have been able to con . Course/Module Resour	tact staff when I needed to.	student guide.	0	(1)	0	(3)	
.1 The course/module wa .2 The course/module foc .3 I have been able to com . Course/Module Resou The course/module mate The library resources for meet my needs	tact staff when I needed to. Inces rials on Moodle are helpful in si the course/module, including in	student guide. upporting my learning.	• • •	(1)	3 6	(3)	
.1 The course/module wa .2 The course/module foc .3 I have been able to com . Course/Module Resou The course/module mate The library resources for meet my needs	tact staff when I needed to. Inces rials on Moodle are helpful in si the course/module, including in	student guide. upporting my learning.	0	② ②	3 6	(3)	
.1 The course/module wa .2 The course/module foc .3 I have been able to con . Course/Module Resou. The course/module mate The library resources for meet my needs. I am satisfied with the que	riact staff when I needed to. rces rials on Moodle are helpful in st the course/module, including its	student guide. upporting my learning.	• • • • • • • • • • • • • • • • • • •	3	3 6	3	
.1 The course/module wa .2 The course/module foc .3 I have been able to con . Course/Module Resou . The course/module mate The library resources for meet my needs. . am satisfied with the qu.	riact staff when I needed to. rces rials on Moodle are helpful in st the course/module, including it: plity of classroom facilities for the	student guide. upporting my learning. s digital resources, his course/module.	•	② ②		0	
.1 The course/module wa .2 The course/module foc .3 I have been able to con . Course/Module Resou. The course/module mate The library resources for meet my needs. I am satisfied with the qua- course/Module Satisfact	riact staff when I needed to. rices rials on Moodle are helpful in st the course/module, including its plity of classroom facilities for the	student guide. upporting my learning. s digital resources, his course/module.	•	2 3	3 6	(1)	
.1 The course/module wa .2 The course/module foc .3 I have been able to con . Course/Module Resou. The course/module mate The library resources for meet my needs. I am satisfied with the qua- course/Module Satisfact	riact staff when I needed to. rices rials on Moodle are helpful in st the course/module, including its plity of classroom facilities for the	student guide. upporting my learning. s digital resources, his course/module.	•	2 3		0	
.1 The course/module wa .2 The course/module foc .2 The course/module Resould .Course/Module Resould .Course/module mate .Course/module mate .Course/module sources for meet my needs. .am satisfied with the quality	riact staff when I needed to. rces rials on Moodle are helpful in st the course/module, including its	student guide. upporting my learning. s digital resources, his course/module.	•	2 0		0	

2-Convert image to grayscale.

	I-Credit Hours Eng	Fnd c				- 1	达 斯。	179	Univer
Course		rua-Cot	irse/Mod	ule Ev	alus	· V	1013	186	Fact I
Code	Course				uiuat	on		.635	East L
Semester	Name				Ge	nder			
-	● Fall					nger	1	Male	Female
-			Spring		(I) s	ummer			
Program	1 MCTA 2 ENVE	R BLDG			-	unimer			
-	1 LAAR 1 MATL		⊕ CESS	® ER	GY @	COMM			
Mark as shown:	CORRECT DI		① HAUD					MANE	
-		a ball-point p w the examp	en or a thus						
-	riease folio	a ball-point p w the examp out this cours	les shown on	elt tip. T	his form	will be	Drocerr		
it is important to	us to get feedback from you abli- identified, so please take the ti- /module and to plan for the futi- lox for each question that best i			the left	hand sid	le to he	p optim	d automa	itically.
review the	us to get feedback from you ab identified, so please take the ti (module and to plan for the futi look for each question that best i liffy any individuals (including st	out this cours	B/mod s					ize the rei	ading res
Please this course	module and to all	me to answer	ermodule. Th	ne results	of the				
Please select one b	ox for each own for the futi	ire.	all the ques	tions as I	ully as w	urvey a	e anony	mised and	d indicate
riease do not ident	module and to plan for the fut took for each question that best tify any individuals (including st	eflects your	No.		, us y	ou can.	Your feet	dback will	be used
-	including st	aff names) in	pinion,						oc nised
1 Teach	yox for each question that best in tify any individuals (including st	10.27 111	your comme	nts.					
- reaching Sessi	ons								
1.1 The teaching	this course/module is intellectuation				Strongly	Agree			
1 2 M	this course/module is intelled		The same of		Agree		Neutra	al Disagre	strongi
1.2 matters are expli	pined well in the teaching session	ally stimulation	ig.						Disagre
ine teaching mai	had session	15.			①	(2)	0		
1.4 Lecturers were	reiped me to learn.				1	(2)	(3)	•	(3)
1.5 The course/mod	nods used helped me to learn. ood at explaining things.				(1)		•	(4)	(8)
	was academically chall				0	(2)	(3)	•	
2. Course/Module S	, chanenging.					•	(3)	0	(8)
3 1 1	upport				1	2	•		(3)
2.11 am aware of the c	OUrse/mod. L	Service Committee						(1)	(8)
2.2 The assessment req	ourse/module learning outcome	\$.							
2.3 I feel well supp	mements were clear.					2)			
2.4 Feedback on	on this course/module			(1	france of the same		3	(d)	(8)
2.5 The worklands	ative work was provided with			G	-	2)	(3)	(4)	
2.6 The assessment of the	offive work was provided within to s course/module is manageable.	he time speci	fied	-	-		(3)		-700-
THE COM	ipleted so far stimut				(2		(3)	0	(3)
3. Course/Module a	stimulated my lear	ning.		1	(3	-	1	(1)	(3)
and Old	anization.			1	•	-	-		(3)
3.1 The course/module		Nicosop.			*****	-	2)	(4)	(8)
3.2 The course/module 4	is well organized and ran smoot used on what was set out in the stact staff when I needed to	hi.							
3.3 I have been	used on what was set out in a	my.		1					
been able to con	used on what was set out in the stact staff when I needed to.	student guid	0.			(3		0 0	
4. Course/Mad	needed to.			•	(2)	(3)	-	7	8
4. Course/Module Resou	Irces			1	2	•			
.1 The course/module mat	erials on Moodle are helpful in s the course/module, including in						(4	3	
2 The library resources to	errais on Moodle are helpful in s	IIDD a sail							-
meet my pends	the course/module, including in	apporting my	learning.	(3)	(2)				
I am satisfied	erials on Moodle are helpful in s the course/module, including it	s digital resou	FCes,	0	0	•	(4)	(3)	
redistred with the qu	ality of classroom to the				•	3	(4)		
Course/Module Satisfac	iality of classroom facilities for ti	his course/mo	dule	-				(0)	
Overall .	tion			0	2	•	(4)		
overall, I was satisfied wit	h my experience of this course/n							(8)	
would rece	, experience of this course/n	nodula							
recommend this									
would recommend this co	ourse/module to another stude			•	(2)	1			

3-Crop a simple part of the image which should only have horizontal or vertical lines.



4-Apply Canny Edge Detector.



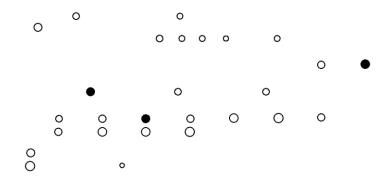
5-Get hough lines then check the theta of the first one and if it is not 90 degrees rotate the grayscale image by the difference using Affine.

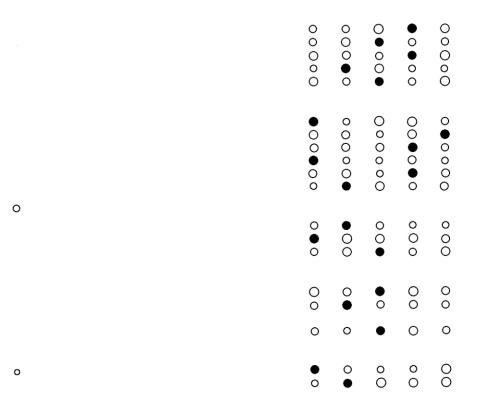
	I-Credit Hou (i.CHEP)		ering Progra nd-Course/M		ation		Y W	Unive East I	
Course		Course			1				
Code		Name			Gender	0	Male	Fema	le
Semester		Fall	(2) Spri	ing	(3) Summi	or.			
semester			0						
Program	① MCTA ⑥ LAAR	2 ENVER 9 MATL	● BLDG ④ (4) (1) CISE (1)	CESS (§ ERGY	(i) CO	MM T	MANF		
Mark as shown:	● CORRECT ② ⊗ INCORRECT		ball-point pen or v the examples sh						
comments are review this cou Please select or Please do not in	to us to get feedback not identified, so plei rse/module and to pi ne box for each quest dentify any individua	ase take the ti lan for the fut tion that best	me to answer all t ure. reflects your opin	he questions as l					
1. Teaching :		No.	A specific visite	400	①				
	1.1 The teaching on this course/module is intellectually stimulating.					(2)	(3)	•	(3)
1.2 Matters are	explained well in the	teaching ses	sions.		1	2	•	(4)	(6)
	ng methods used help		n.		(1)	(2)	(1)		(5)
	vere good at explaini				0	-	(3)	0	(3)
1.5 The course	/module was academ	ically challeng	jing.		1	2	•	4	(0)
2. Course/M	odule Support	-							
2.1 I am aware	of the course/modul	e learning out	comes.		•	2	3	4	(3)
2.2 The assess	ment requirements w	ere clear.			3	2	3	(4)	•
2.3 I feel well s	supported on this cou	irse/module.			0	(2)	(3)	•	(1)
2.4 Feedback	on summative work v	ras provided w	vithin the time spe	cified	•	2	3	(4)	(3)
	oad for this course/me				0	2	0	•	0
2.6 The assess	ments completed so	ar stimulated	my learning.		(1)	•	(3)	(4)	(8)
3. Course/M	odule Organization	-	NO SECURIO						
3.1 The course	/module was well org	anized and ra	in smoothly.		1	•	3	(4)	(8)
3.2 The course	/module focused on	what was set o	out in the student	guide.	•	2	3	4	(3)
	n able to contact staf	f when I neede	rd to.		0	2	•	(4)	(3)
3.3 I have been	odule Resources								
			nelpful in supporti	ng my learning.	①	(2)	•	(4)	(3)
4. Course/M	/module materials or	4.1 The course/module materials on Moodle are helpful in supporting my learning. 4.2 The library resources for the course/module, including its digital resources.				•	3	(4)	(8)
4. Course/M			ncluding its digita		0				
4. Course/M 4.1 The course 4.2 The library	resources for the co		ncluding its digita						
4. Course/M 4.1 The course 4.2 The library meet my n	resources for the co	urse/module, i		rse/module.	1	2	•	(4)	(3)
4. Course/M 4.1 The course 4.2 The library meet my n 4.3 I am satisf	resources for the coneeds.	urse/module, i		rse/module.	1	2	•	(1)	(8)
4. Course/M 4.1 The course 4.2 The library meet my n 4.3 I am satisf 5. Course/M	resources for the con needs. ied with the quality o	urse/module, i	ocilities for this cou		1	2	• 3	(4)	(5)

6-Get Hough circles of image and draw their outlines in black.

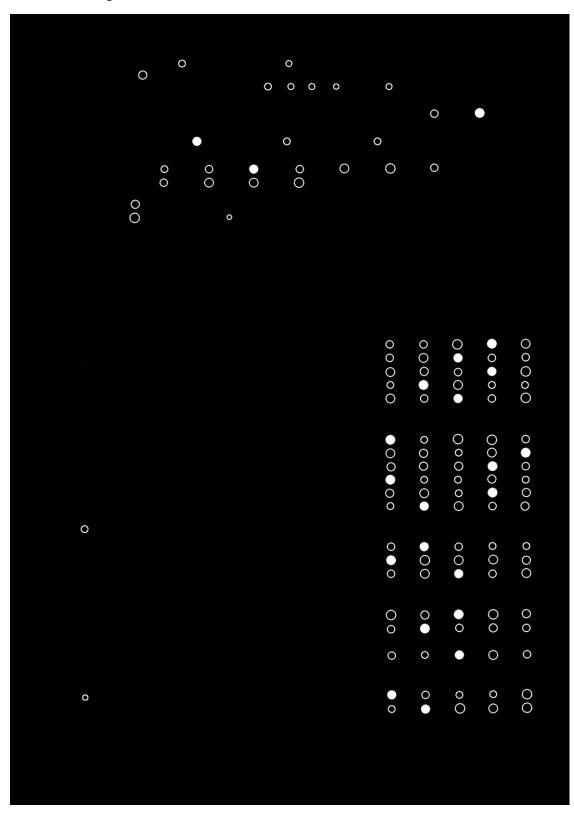
AIN SHAMS UNIVERSITY I-Credit Hours Engineering Programs (i.OHEP) End-Course/Module Ev						University of East London					
Course		Course Name				Gender	0	Male	Fema	ile	
emester		Fall		Spring		① Summ	er				
Program	O MCTA O LAAR	MATL	BLDG 10 CISE	O CESS	(1) ERGY	(i) co	MAM ①	MANF			
flark as shown:	○ CORRECT ○ ⊗ INCORRECT			pen or a thin ples shown o							
omments are neview this cour lease select on	o us to get feedback not identified, so plea se/module and to pl ne box for each quest ientify any individual	ase take the lan for the full that besites	time to answ ture. t reflects yo	ver all the quu ur opinion.	estions as f						
1. Teaching S	essions	delicities of	A CANADA	Name and Address of the						,	
1.1 The teaching on this course/module is intellectually stimulating.						0	0	0	•	0	
1.2 Matters are explained well in the teaching sessions.						0	0	•	0	0	
1.3 The teaching methods used helped me to learn.						0	0	0	•	0	
1.4 Lecturers were good at explaining things.						0	•	0	0	0	
1.5 The course	module was academ	ically challen	iging.			0	0	•	0	0	
2. Course/Mo	odule Support	-	inclinin	-							
2.1 I am aware	of the course/module	e learning ou	itcomes.				0	0	0	0	
2.2 The assessn	nent requirements w	ere clear.				0	0	0	0	•	
2.3 I feel well s	upported on this cou	rse/module.				0	0	0	•	0	
2.4 Feedback o	n summative work w	as provided	within the ti	ime specified		•	0	0	0	0	
2.5 The worklo	ad for this course/mo	dule is man	ageable.			0	0	0	•	0	
2.6 The assessr	ments completed so f	ar stimulated	d my learnin	g.		0	•	0	0	0	
3. Ourse/Mo	odule Organization	-	Name and Address of	and the same							
3.1 The course	module was well org	anized and r	an smoothly	1.		0	•	0	0	0	
3.2 The course/module focused on what was set out in the student guide.						•	0	0	0	0	
3.2 The course	able to contact staff	when I need	led to.			0	0	•	0	0	
				and the same							
3.3 I have been	odule Resources		and the state of t	4.1 The course/module materials on Moodle are helpful in supporting my learning					0	0	
3.3 I have been 4. Course/Mo		Moodle are	helpful in sa	apporting my	learning.	0		0	0	0	
4. Course/Mo 4.1 The course 4.2 The library	module materials on resources for the cou					ō	•	0			
4. Course/Mo 4.1 The course 4.2 The library meet my n	module materials on resources for the cou	ırse/module,	including it	s digital resou	irces,		0	•	0	0	
4. Course/Mo 4.1 The course. 4.2 The library meet my n 4.3 I am satisfi	/module materials on resources for the cou eeds.	ırse/module,	including it	s digital resou	irces,	0	0				
4. Course/Mc 4.1 The course 4.2 The library meet my n 4.3 I am satisfi 5. Course/Mc	module materials on resources for the cou eeds. ed with the quality o	irse/module, f classroom f	including it	s digital resou this course/m	irces,	0	0				

7-Use a binary threshold on the image to get rid of unnecessary details.

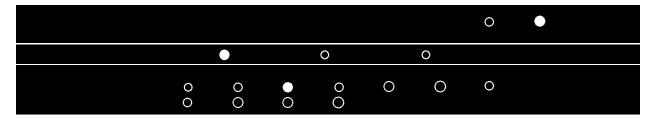




8-Invert the image.

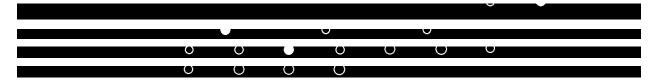


9-Crop the relevant parts of the image into separate images.



10-Crop the individual images again to make sure every object has at least one pixel on the first row.

In the case of programs, separate it into 2 images.



- 11-Get connected components for each separate image and arrange them by area.
- 12-The maximum area in the separate section is the filled in bubble and since we have made sure every object has at least one pixel on the first row, they appear in the correct order in the list so they are easy to identify.