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Порівняльний аналіз результатів досліджень відносно точності класифікаторів на різних базах даних обличь

Проаналізовано більше 100 робіт з розпізнавання облич, в результаті чого було виділені дані, приведені в таблиці. Метою аналізу було вилучити показники точності систем, в яких використовувались відповідні методи для класифікації даних та бази зображень облич.

Ключові слова: класифікатор, база зображень, точність

Dataset	Authors	Methods					
		PCA	LDA	SVM	K-NN	ANN/CNN	RF
Fer2013 [1]	Ozdemir 2019 [2]	66,47 [(1)]	71,13	81,56	73,24	71,35 71,12 80,29 96,42 91,12 94,12	83,54
	Georgescu 2019 [3]			74,23			
	Average	66,47*[(2)]	71,13*	77,89*	73,24*	84,07	83,54*
JAFFE [4]	Abd El Meguid 2014 [5]						72,11
	Abdulrahman 2014 [6]	74,14 75,71					
	Abdulrahman 2015 [7]	88,71		88,71 76,71			
	Faisal 2015 [8]		90,23	90,23			
	Alshamsi 2017 [9]			91,87			
	Fernandes 2013 [10]	98,87					
	Fernandes 2013 [11]	89,5					
	Wenfei Gu 2012 [12]	89,67	89,67				
	Ridha Ilyas 2019 [13]					98,42	
	Jayalekshmi 2017 [14]			90,14	81,69		91,54
	Kasemsumran 2016 [15]				100		
	Kwang Ho An 2010 [16]	33,1 50,5	71,98 50,5				
	Palaniswamy 2019 [17]					93,82	
	Ke Shan 2017 [18]				58,52 65,11	73,01 76,74	
	Shokrani 2014 [19]				98,26	83,08	

	Sujata 2018 [20]	87,21					
	Zhan Wang 2010 [21]	77,25	89				
	Yaddaden 2018 [22]			92,68			
	Zhang 2011 [23]			92,92			
	Cheng 2008 [24]		60,09				
	Zhang 2011 [25]			77			
	Ronghang Zhu 2015 [26]			61,9			
	Ozdemir 2019 [2]					94,12	
							83,54
	Average	76,46	75,24	84,68	80,71	86,53	82,39*
YALEB [27]	Lin Luo 2003 [28]	88,81 95,71	94,75			76,32	83,54
	Savvides 2004 [29]	93,58					
	Huxidan 2012 [30]	81,53	91,06 91,76 92,24				
	Kwang Ho An 2008 [31]	76,04 72,91	76,04				
	Ajmal Mian 2010 [32]			93,76			
	Song 2010 [33]	59,79 93,6	93,35 93,6 100				
	Jianqiang Xu 2012 [34]	98,12 43,96					
	Zhang 2010 [35]	 96,1 99,1 99			97 96,1 99 99		
	Average	84,48	91,6	93,76	97,77	76,32*	83,54*
YALE [36]	Lin Luo 2003 [28]	90,48 98,79	98,18				83,54
	Aldhahab 2014 [37]	94,29 82,33				94,29	
	Alobaidi 2017 [38]			98,8			
	Goudelis 2007 [39]	90,96	94,2 78,9 97,6				
	Sujay 2017 [40]			83,63			
	Titijaroonro 2020 [41]	79,57					
	Wei 2017 [42]	81,29 86,68	91,64 93,07				

				94,39			
	Jun Ye 2013 [43]				67,49		
					71,62		
						76,32	
	Average	88,04	92,568571	91,215	69,555	85,305[*]	83,54[*]
UMIST [44]	Goudelis 2007 [39]	86,04	88,08			76,32	83,54
			80,54				
			93,68				
	Al-Waisy 2015 [45]				98,49		
	Gupta 2002 [46]	96,8	97,8	95,56	93,8		
		96,99	97,37	96,06	93,7		
		96,17	97,4	96,99			
	Dey 2015 [47]	93,33	94,23		94,83		
	Huang 2008 [48]			92,8			
	Juwei Lu 2003 [49]	65,63	52,24				
	Kong 2012 [50]			92,76			
	Satonaka 2006 [51]				96,58		
	Thakur 2008 [52]					94,1	
	Average	89,16	87,66	94,83	95,48	85,21[*]	83,54[*]
YALEB+ [53]	Titijaroonro 2020 [41]	85,74					83,54
	Vinay 2017 [54]					92,57	
	Asif 2018 [55]					94,2	
	Budiman 2016 [56]				89,85		
	Castillo 2014 [57]	82,08					
	Chan 2015 [58]	86,01			86,01	86,01	
	Kong 2018 [59]	40,15			40,15		
		47,74		47,74			
				80,48			
				84,32			
				98,35		98,35	
	Gan 2014 [60]	67,36	82,1				
		75,26	75,26				
		62,1	84,21				
	Pandey 2016 [61]					96,61	
	Talab 2019 [62]					94,85	
	Umer 2015 [63]			92,49			
	Xia 2016 [64]			99,79			
	Average	68,305	80,52	83,86	72	93,76	83,54[*]
ORL [65]	Huxidan 2012 [30]	91,05	95,85				83,54
			94,1				
			95,18				
	Aldhahab 2014 [37]	95,02				95,02	
		86,15					

	Alobaidi 2017 [38]			98,9			
	Goudelis 2007 [39]	93,5	94,8				
			86,2				
			96,04				
	Titijaroonro 2020 [41]	91,2					
	Jun Ye 2013 [43]				80,18		
					81,73		
	Wei 2017 [42]	89,38	93,92				
		90,82	95,37				
			96,76				
	Dey 2015 [47]	91,62	92,84		91,62		
	Satonaka 2006 [51]				98,47		
	Thakur 2008 [52]				93,5		
	Kong 2018 [59]	91,5			91,5		
		94,5		94,5			
				83,5			
				87,5			
				96,33		96,33	
	Gan 2014 [60]	82,45	72,4				
		74,99	74,99				
		85,76	75,97				
	Talab 2019 [62]					92,45	
	Umer 2015 [63]			98,05			
	Xia 2016 [64]			98,67			
	Ahdid 2014 [66]					62,83	
	Budiman 2016 [56]				89,28		
	Salhi 2012 [67]			94,45		92,2	86,13
	Ouarda 2014 [68]			77,29			
	Wang 2018 [69]					99,5	
	Yan 2017 [70]					99,82	
	Yong Xu 2014 [71]	88,81	88	92,37	84,56		
	Ananthakumar 2018 [72]			98,61		98,61	
	Average	89,05	89,4	92,7	88,8	92,0	84,8*
CMU-PIE [73]	Savvides 2004 [29]	77,75		81,56	76,32		83,54
	Huxidan 2012 [30]	83,45	89,73				
			88,01				
			94,98				
	Vinay 2017 [54]					96,56	
	Gan 2014 [60]	78,93	3,37				
		40,94	40,94				
		76,85	1,91				
	Pandey 2016 [61]					91,67	
	Asif 2018 [55]					94,53	
	Chen 2010 [74]		82,03				

	Xiaoping Hu 2016 [75]						
	Jirka 2014 [76]	73,81		73,81			
				72,75			
	Liu 2016 [77]	99,25					
		83,6					
	Wang Ying 2008 [78]				81,8		
	Average	76,82	57,28	76,04*	79,06*	94,25	83,54*
KDEF [79]	Abd El Meguid 2014 [5]	<u>66,47</u>	<u>71,13</u>		76,32		89
	Alshamsi 2017 [9]			90,77			
	Palaniswamy 2019 [17]					95,1	
	Yaddaden 2018 [22]			93,33			
	Akyol 2016 [80]			93,28			
	Mahmud 2018 [81]				85,85		
	Ozdemir 2019 [2]					94,12	
	Ruiz-Garcia 2017 [82]					92,52	
	Santra 2016 [83]			80,49			
	Zhou 2017 [84]					86,43	<u>83,54</u>
	Average	66,47*	71,13*	89,46	81,08	92,04	86,27*
BU-4DFE [85]	Abd El Meguid 2014 [5]	<u>66,47</u>	<u>71,13</u>		<u>73,24</u>		73,1
	Drira 2012 [86]						93,21
	Hayat 2012 [87]			92,68			<u>83,54</u>
	Daoudi 2013 [88]		93,83				
	Jeni 2011 [89]			74,32			
	Suja 2015 [90]			79,05		74	
	Yang 2017 [91]					75,9	
	Yang 2018 [92]					89,55	
	Average	66,47*	82,48*	82,01	73,24*	79,81	83,28*
MULTI-PIE [73]			<u>71,13</u>				<u>83,54</u>
	Chan 2015 [58]	84,36			84,36	84,36	
					69,77	69,77	69,77
			80,18		80,18	80,18	
		82,45		82,45		82,45	
	Pandey 2016 [61]					96,52	
	Bhatt 2012 [93]			81,55			
	Chen 2015 [94]			96,4			
	Masi 2014 [95]	89,55					
	Palaniswamy 2019 [17]					96,55	
	Soleymani 2018 [96]			45,25	43,84	87,76	
	Average	85,45	75,65*	76,41	69,53	85,37	76,65*
AR [97]	Alobaidi 2017 [38]			98,6			<u>83,54</u>

Database	Reference	C1	C2	C3	C4	C5	C6
	Goudelis 2007 [39]	84,58	92,6				
			79,52				
			95,68				
	Chan 2015 [58]	93,58			93,58	93,58	
	Kong 2018 [59]	39,05			39,05		
		43,32		43,32			
				72,29			
				76,21			
	Xia 2016 [64]			93,48			
	Wang 2018 [69]					85,97	
	Yong Xu 2014 [71]	56,53	65,36	66,39	61,17		
	Petpairote 2013 [98]	81,53			81,53		
			71,83		71,83		
	Castillo 2014 [57]	54,76					
	Saikia 2017 [99]				98,4		
	Xie 2008 [100]		97,69				
	Yan 2017 [70]					99,78	
	Average	64,76	83,78	75,04	74,26	93,11	83,54*
CK+ [101], [102]	Faisal 2015 [8]		90,23	90,23			83,54
	Alshamsi 2017 [9]			96,27			
	Wenfei Gu 2012 [12]	91,51	91,51				
	Ridha Ilyas 2019 [13]					96,45	
	Palaniswamy 2019 [17]					94,9	
	Ke Shan 2017 [18]				73,27	77,57	
					77,27	80,3	
	Shokrani 2014 [19]			94,44	98,91		
	Sujata 2018 [20]	88,67					
	Zhan Wang 2010 [21]	80,63	86,56				
	Zhang 2011 [23]			94,48			
	Zhang 2011 [25]			77			
	Ronghang Zhu 2015 [26]			60,02			
	Mahmud 2018 [81]				99,4		
	Jeni 2011 [89]			82,2			
	Yang 2018 [92]					96,57	
	Acevedo 2017 [103]				82,17		
	Average	86,93	89,43	84,94	86,20	89,15	83,54*
FERET [104]	Aldhahab 2014 [37]	93,94				93,94	83,54
		82,73					
	Alobaidi 2017 [38]	97,7					

Sujay 2017 [40]			83,67			
Wei 2017 [42]	51,64	54,04				
	52,47	55,56				
		56,8				
Chan 2015 [58]	95,31			95,31	95,31	
Wang 2018 [69]					93,57	
Yong Xu 2014 [71]	73,08	70,37	77,29	72,16		
Castillo 2014 [57]	38,26					
Saikia 2017 [99]				96,3		
Xie 2008 [100]		97,69				
Biradar 2017 [105]				98,33		
Goel 2012 [106]			98,02			
Guo 2016 [107]			97,5		97,5	
			96,89			
Kayım 2013 [108]			95			95
Average	73,14	66,89	91,39	90,52	95,08	89,27*
CALTECH [109]		71,13		73,24	76,32	83,54
Ouarda 2014 [68]			75,66			
Goel 2012 [106]			98,75			
Fernandes 2013 [10]	97,62					
Fernandes 2013 [11]	87					
Ananthakumar 2018 [72]			97,15		97,15	
Kunjumon 2014 [110]	50,36	37,27				
Liu 2015 [111]				87,09		
Average	78,32	54,2*	90,52	80,16*	86,73*	83,54*

1. Підкреслені показники точності відповідають даним з [112]
2. Показники точності з зірочкою – для аналізу застосовувалось менше трьох показників точності

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