

Supplementary Material

A Model specifications and hyperparameters

For Table 2, the following conventions will be used:

B BERT Dimension	H Hidden Dimension	BS Batch Size
E Embedding Dimension	$\#L$ Number of Layers	
CS Capsule Size	LR Learning Rate	

B Complete results

Tables 3, 4, 5 and 6 show the quantitative results of our experiments. For SemEval-14, five train-validation splits were created out of the original training set. On each split pair, five runs were performed which lead to split-specific means and standard deviations. In the overall mean and deviation, all runs of all splits are included. Consequently, they are based on 25 values for SemEval-14 and ARTS data and five values for MAMS data (as there were no splits applied).

Table 2: Overview on the model hyperparameters used in this work.

Model	Data Set	Training						Model				<i>Deviation (to Original)</i>
		Epochs	BS	LR	Dropout	Warmup %	L2	Max Len	# L	E	H	
MGATN	all	50	16	1,00E-03	0.1	0	1,00E-02	85	300	300		Dropout: 0.5; L2: 1e-5
RGAT-BERT	Laptops	15	16	1,00E-05	BERT-specific	0	1,00E-05	90	2			
	Restaurants/MAMS	15	16	1,00E-05	BERT-specific	0	1,00E-05	90	2			
CapsNet-BERT	all	50	32	2,00E-05	0.1	0	0	-				LR: 3e-5
LCF-ATEPC	all	50	16	3,00E-05	0	0	1,00E-05	80				Epochs: 5
BERT+TFM	Laptops	50	32	2,00E-05		0	0	128				BS: 25; 1.5k steps, no epochs
	Restaurants/MAMS	50	16	2,00E-05		0	0	128				model selection after 1k steps
GRACE	ATE+GHL	5	32	3,00E-05		0.1		128				
	ATE+GHL+VAT	1	32	1,00E-05		0.1		128				
	ATE+ATSC+GHL+VAT	50	32	3,00E-06		0.1		128				Epochs: 10
		BERT (Specific)				Other Specifications (Model specific)						
Model	Data Sets	H	Output	Dimension	LR	Input Dropout	Attention Dropout	Dependency	Dimension	SRD	Capsule Size	
MGATN	all	768		-	-						3	
RGAT-BERT	Laptops			100	2,00E-05	0.1	0.1		100		-	
	Restaurants/MAMS			100	2,00E-05	0.1	0		80		-	
CapsNet-BERT	all	bert-base-uncased (huggingface)										
LCF-ATEPC	all	bert-base-uncased (huggingface)										
BERT+TFM	Laptops	bert-base-uncased (huggingface)										
	Restaurants/MAMS	bert-base-uncased (huggingface)										
GRACE	ATE+GHL	bert-base-uncased (huggingface)										
	ATE+GHL+VAT	bert-base-uncased (huggingface)										
	ATE+ATSC+GHL+VAT	bert-base-uncased (huggingface)										

Table 3: Our performance results (mean \pm standard deviation) for ATE+ATSC models on SemEval-14 Restaurants and Laptops. *In the case of BERT+TFM, the authors re-published their results on the Restaurants data set on <https://github.com/lixin4ever/BERT-E2E-ABSA>

Metric	Model	SemEval-14 Restaurant						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
F1 Micro	BERT+TFM	74.27 (± 1.25)	74.90 (± 0.84)	75.90 (± 0.53)	74.55 (± 0.54)	74.96 (± 0.46)	74.91 (± 0.91)	73.98*
	GRACE	77.78 (± 0.65)	77.40 (± 0.54)	78.43 (± 0.75)	77.90 (± 0.95)	77.84 (± 0.80)	77.87 (± 0.76)	77.26
F1 Macro	BERT+TFM	66.71 (± 1.52)	67.16 (± 1.39)	69.37 (± 0.73)	66.49 (± 0.84)	67.63 (± 1.20)	67.47 (± 1.50)	-
	GRACE	72.05 (± 0.88)	71.40 (± 0.99)	72.41 (± 1.22)	72.13 (± 1.35)	71.36 (± 1.49)	71.87 (± 1.18)	-
Precision	BERT+TFM	74.25 (± 1.46)	74.72 (± 1.00)	76.04 (± 0.86)	74.29 (± 0.35)	75.46 (± 0.85)	74.95 (± 1.14)	-
	GRACE	76.25 (± 0.79)	76.08 (± 0.90)	77.17 (± 0.82)	76.86 (± 0.87)	76.35 (± 0.83)	76.54 (± 0.87)	-
Recall	BERT+TFM	74.30 (± 1.30)	75.10 (± 1.01)	75.78 (± 0.57)	74.82 (± 0.90)	74.48 (± 1.07)	74.90 (± 1.06)	-
	GRACE	79.37 (± 0.75)	78.78 (± 0.22)	79.75 (± 0.87)	78.99 (± 1.12)	79.41 (± 0.83)	79.26 (± 0.82)	-
ATE F1 Micro	GRACE	87.88 (± 0.60)	88.29 (± 0.30)	88.38 (± 0.42)	88.64 (± 0.41)	88.66 (± 0.53)	88.37 (± 0.51)	-
Metric	Model	SemEval-14 Laptop						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
F1 Micro	BERT+TFM	63.53 (± 0.93)	63.92 (± 0.81)	64.03 (± 1.56)	64.16 (± 0.99)	64.09 (± 1.05)	63.95 (± 1.03)	60.80
	GRACE	70.04 (± 1.33)	68.84 (± 0.27)	69.10 (± 1.68)	69.10 (± 1.17)	69.49 (± 1.28)	69.31 (± 1.21)	70.71
F1 Macro	BERT+TFM	56.92 (± 2.33)	57.04 (± 2.39)	57.92 (± 2.66)	58.62 (± 1.31)	58.09 (± 1.49)	57.72 (± 2.03)	-
	GRACE	65.29 (± 1.90)	64.00 (± 0.39)	64.95 (± 2.42)	64.51 (± 0.98)	65.06 (± 1.57)	64.76 (± 1.55)	-
Precision	BERT+TFM	65.57 (± 1.16)	65.69 (± 0.65)	65.19 (± 1.61)	65.48 (± 0.77)	65.35 (± 1.02)	65.46 (± 1.02)	63.23
	GRACE	69.77 (± 1.47)	68.19 (± 0.35)	68.18 (± 1.78)	68.64 (± 1.60)	68.63 (± 1.31)	68.68 (± 1.41)	72.38
Recall	BERT+TFM	61.65 (± 1.38)	62.26 (± 1.37)	62.94 (± 1.79)	62.90 (± 1.31)	62.90 (± 1.33)	62.53 (± 1.42)	58.64
	GRACE	70.32 (± 1.27)	69.52 (± 0.47)	70.06 (± 1.69)	69.58 (± 0.82)	70.38 (± 1.38)	69.97 (± 1.16)	69.12
ATE F1 Micro	GRACE	85.99 (± 1.51)	85.18 (± 0.60)	85.40 (± 0.59)	85.98 (± 0.72)	85.68 (± 0.65)	85.64 (± 0.87)	87.93

Table 4: Our performance results (mean \pm standard deviation) for ATE+ATSC models on MAMS and ARTS. For MAMS, no ARS Accuracy is measured.

Metric	Model	MAMS						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
F1 Micro	BERT+TFM	-	-	-	-	-	64.94 (± 1.47)	-
	GRACE	-	-	-	-	-	63.48 (± 0.60)	-
F1 Macro	BERT+TFM	-	-	-	-	-	65.54 (± 1.43)	-
	GRACE	-	-	-	-	-	64.59 (± 0.61)	-
Precision	BERT+TFM	-	-	-	-	-	65.01 (± 1.90)	-
	GRACE	-	-	-	-	-	62.63 (± 0.98)	-
Recall	BERT+TFM	-	-	-	-	-	64.93 (± 2.42)	-
	GRACE	-	-	-	-	-	64.37 (± 0.86)	-
ATE F1 Micro	GRACE	-	-	-	-	-	75.96 (± 0.42)	-
Metric	Model	ARTS Restaurant						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
F1 Micro	BERT+TFM	39.80 (± 0.78)	39.34 (± 0.44)	39.76 (± 0.41)	39.29 (± 0.56)	39.28 (± 1.01)	39.50 (± 0.66)	-
	GRACE	61.86 (± 1.53)	63.22 (± 1.04)	62.80 (± 1.28)	62.44 (± 1.71)	63.82 (± 2.38)	62.83 (± 1.66)	-
F1 Macro	BERT+TFM	36.83 (± 0.90)	36.13 (± 0.47)	36.80 (± 0.50)	36.04 (± 0.76)	36.19 (± 1.27)	36.40 (± 0.84)	-
	GRACE	55.91 (± 2.11)	57.22 (± 1.11)	56.89 (± 1.80)	56.40 (± 2.03)	57.18 (± 3.46)	56.72 (± 2.10)	-
Precision	BERT+TFM	28.21 (± 0.62)	27.83 (± 0.39)	28.22 (± 0.28)	27.77 (± 0.46)	27.97 (± 0.56)	28.00 (± 0.48)	-
	GRACE	60.76 (± 1.67)	62.20 (± 1.41)	61.63 (± 1.62)	61.68 (± 1.46)	62.56 (± 2.38)	61.76 (± 1.71)	-
Recall	BERT+TFM	67.55 (± 1.17)	67.17 (± 0.99)	67.33 (± 0.85)	67.17 (± 0.86)	66.01 (± 2.72)	67.05 (± 1.47)	-
	GRACE	63.02 (± 1.65)	64.30 (± 0.93)	64.02 (± 1.00)	63.24 (± 2.02)	65.14 (± 2.38)	63.94 (± 1.73)	-
ARS Accuracy	BERT+TFM	37.53 (± 1.97)	35.60 (± 2.25)	35.07 (± 2.59)	35.83 (± 2.43)	34.30 (± 2.81)	35.67 (± 2.94)	-
	GRACE	34.71 (± 2.98)	38.39 (± 3.00)	37.70 (± 2.49)	36.78 (± 3.81)	40.69 (± 4.11)	37.66 (± 3.64)	-
ATE F1 Micro	GRACE	50.53 (± 0.32)	50.81 (± 0.25)	50.78 (± 0.26)	50.87 (± 0.14)	51.02 (± 0.33)	50.83 (± 0.29)	-
Metric	Model	ARTS Laptop						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
F1 Micro	BERT+TFM	34.56 (± 1.88)	34.55 (± 1.61)	35.06 (± 1.64)	35.80 (± 0.75)	35.50 (± 0.39)	35.09 (± 1.36)	-
	GRACE	65.90 (± 1.75)	64.63 (± 3.57)	63.16 (± 1.97)	64.36 (± 2.47)	64.67 (± 1.10)	64.54 (± 2.30)	-
F1 Macro	BERT+TFM	31.70 (± 2.60)	31.34 (± 2.02)	32.44 (± 2.22)	33.37 (± 0.55)	33.12 (± 0.64)	32.39 (± 1.84)	-
	GRACE	63.98 (± 1.92)	61.54 (± 3.97)	60.24 (± 2.27)	61.56 (± 3.10)	61.90 (± 1.85)	61.85 (± 2.79)	-
Precision	BERT+TFM	25.91 (± 1.29)	25.85 (± 0.99)	26.06 (± 1.00)	26.56 (± 0.53)	26.41 (± 0.15)	26.16 (± 0.86)	-
	GRACE	66.81 (± 2.20)	65.43 (± 3.99)	63.83 (± 2.04)	65.23 (± 3.14)	65.41 (± 2.23)	65.34 (± 2.75)	-
Recall	BERT+TFM	51.91 (± 3.33)	52.14 (± 3.33)	53.62 (± 3.45)	54.90 (± 1.32)	54.15 (± 1.42)	53.34 (± 2.78)	-
	GRACE	65.03 (± 1.48)	63.89 (± 3.37)	62.51 (± 1.96)	63.54 (± 2.08)	64.00 (± 1.34)	63.79 (± 2.14)	-
ARS Accuracy	BERT+TFM	23.60 (± 4.29)	23.26 (± 4.83)	24.87 (± 4.12)	26.91 (± 2.10)	26.23 (± 2.47)	24.97 (± 3.70)	-
	GRACE	38.80 (± 3.90)	36.40 (± 3.85)	33.20 (± 1.79)	32.80 (± 3.03)	36.40 (± 4.56)	35.52 (± 3.97)	-
ATE F1 Micro	GRACE	52.97 (± 0.53)	52.64 (± 0.59)	52.62 (± 0.36)	53.08 (± 0.49)	52.82 (± 0.37)	52.83 (± 0.47)	-

Table 5: Our performance results (mean \pm standard deviation) for ATSC models on SemEval-14 Restaurants, Laptops and MAMS.

Metric	Model	SemEval-14 Restaurant						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
Accuracy = F1 Micro	MGATN	74.32 (± 1.24)	74.36 (± 1.47)	74.70 (± 0.73)	73.23 (± 1.07)	73.66 (± 0.81)	74.05 (± 1.14)	81.25
	RGAT-BERT	82.52 (± 0.60)	83.21 (± 0.88)	82.00 (± 1.13)	82.70 (± 0.67)	82.09 (± 0.60)	82.50 (± 0.86)	86.68
	CapsNetBERT	84.46 (± 0.84)	84.07 (± 0.92)	84.68 (± 0.87)	83.46 (± 0.63)	82.77 (± 1.40)	83.89 (± 1.13)	85.93
	LCF-ATEPC	82.56 (± 0.89)	83.09 (± 0.49)	82.87 (± 1.28)	82.01 (± 1.06)	81.78 (± 1.52)	82.46 (± 1.13)	86.77
F1 Macro	MGATN	62.04 (± 2.37)	60.48 (± 2.78)	61.34 (± 0.99)	59.05 (± 3.13)	57.15 (± 3.70)	60.01 (± 3.08)	71.94
	RGAT-BERT	72.88 (± 0.68)	75.00 (± 1.72)	72.86 (± 2.21)	73.59 (± 2.27)	72.39 (± 0.81)	73.34 (± 1.79)	80.92
	CapsNetBERT	76.21 (± 1.59)	76.85 (± 0.87)	77.02 (± 1.66)	74.50 (± 1.06)	72.43 (± 4.07)	75.40 (± 2.66)	-
	LCF-ATEPC	73.33 (± 2.34)	75.17 (± 0.38)	74.03 (± 2.85)	73.22 (± 1.58)	71.38 (± 2.76)	73.43 (± 2.36)	80.54
F1 Weighted	MGATN	72.83 (± 1.56)	71.91 (± 1.81)	72.53 (± 0.48)	71.08 (± 1.75)	70.03 (± 2.23)	71.68 (± 1.84)	-
	RGAT-BERT	81.03 (± 0.54)	82.42 (± 1.11)	81.09 (± 1.37)	81.80 (± 1.32)	80.76 (± 0.67)	81.42 (± 1.15)	-
	CapsNetBERT	83.50 (± 1.00)	83.65 (± 0.75)	83.98 (± 1.09)	82.48 (± 0.71)	81.02 (± 2.44)	82.93 (± 1.65)	-
	LCF-ATEPC	83.86 (± 0.73)	83.80 (± 0.70)	83.97 (± 0.89)	82.88 (± 1.09)	83.61 (± 1.37)	83.63 (± 0.99)	-
Metric	Model	SemEval-14 Laptop						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
Accuracy = F1 Micro	MGATN	64.48 (± 0.85)	63.86 (± 2.66)	64.67 (± 1.78)	64.08 (± 0.88)	63.61 (± 0.85)	64.14 (± 1.49)	75.39
	RGAT-BERT	76.14 (± 1.05)	76.24 (± 1.43)	75.27 (± 0.63)	76.39 (± 1.19)	75.20 (± 1.02)	75.85 (± 1.13)	80.94
	CapsNetBERT	76.21 (± 1.01)	77.52 (± 1.80)	77.49 (± 1.13)	77.55 (± 1.22)	77.84 (± 1.70)	77.32 (± 1.41)	-
	LCF-ATEPC	76.22 (± 2.37)	76.93 (± 1.24)	75.61 (± 1.35)	77.58 (± 1.16)	75.44 (± 1.16)	76.36 (± 1.62)	80.97
F1 Macro	MGATN	56.98 (± 0.92)	56.36 (± 3.09)	55.82 (± 2.29)	56.81 (± 2.87)	56.93 (± 2.05)	56.58 (± 2.21)	72.47
	RGAT-BERT	70.54 (± 1.54)	70.86 (± 2.51)	69.49 (± 1.13)	71.94 (± 1.62)	70.59 (± 1.23)	70.68 (± 1.73)	78.2
	CapsNetBERT	70.76 (± 1.87)	72.92 (± 2.45)	72.68 (± 1.72)	72.56 (± 2.43)	73.39 (± 3.21)	72.46 (± 2.37)	-
	LCF-ATEPC	70.23 (± 3.60)	72.43 (± 0.89)	70.20 (± 1.58)	73.34 (± 1.72)	70.63 (± 2.07)	71.37 (± 2.37)	77.86
F1 Weighted	MGATN	63.71 (± 0.66)	63.20 (± 2.63)	62.52 (± 1.87)	63.22 (± 2.30)	63.50 (± 1.48)	63.23 (± 1.79)	-
	RGAT-BERT	75.16 (± 1.26)	75.37 (± 1.87)	74.38 (± 1.00)	76.14 (± 1.32)	74.99 (± 0.97)	75.21 (± 1.34)	-
	CapsNetBERT	75.29 (± 1.47)	77.20 (± 2.09)	76.97 (± 1.38)	76.73 (± 2.00)	77.43 (± 2.59)	76.72 (± 1.95)	-
	LCF-ATEPC	77.33 (± 1.93)	77.08 (± 1.72)	76.43 (± 1.37)	77.74 (± 0.99)	75.59 (± 1.23)	76.84 (± 1.56)	-
Metric	Model	MAMS						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
Accuracy = F1 Micro	MGATN	-	-	-	-	-	61.95 (± 3.17)	-
	RGAT-BERT	-	-	-	-	-	79.79 (± 0.55)	84.52
	CapsNetBERT	-	-	-	-	-	83.04 (± 0.70)	83.39
	LCF-ATEPC	-	-	-	-	-	78.94 (± 0.56)	-
F1 Macro	MGATN	-	-	-	-	-	59.25 (± 3.78)	-
	RGAT-BERT	-	-	-	-	-	79.24 (± 0.69)	83.74
	CapsNetBERT	-	-	-	-	-	82.44 (± 0.81)	-
	LCF-ATEPC	-	-	-	-	-	78.43 (± 0.64)	-
F1 Weighted	MGATN	-	-	-	-	-	61.24 (± 3.53)	-
	RGAT-BERT	-	-	-	-	-	79.77 (± 0.59)	-
	CapsNetBERT	-	-	-	-	-	83.04 (± 0.74)	-
	LCF-ATEPC	-	-	-	-	-	78.94 (± 0.50)	-

Table 6: Our performance results (mean \pm standard deviation) for ATSC models on ARTS.

Metric	Model	ARTS Restaurant						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
Accuracy = F1 Micro	MGATN	57.19 (± 1.42)	57.61 (± 2.47)	58.04 (± 1.91)	57.74 (± 1.01)	58.45 (± 0.57)	57.81 (± 1.54)	-
	RGAT-BERT	72.32 (± 0.83)	73.20 (± 1.52)	72.57 (± 2.37)	71.38 (± 1.54)	72.44 (± 1.09)	72.38 (± 1.54)	-
	CapsNetBERT	78.80 (± 1.17)	78.38 (± 0.75)	78.91 (± 1.98)	78.80 (± 0.77)	75.23 (± 5.86)	78.02 (± 2.98)	-
	LCF-ATEPC	73.59 (± 0.55)	73.92 (± 1.43)	74.88 (± 1.58)	71.11 (± 3.27)	73.13 (± 0.90)	73.32 (± 2.09)	-
F1 Macro	MGATN	47.03 (± 0.76)	43.15 (± 6.16)	43.17 (± 7.18)	45.96 (± 1.69)	43.13 (± 2.40)	44.49 (± 4.40)	-
	RGAT-BERT	63.53 (± 2.11)	66.20 (± 2.04)	64.77 (± 3.19)	62.99 (± 3.07)	63.70 (± 1.27)	64.24 (± 2.51)	-
	CapsNetBERT	71.22 (± 1.36)	71.94 (± 0.65)	71.63 (± 2.65)	71.02 (± 1.32)	65.87 (± 7.49)	70.34 (± 4.06)	-
	LCF-ATEPC	64.94 (± 1.38)	66.82 (± 1.76)	66.55 (± 2.61)	62.91 (± 2.71)	63.84 (± 0.99)	65.01 (± 2.39)	-
F1 Weighted	MGATN	54.89 (± 0.81)	52.59 (± 3.92)	52.79 (± 5.22)	55.02 (± 0.25)	52.96 (± 1.44)	53.65 (± 2.96)	-
	RGAT-BERT	70.96 (± 1.15)	72.65 (± 1.66)	72.03 (± 2.49)	70.61 (± 2.07)	71.41 (± 1.16)	71.53 (± 1.79)	-
	CapsNetBERT	78.12 (± 1.19)	78.29 (± 0.48)	78.55 (± 1.85)	78.19 (± 0.84)	74.20 (± 6.39)	77.47 (± 3.25)	-
	LCF-ATEPC	74.74 (± 0.37)	74.41 (± 1.36)	75.83 (± 1.34)	72.04 (± 3.37)	74.70 (± 0.91)	74.34 (± 2.07)	-
ARS Accuracy	MGATN	9.13 (± 1.42)	9.50 (± 2.51)	10.00 (± 3.03)	9.90 (± 1.00)	9.57 (± 0.67)	9.62 (± 1.81)	-
	RGAT-BERT	35.17 (± 3.16)	36.47 (± 3.02)	35.47 (± 4.52)	33.33 (± 3.31)	35.73 (± 3.14)	35.23 (± 3.34)	-
	CapsNetBERT	29.96 (± 3.11)	27.70 (± 2.60)	28.75 (± 5.70)	29.74 (± 1.84)	21.43 (± 8.50)	27.52 (± 5.57)	55.36
	LCF-ATEPC	39.16 (± 1.66)	40.30 (± 3.24)	40.10 (± 3.89)	34.02 (± 6.20)	39.16 (± 3.12)	38.55 (± 4.28)	-
Metric	Model	ARTS Laptop						
		Split 1	Split 2	Split 3	Split 4	Split 5	Overall	Reported
Accuracy = F1 Micro	MGATN	52.31 (± 0.20)	52.14 (± 1.56)	52.29 (± 1.20)	52.19 (± 0.83)	52.83 (± 0.77)	52.35 (± 0.96)	-
	RGAT-BERT	65.81 (± 3.23)	64.66 (± 5.33)	66.31 (± 1.68)	68.25 (± 1.35)	66.31 (± 2.56)	66.27 (± 3.12)	-
	CapsNetBERT	66.68 (± 6.17)	72.51 (± 0.73)	70.80 (± 2.32)	71.97 (± 1.48)	71.84 (± 1.85)	79.77 (± 3.60)	-
	LCF-ATEPC	69.38 (± 1.78)	67.57 (± 2.58)	68.99 (± 0.74)	69.45 (± 2.12)	67.50 (± 1.56)	68.58 (± 1.91)	-
F1 Macro	MGATN	46.58 (± 0.76)	46.86 (± 2.05)	44.91 (± 1.69)	46.81 (± 2.63)	48.41 (± 1.57)	46.71 (± 2.03)	-
	RGAT-BERT	60.30 (± 4.14)	59.96 (± 5.90)	61.46 (± 1.73)	64.37 (± 1.69)	62.75 (± 2.62)	61.77 (± 3.68)	-
	CapsNetBERT	61.61 (± 6.59)	68.53 (± 1.71)	66.57 (± 3.09)	67.36 (± 2.66)	68.29 (± 3.51)	66.47 (± 4.38)	-
	LCF-ATEPC	63.90 (± 2.70)	63.79 (± 3.44)	64.19 (± 1.64)	66.02 (± 2.87)	63.81 (± 1.99)	64.34 (± 2.53)	-
F1 Weighted	MGATN	50.54 (± 0.45)	50.67 (± 1.20)	49.60 (± 1.30)	50.83 (± 1.70)	52.10 (± 1.00)	50.75 (± 1.37)	-
	RGAT-BERT	64.30 (± 3.69)	63.47 (± 5.71)	65.23 (± 1.58)	67.60 (± 1.52)	65.73 (± 2.70)	65.27 (± 3.43)	-
	CapsNetBERT	65.34 (± 6.43)	71.89 (± 1.18)	70.02 (± 2.69)	70.96 (± 2.11)	71.31 (± 2.61)	69.91 (± 4.00)	-
	LCF-ATEPC	70.71 (± 1.68)	68.02 (± 2.25)	69.94 (± 0.60)	69.79 (± 1.80)	67.96 (± 1.59)	69.28 (± 1.89)	-
ARS Accuracy	MGATN	11.68 (± 0.83)	12.12 (± 1.43)	11.14 (± 1.78)	12.41 (± 1.34)	13.87 (± 0.93)	12.24 (± 1.52)	-
	RGAT-BERT	34.31 (± 6.26)	31.68 (± 10.32)	34.84 (± 3.83)	39.17 (± 2.18)	34.01 (± 6.34)	34.80 (± 6.36)	-
	CapsNetBERT	35.52 (± 10.83)	46.13 (± 1.61)	41.75 (± 3.66)	44.33 (± 3.01)	42.34 (± 2.90)	42.01 (± 6.21)	25.86
	LCF-ATEPC	41.98 (± 2.42)	37.77 (± 4.95)	40.69 (± 0.75)	40.94 (± 4.09)	37.08 (± 3.60)	39.69 (± 3.73)	-