

Automatic classification of esophageal disease in gastroscopic images using an efficient channel attention deep dense convolutional neural network: supplement

WENJU DU,^{1,2}  NINI RAO,^{1,2,5}  CHANGLONG DONG,^{1,2} YINGCHUN WANG,^{1,2} DINGCAN HU,^{1,2} LINLIN ZHU,³ BING ZENG,⁴ AND TAO GAN^{3,6}

¹Center for Informational Biology, University of Electronic Science and Technology of China, Chengdu 610054, China

²School of Life Science and Technology, University of Electronic Science and Technology of China, Chengdu 610054, China

³Digestive Endoscopic Center of West China Hospital, Sichuan University, Chengdu 610017, China

⁴School of Information and Communication Engineering, University Electronic Science and Technology of China, Chengdu 610054, China

⁵raonn@uestc.edu.cn

⁶gantao111@aliyun.com

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Table S1 Statistical comparison of each sub-category with different state-of-the-art methods on esophageal dataset

		Disease Type						
		NE	SC	O	EV	ESE	EEC	AEC
Pr (%)	M1	84.59	90.24	83.65	95.12	87.40	85.24	91.61
	(95% CI)	(80.70,88.55)	(87.44,92.89)	(81.03,86.27)	(93.86,96.37)	(83.95,90.70)	(82.40,87.90)	(89.49,93.65)
	M2	84.47	89.02	81.96	96.26	90.19	82.95	93.37
	(95% CI)	(80.48,88.40)	(86.06,92.01)	(79.01,84.84)	(95.16,97.35)	(87.07,93.05)	(79.78,86.18)	(91.32, 95.33)
	M3	85.81	88.86	84.64	95.14	87.43	85.08	91.09
	(95% CI)	(81.88,89.56)	(85.82,91.71)	(82.10,87.26)	(93.88,96.36)	(84.01,90.66)	(82.16,87.95)	(88.96,93.34)
	M4	82.75	90.95	82.98	96.74	88.86	84.15	91.50
Rec (%)	(95% CI)	(78.79,87.06)	(88.28,93.48)	(80.23,85.64)	(95.63,97.72)	(85.71,91.91)	(80.97,87.23)	(89.02,93.70)
	M5	84.92	88.22	85.38	96.04	89.13	84.38	92.44
	(95% CI)	(81.00,88.59)	(85.10,90.97)	(82.68,88.03)	(94.91,97.13)	(85.67,92.09)	(81.19,87.38)	(90.46,94.46)
	Our	87.71	92.09	84.65	96.70	89.92	83.90	93.03
	(95% CI)	(83.93,91.37)	(89.67,94.71)	(81.98,87.29)	(95.66,97.69)	(86.71,92.81)	(80.70,86.90)	(91.00,94.92)
	M1	87.76	85.55	85.63	95.44	87.40	86.92	88.94
	(95% CI)	(83.56,91.46)	(82.19,88.84)	(83.10,88.25)	(94.27,96.52)	(83.79,90.49)	(84.19,89.64)	(86.54,91.19)
F1 (%)	M2	88.78	87.81	86.81	95.52	87.40	83.69	88.63
	(95% CI)	(84.83,92.45)	(84.83, 90.75)	(84.22, 89.22)	(94.28, 96.76)	(83.98, 90.59)	(80.57, 86.71)	(86.20, 91.01)
	M3	88.44	86.46	86.52	95.95	85.86	82.80	91.09
	(95% CI)	(84.87,91.78)	(83.26,89.58)	(83.90,89.11)	(94.82,97.13)	(82.27,89.30)	(79.82,85.59)	(88.67,93.22)
	M4	88.10	86.23	88.15	95.35	84.06	86.56	89.25
	(95% CI)	(84.48,91.60)	(83.07,89.60)	(85.93,90.69)	(94.13,96.51)	(80.44,87.50)	(83.77,89.54)	(86.83,91.45)
	M5	88.10	86.23	87.41	96.20	84.32	87.10	90.17
	(95% CI)	(84.50,91.56)	(83.26,89.41)	(84.97,89.77)	(95.05,97.23)	(80.49,87.98)	(84.49,89.68)	(87.75,92.32)
	Our	87.41	86.68	89.04	96.54	87.15	87.81	90.17
	(95% CI)	(83.33,91.26)	(83.49,89.84)	(86.62,91.24)	(95.38,97.45)	(83.78,90.44)	(85.11,90.46)	(87.73,92.50)
	M1	86.14	87.83	84.63	95.28	86.07	87.40	90.26
	(95% CI)	(83.01,89.14)	(85.68,90.06)	(82.62,86.69)	(94.39,96.11)	(84.72,89.82)	(83.98,88.16)	(88.57,91.76)
	M2	86.57	88.41	84.32	95.89	88.77	83.32	90.94
	(95% CI)	(83.42, 89.38)	(86.03, 90.60)	(82.16, 86.40)	(94.99, 96.75)	(86.33, 90.91)	(80.84, 85.81)	(89.29, 92.60)
	M3	87.10	87.64	85.57	95.54	86.64	83.92	91.09
	(95% CI)	(84.27,89.95)	(85.23,89.87)	(83.54,87.53)	(94.70,96.44)	(83.94,89.04)	(81.60,86.12)	(89.48,92.56)
	M4	85.34	88.53	85.49	96.04	86.39	85.34	90.36
	(95% CI)	(82.30,88.32)	(86.43,90.65)	(83.56,87.35)	(95.26,96.84)	(83.81,88.69)	(82.95,87.62)	(88.54,92.06)
	M5	86.48	87.21	86.38	96.12	86.66	85.71	91.29
	(95% CI)	(83.58,89.11)	(84.87,89.44)	(84.54,88.28)	(95.26,96.90)	(83.94,89.19)	(83.56,87.84)	(89.72,92.87)

	Our	87.56	89.30	86.79	96.62	88.51	85.81	91.58
	(95% CI)	(84.79,90.03)	(87.23,91.43)	(84.80,88.72)	(95.84,97.31)	(86.07,90.83)	(83.63,87.96)	(89.92,93.23)
AUC (%)	M1	98.64	98.65	98.11	99.48	97.89	97.93	97.47
	(95% CI)	(97.77,99.30)	(98.01,99.18)	(97.59,98.53)	(99.21,99.69)	(96.97,98.67)	(97.19,98.54)	(96.55,98.35)
	M2	98.67	98.69	98.11	99.48	98.40	97.60	97.88
	(95% CI)	(97.76,99.41)	(98.14,99.17)	(97.62,98.57)	(99.24,99.71)	(97.57,99.11)	(96.84,98.27)	(97.10,98.55)
	M3	99.18	98.84	98.22	99.65	98.30	97.77	98.25
	(95% CI)	(98.88,99.45)	(98.33,99.27)	(97.72,98.64)	(99.52,99.77)	(97.53,98.91)	(97.06,98.40)	(97.57,98.87)
	M4	98.41	98.53	97.70	99.38	97.86	97.48	97.84
	(95% CI)	(97.57,99.18)	(97.76,99.11)	(97.02,98.26)	(99.09,99.63)	(96.91,98.71)	(96.68,98.23)	(97.02,98.52)
	M5	98.98	98.30	98.38	99.56	98.10	97.70	97.77
	(95% CI)	(98.33,99.48)	(97.51,98.95)	(97.89,98.79)	(99.33,99.76)	(97.24,98.88)	(96.99,98.37)	(96.95,98.52)
	Our	98.56	98.62	98.57	99.54	98.60	98.16	98.17
	(95% CI)	(97.69,99.30)	(97.95,99.20)	(98.24,98.87)	(99.31,99.73)	(97.88,99.18)	(97.48,98.73)	(97.39,98.83)

M1: Kumagai et al. [17]; M2: Liu et al. [19]; M3: Hu et al. [30]; M4: Tan et al. [41]; M5: Wang et al. [39].

Table S2 Statistical comparison of each class with different state-of-the-art methods on skin datasets

		Disease Type							
		AK	BCC	BKL	DF	MEL	NV	SCC	VACC
Pr (%)	M1	84.11	87.11	86.99	91.89	82.07	83.50	63.79	92.16
		(77.94,89.71)	(84.59,89.47)	(83.93,89.98)	(82.35,100.00)	(79.60,84.53)	(80.87,86.06)	(51.79,75.93)	(83.33,98.08)
	M2	80.50	84.54	84.93	87.18	83.26	81.49	58.62	88.46
		(73.68,86.71)	(81.71,87.02)	(81.74, 87.99)	(75.68, 96.88)	(80.79, 85.48)	(78.65, 84.02)	(45.76, 71.64)	(78.57, 97.01)
	M3	78.74	86.38	86.48	95.24	83.99	84.61	62.96	86.79
		(72.33,85.12)	(83.96,88.76)	(83.19,89.34)	(87.50,100.00)	(81.65,86.22)	(81.98,87.17)	(48.94,76.09)	(77.14,95.12)
	M4	86.81	87.18	84.93	100.00	85.34	81.71	60.32	94.00
		(80.92,92.21)	(84.52,89.57)	(81.67,88.08)	(100.00,100.00)	(83.07,87.66)	(79.09,84.19)	(48.10,72.31)	(87.50,100.00)
Rec (%)	M5	82.14	87.39	86.31	97.50	84.79	83.87	66.04	88.46
		(76.28,87.82)	(84.72,90.02)	(83.07,89.32)	(91.67,100.00)	(82.34,87.08)	(81.33,86.41)	(52.83,79.17)	(79.37,96.23)
	Our	80.59	88.18	90.13	91.11	84.86	83.99	66.10	90.74
		(74.83,86.05)	(85.84,90.38)	(87.45,92.79)	(82.69,100.00)	(82.58,87.20)	(81.66,86.43)	(53.85,77.78)	(82.54,98.04)
	M1	73.41	92.62	81.52	70.83	85.07	81.63	74.00	94.00
		(67.08,80.12)	(90.52,94.48)	(78.25,84.66)	(58.33,83.05)	(82.65,87.35)	(78.93,84.30)	(62.07,86.05)	(86.96,100.00)
	M2	73.99	91.42	76.19	70.83	82.52	83.63	68.00	92.00
		(67.48,80.50)	(89.17,93.65)	(72.34,79.72)	(57.69,83.33)	(79.78,84.94)	(81.12,86.01)	(54.17,80.77)	(83.67,98.15)
	M3	79.19	91.72	80.38	83.33	84.73	83.13	68.00	92.00
		(73.26,84.94)	(89.67,93.76)	(76.60,83.59)	(71.43,93.33)	(82.42,87.06)	(80.47,85.57)	(54.90,80.77)	(83.78,98.11)
	M4	72.25	92.17	79.43	79.17	82.41	87.12	76.00	94.00
		(65.41,79.06)	(90.06,94.27)	(75.86,82.93)	(67.50,90.00)	(80.02,84.82)	(84.83,89.36)	(63.41,87.80)	(87.10,100.00)
	M5	79.77	90.81	82.86	81.25	84.51	84.50	70.00	92.00
		(73.53,85.80)	(88.59,92.96)	(79.58,86.12)	(68.89,92.16)	(82.23,86.78)	(82.01,86.83)	(55.10,81.48)	(84.09,98.31)
	Our	79.19	92.17	81.71	85.42	84.29	85.88	78.00	98.00
		(72.56,85.21)	(90.05,94.14)	(78.44,84.85)	(74.36,94.59)	(81.88,86.59)	(83.37,88.27)	(66.67,88.89)	(93.33,100.00)

F1 (%)	M1	78.40	89.78	84.17	80.00	83.54	82.55	68.52	93.07
		(73.53,83.33)	(87.98,91.33)	(81.66,86.46)	(70.00,88.46)	(81.61,85.40)	(80.59,84.54)	(58.00,78.52)	(87.13,97.25)
	M2	77.11	87.84	80.32	78.16	82.89	82.54	62.96	90.20
		(71.75, 82.02)	(85.86, 89.52)	(77.44, 82.93)	(67.92,86.60)	(80.91,84.54)	(80.49,84.42)	(52.17,73.47)	(82.93,95.65)
	M3	78.96	88.97	83.32	88.89	84.36	83.86	65.38	89.32
		(73.93,83.57)	(87.20,90.66)	(80.67,85.63)	(81.16,95.05)	(82.70,86.11)	(81.86,85.73)	(53.47,75.34)	(82.35,95.08)
	M4	78.86	89.60	82.09	88.37	83.85	84.33	67.26	94.00
		(73.48,83.55)	(87.88,91.26)	(79.39,84.51)	(80.60,94.74)	(82.05,85.75)	(82.45,86.24)	(56.82,76.12)	(88.89,97.92)
	M5	80.94	89.07	84.55	88.64	84.65	84.18	67.96	90.20
		(76.38,85.43)	(87.17,90.95)	(81.90,87.02)	(80.00,95.15)	(82.87,86.42)	(82.33,86.03)	(55.67,77.42)	(83.33,95.50)
	Our	79.88	90.13	85.71	88.17	84.57	84.92	71.56	94.23
		(75.00,84.59)	(88.40,91.80)	(83.33,87.91)	(80.46,94.38)	(82.76,86.32)	(82.98,86.78)	(61.02,80.00)	(88.89,98.21)

M1: Kumagai et al. [17]; M2: Liu et al. [19]; M3: Hu et al. [30]; M4: Tan et al. [41]; M5: Wang et al. [39].

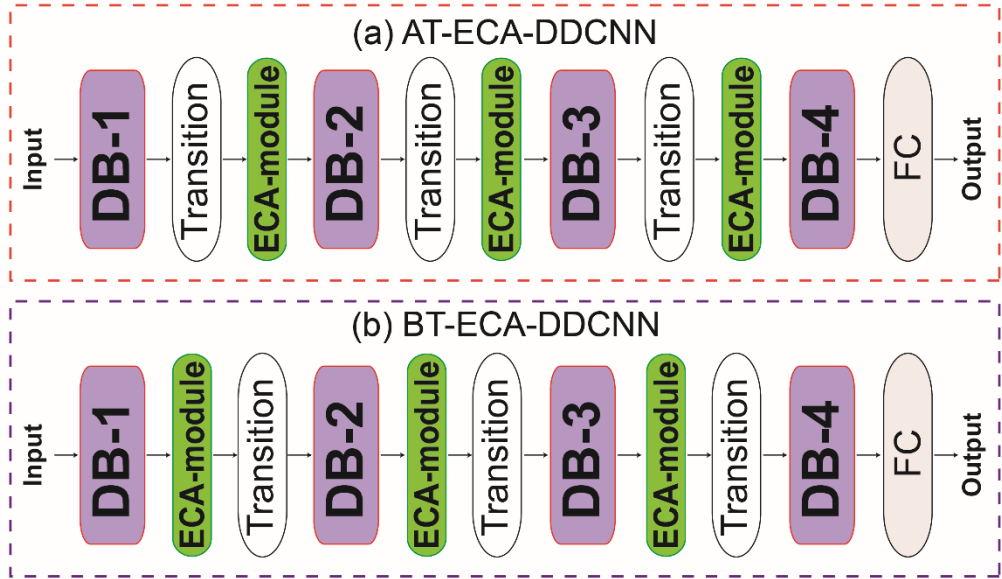


Fig. S1. The structures of AT-ECA-DDCNN and BT-ECA-DDCNN.