

Triple-attention-based Parallel Network for Hyperspectral Image Classification

(Impact of attention modules)

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Table 1. Comparison between different attention mechanisms over Salinas Valley dataset in terms of Per-class, overall (OA), average (AA) accuracy (in %) and the Kappa score.

Class	Salinas Valley			
	ParallelNet	ParallelNet-SS	ParallelNet-CS	TAP-Net
C1	99.36±0.55	99.31±0.80	99.16±0.85	98.73±1.03
C2	97.58±1.38	99.47±0.50	99.53±0.76	99.71±0.34
C3	97.78±3.32	92.92±7.86	83.96±13.97	91.29±7.74
C4	97.78±1.03	98.82±0.45	98.18±0.66	98.77±0.58
C5	94.46±3.48	94.06±1.79	95.59±1.74	96.27±2.22
C6	99.27±0.96	99.35±0.63	98.97±0.97	99.26±0.59
C7	99.43±0.46	99.56±0.31	99.47±0.17	99.35±0.32
C8	84.07±3.45	83.49±10.02	87.68±2.47	84.76±3.62
C9	98.07±1.57	98.96±1.16	98.77±1.01	98.13±1.23
C10	89.6±2.48	89.56±1.54	89.14±4.32	88.56±4.41
C11	95.38±0.72	93.96±2.54	91.35±6.07	84.59±8.04
C12	98.28±2.26	99.4±1.60	98.54±2.21	99.02±1.48
C13	97.58±2.12	98.12±1.23	98.16±1.96	98.07±1.93
C14	96.01±3.47	95.7±4.06	93.29±4.10	94.59±5.59
C15	58.84±4.81	60.77±13.12	61.56±4.27	69.09±8.00
C16	86.56±11.11	89.97±6.32	89.36±5.43	90.71±6.87
OA	88.94±0.86	89.32±1.45	89.85±1.32	90.31±1.27
AA	92.73±1.35	93.34±0.97	92.67±1.27	93.18±1.27
Kappa	0.866±0.03	0.867±0.04	0.877±0.03	0.881±0.03

Table 2. Comparison between different attention mechanisms over Pavia University dataset in terms of Per-class, overall (OA), average (AA) accuracy (in %) and the Kappa score.

Class	Pavia University			
	ParallelNet	ParallelNet-SS	ParallelNet-CS	TAP-Net
C1	94.29±0.83	95.53±2.06	94.07±2.88	95.67±1.43
C2	93.97±3.70	98.23±1.85	98.25±1.69	97.61±1.39
C3	69.81±23.93	85.48±15.35	81.00±12.68	73.08±11.00
C4	85.31±4.78	91.03±4.54	88.82±6.65	94.23±1.38
C5	99.5±0.25	99.52±0.27	99.70±0.26	99.48±0.35
C6	71.24±13.94	72.90±25.97	83.08±5.97	84.17±10.26

C7	50.97±10.15	66.77±26.09	67.68±19.86	59.92±12.74
C8	73.52±12.75	66.43±10.23	71.88±9.27	83.60±7.42
C9	92.44±0.30	99.18±0.55	98.14±1.42	99.33±0.44
OA	86.3±2.94	89.36±2.97	90.33±2.16	91.64±1.08
AA	82.01±3.14	86.12±5.56	86.96±3.45	87.45±3.09
Kappa	0.846±0.01	0.857±0.05	0.879±0.02	0.892±0.02

Table 3. Comparison between different attention mechanisms over Indian Pines dataset in terms of Per-class, overall (OA), average (AA) accuracy (in %) and the Kappa score.

Class	Indian Pines			
	ParallelNet	ParallelNet-SS	ParallelNet-CS	TAP-Net
C1	13.3±9.48	62±12.88	58.63±26.02	70.98±22.75
C2	70.86±8.75	75.37±11.37	75.29±9.40	76.54±5.92
C3	60.08±9.60	69.13±10.52	72.31±12.84	75.62±7.62
C4	53.67±22.10	46.19±18.74	47.78±17.65	46.83±17.89
C5	64.97±16.47	71.12±13.58	65.77±15.11	69.78±14.82
C6	89.06±6.69	93.01±3.45	93.53±3.37	94.77±3.96
C7	93.33±14.91	48.36±30.00	35.18±33.72	80.4±27.43
C8	98.49±1.39	98.02±1.27	97.92±3.85	98.95±1.58
C9	86.17±16.41	59.6±26.38	72.93±26.08	70.03±23.60
C10	81.34±4.01	85.32±2.32	81.75±5.95	84.59±5.99
C11	75.9±4.77	76.73±7.77	77.37±4.89	80.39±4.36
C12	71.7±10.89	75.08±7.92	78.12±6.74	76.84±6.18
C13	98.15±2.51	95.06±3.96	95.8±2.74	97.13±2.53
C14	90.04±5.01	92.57±3.21	92.76±3.83	94.83±1.92
C15	38.52±10.21	45.09±3.58	51.5±9.21	51.7±10.20
C16	80.54±16.16	86.82±8.07	87.51±7.54	92.27±5.12
OA	76.59±2.77	79.07±1.76	79.51±2.81	81.35±1.53
AA	73.51±3.93	73.72±3.52	74.01±3.61	78.85±3.18
Kappa	0.733±0.03	0.761±0.02	0.744±0.04	0.787±0.02