

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

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	Ozdemir 2019 [1]	<u>66,47</u> ⁽¹⁾	<u>71,13</u>	<u>81,56</u>	<u>73,24</u>	71,35 71,12 80,29 96,42 91,12 94,12	<u>83,54</u>
	Georgescu 2019 [2]			74,23			
	Average	66,47 ^{*(2)}	71,13 [*]	77,89 [*]	73,24 [*]	84,07	83,54 [*]
JAFPE	Abd El Meguid 2014 [3]						72,11
	Abdulrahman 2014 [4]	74,14 75,71					
	Abdulrahman 2015 [5]	88,71		88,71 76,71			
	Faisal 2015 [6]		90,23	90,23			
	Alshamsi 2017 [7]			91,87			
	Fernandes 2013 [8]	98,87					
	Fernandes 2013 [9]	89,5					
	Wenfei Gu 2012 [10]	89,67	89,67				
	Ridha Ilyas 2019 [11]					98,42	
	Jayalekshmi 2017 [12]			90,14	81,69		91,54
	Kasemsumran 2016 [13]				100		
	Kwang Ho An 2010 [14]	33,1 50,5	71,98 50,5				
	Palaniswamy 2019 [15]					93,82	
	Ke Shan 2017 [16]				58,52 65,11	73,01 76,74	
	Shokrani 2014 [17]				98,26	83,08	
	Sujata 2018 [18]	87,21					
	Zhan Wang 2010 [19]	77,25	89				
	Yaddaden 2018 [20]			92,68			

	Zhang 2011 [21]			92,92			
	Cheng 2008 [22]		60,09				
	Zhang 2011 [23]			77			
	Ronghang Zhu 2015 [24]			61,9			
	Ozdemir 2019 [1]					94,12	
							<u>83,54</u>
	Average	76,46	75,24	84,68	80,71	86,53	82,39*
YALEB	Lin Luo 2003 [25]	88,81 95,71	94,75			<u>76,32</u>	<u>83,54</u>
	Savvides 2004 [26]	93,58					
	Huxidan 2012 [27]	81,53	91,06 91,76 92,24				
	Kwang Ho An 2008 [28]	76,04 72,91	76,04				
	Ajmal Mian 2010 [29]			93,76			
	Song 2010 [30]	59,79 93,6	93,35 93,6 100				
	Jianqiang Xu 2012 [31]	98,12 43,96					
	Zhang 2010 [32]	96,1 99,1 99			97 96,1 99 99		
	Average	84,48	91,6	93,76	97,77	76,32*	83,54*
YALE	Lin Luo 2003 [25]	90,48 98,79	98,18				<u>83,54</u>
	Aldhahab 2014 [33]	94,29 82,33				94,29	
	Alobaidi 2017 [34]			98,8			
	Goudelis 2007 [35]	90,96	94,2 78,9 97,6				
	Sujay 2017 [36]			83,63			
	Titijaroonro 2020 [37]	79,57					
	Wei 2017 [38]	81,29 86,68	91,64 93,07 94,39				
	Jun Ye 2013 [39]				67,49 71,62		
						<u>76,32</u>	
	Average	88,04	92,568571	91,215	69,555	85,305*	83,54*
UMIST	Goudelis 2007 [35]	86,04	88,08 80,54			<u>76,32</u>	<u>83,54</u>

			93,68				
	Al-Waisy 2015 [40]				98,49		
	Gupta 2002 [41]	96,8	97,8	95,56	93,8		
		96,99	97,37	96,06	93,7		
		96,17	97,4	96,99			
	Dey 2015 [42]	93,33	94,23		94,83		
	Huang 2008 [43]			92,8			
	Juwei Lu 2003 [44]	65,63	52,24				
	Kong 2012 [45]			92,76			
	Satonaka 2006 [46]				96,58		
YALEB +	Thakur 2008 [47]					94,1	
	Average	89,16	87,66	94,83	95,48	85,21*	83,54*
	Titijaroonro 2020 [37]	85,74					<u>83,54</u>
	Vinay 2017 [48]					92,57	
	Asif 2018 [49]					94,2	
	Budiman 2016 [50]				89,85		
	Castillo 2014 [51]	82,08					
	Chan 2015 [52]	86,01			86,01	86,01	
	Kong 2018 [53]	40,15			40,15		
		47,74		47,74			
				80,48			
				84,32			
				98,35		98,35	
	Gan 2014 [54]	67,36	82,1				
		75,26	75,26				
		62,1	84,21				
	Pandey 2016 [55]					96,61	
	Talab 2019 [56]					94,85	
	Umer 2015 [57]			92,49			
	Xia 2016 [58]			99,79			
	Average	68,305	80,52	83,86	72	93,76	83,54*
ORL	Huxidan 2012 [27]	91,05	95,85 94,1 95,18				<u>83,54</u>
	Aldhahab 2014 [33]	95,02				95,02	
		86,15					
	Alobaidi 2017 [34]			98,9			
	Goudelis 2007 [35]	93,5	94,8 86,2 96,04				
	Titijaroonro 2020 [37]	91,2					
	Jun Ye 2013 [39]				80,18 81,73		
	Wei 2017 [38]	89,38	93,92 95,37 96,76				
		90,82					
	Dey 2015 [42]	91,62	92,84		91,62		

	Satonaka 2006 [46]				98,47		
	Thakur 2008 [47]				93,5		
	Kong 2018 [53]	91,5			91,5		
		94,5		94,5 83,5 87,5 96,33		96,33	
	Gan 2014 [54]	82,45	72,4				
		74,99 85,76	74,99 75,97				
	Talab 2019 [56]					92,45	
	Umer 2015 [57]			98,05			
	Xia 2016 [58]			98,67			
	Ahdid 2014 [59]					62,83	
	Budiman 2016 [50]				89,28		
	Salhi 2012 [60]			94,45		92,2	86,13
	Ouarda 2014 [61]			77,29			
	Wang 2018 [62]					99,5	
	Yan 2017 [63]					99,82	
	Yong Xu 2014 [64]	88,81	88	92,37	84,56		
	Ananthakumar 2018 [65]			98,61		98,61	
	Average	89,05	89,4	92,7	88,8	92,0	84,8*
CMU-PIE	Savvides 2004 [26]	77,75		<u>81,56</u>	<u>76,32</u>		<u>83,54</u>
	Huxidan 2012 [27]	83,45	89,73 88,01 94,98				
	Vinay 2017 [48]					96,56	
	Gan 2014 [54]	78,93 40,94 76,85	3,37 40,94 1,91				
	Pandey 2016 [55]					91,67	
	Asif 2018 [49]					94,53	
	Chen 2010 [66]		82,03				
	Xiaoping Hu 2016 [67]						
	Jirka 2014 [68]	73,81		73,81 72,75			
	Liu 2016 [69]	99,25 83,6					
	Wang Ying 2008 [70]				81,8		
	Average	76,82	57,28	76,04*	79,06*	94,25	83,54*
KDEF	Abd El Meguid 2014 [3]	<u>66,47</u>	<u>71,13</u>		76,32		89
	Alshamsi 2017 [7]			90,77			
	Palaniswamy 2019 [15]					95,1	
	Yaddaden 2018 [20]			93,33			
	Akyol 2016 [71]			93,28			

	Mahmud 2018 [72]				85,85		
	Ozdemir 2019 [1]					94,12	
	Ruiz-Garcia 2017 [73]					92,52	
	Santra 2016 [74]			80,49			
	Zhou 2017 [75]					86,43	<u>83,54</u>
	Average	66,47*	71,13*	89,46	81,08	92,04	86,27*
BU-4DFE	Abd El Meguid 2014 [3]	<u>66,47</u>	<u>71,13</u>		<u>73,24</u>		73,1
	Drira 2012 [76]						93,21
	Hayat 2012 [77]			92,68			<u>83,54</u>
	Daoudi 2013 [78]		93,83				
	Jeni 2011 [79]			74,32			
	Suja 2015 [80]			79,05		74	
	Yang 2017 [81]					75,9	
	Yang 2018 [82]					89,55	
	Average	66,47*	82,48*	82,01	73,24*	79,81	83,28*
MULTI-PIE			<u>71,13</u>				<u>83,54</u>
	Chan 2015 [52]	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 [55]					96,52	
	Bhatt 2012 [83]			81,55			
	Chen 2015 [84]			96,4			
	Masi 2014 [85]	89,55					
	Palaniswamy 2019 [15]					96,55	
	Soleymani 2018 [86]			45,25	43,84	87,76	
	Average	85,45	75,65*	76,41	69,53	85,37	76,65*
AR	Alobaidi 2017 [34]			98,6			<u>83,54</u>
	Goudelis 2007 [35]	84,58	92,6 79,52 95,68				
	Chan 2015 [52]	93,58			93,58	93,58	
	Kong 2018 [53]	39,05 43,32		43,32 72,29 76,21	39,05		
	Xia 2016 [58]			93,48			
	Wang 2018 [62]					85,97	
	Yong Xu 2014 [64]	56,53	65,36	66,39	61,17		
	Petpairrote 2013 [87]	81,53	71,83		81,53 71,83		
	Castillo 2014 [51]	54,76					
	Saikia 2017 [88]				98,4		
	Xie 2008 [89]		97,69				
	Yan 2017 [63]					99,78	

	Average	64,76	83,78	75,04	74,26	93,11	83,54*
CK+	Faisal 2015 [6]		90,23	90,23			<u>83,54</u>
	Alshamsi 2017 [7]			96,27			
	Wenfei Gu 2012 [10]	91,51	91,51				
	Ridha Ilyas 2019 [11]					96,45	
	Palaniswamy 2019 [15]					94,9	
	Ke Shan 2017 [16]				73,27 77,27	77,57 80,3	
	Shokrani 2014 [17]			94,44	98,91		
	Sujata 2018 [18]	88,67					
	Zhan Wang 2010 [19]	80,63	86,56				
	Zhang 2011 [21]			94,48			
	Zhang 2011 [23]			77			
	Ronghang Zhu 2015 [24]			60,02			
	Mahmud 2018 [72]				99,4		
	Jeni 2011 [79]			82,2			
	Yang 2018 [82]					96,57	
	Acevedo 2017 [90]				82,17		
	Average	86,93	89,43	84,94	86,20	89,15	83,54*
FERET	Aldhahab 2014 [33]	93,94 82,73				93,94	<u>83,54</u>
	Alobaidi 2017 [34]	97,7					
	Sujay 2017 [36]			83,67			
	Wei 2017 [38]	51,64 52,47	54,04 55,56 56,8				
	Chan 2015 [52]	95,31			95,31	95,31	
	Wang 2018 [62]					93,57	
	Yong Xu 2014 [64]	73,08	70,37	77,29	72,16		
	Castillo 2014 [51]	38,26					
	Saikia 2017 [88]				96,3		
	Xie 2008 [89]		97,69				
	Biradar 2017 [91]				98,33		
	Goel 2012 [92]			98,02			
	Guo 2016 [93]			97,5 96,89		97,5	
	Kayım 2013 [94]			95			95
	Average	73,14	66,89	91,39	90,52	95,08	89,27*
CALTE CH			<u>71,13</u>		<u>73,24</u>	<u>76,32</u>	<u>83,54</u>
	Ouarda 2014 [61]			75,66			
	Goel 2012 [92]			98,75			
	Fernandes 2013 [8]	97,62					
	Fernandes 2013 [9]	87					

	Ananthakumar 2018 [65]			97,15		97,15	
	Kunjumon 2014 [95]	50,36	37,27				
	Liu 2015 [96]				87,09		
	Average	78,32	54,2*	90,52	80,16*	86,73*	83,54*

1. Підкреслені показники точності відповідають даним з [97]
2. Показники точності з зірочкою – для аналізу застосовувалось менше трьох показників точності

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