

Table1: Significant Metrics on SemEval Dataset

Source of interest	Metric	Mean diff (gapped)	Mean diff (None-gap)	P value	T
Background Knowledge (local metrics)	1. Avg. eccentricity	9.30E-02	5.35E-02	.027*	-2.24
	2. Local efficiency	1.08E-02	1.56E-02	.007**	2.76
	3. Avg. harmonic centrality	3.13E+00	3.68E+00	.009**	2.63
	4. Average neighbor degree	8.17E-01	1.26E+00	.000**	5.02
	5. Avg. closeness centrality	-3.11E-02	-2.26E-02	.009**	2.66
	6. Avg. current flow closeness centrality	-4.83E-02	-3.77E-02	.000**	3.71
	7. Avg. degree centrality	-1.17E-01	-8.52E-02	.005**	2.85
	8. Ratio of nodes with degree increase	1.35E-01	1.89E-01	.000**	5.49
	9. Var. average neighbor degree	5.89E-01	9.03E-01	.000**	4.24
	10. Var. current flow closeness centrality	2.26E-04	3.10E-04	.013*	2.52
	11. Var. degree centrality	1.35E-02	2.13E-02	.002**	3.09
	12. Var. effective size	3.33E+00	5.17E+00	.000**	3.65
	13. Var. eigenvector centrality	1.56E-04	3.41E-04	.002**	3.21
	14. Var. harmonic centrality	9.75E-01	1.84E+00	.000**	5.16
Answer (global metrics)	15. Average shortest path length	5.34E-01	4.74E-01	.000**	-5.29
	16. Diameter	1.13E+00	9.55E-01	.031*	-2.17
	17. Global efficiency	-2.61E-01	-2.32E-01	.000**	5.50
	18. Node connectivity	-2.26E+00	-1.39E+00	.000**	3.77
Answer (node-level metrics)	19. Local efficiency	-7.54E-02	-6.72E-02	.000**	3.77
	20. Avg. eccentricity	9.35E-01	7.48E-01	.001**	-3.32
	21. Avg. betweenness centrality	3.16E-02	2.47E-02	.000**	-4.83
	22. Avg. closeness centrality	-3.01E-01	-2.49E-01	.000**	5.10
	23. Avg. current flow closeness centrality	-3.64E-01	-3.04E-01	.000**	5.44
	24. Avg. degree centrality	-1.02E+00	-8.52E-01	.000**	5.23
	25. Avg. eigenvector centrality	-2.02E-01	-1.56E-01	.000**	4.42
	26. Avg. Newman betweenness centrality	3.16E-02	2.47E-02	.000**	-4.82
	27. Ratio of nodes with degree increase	4.87E-01	5.62E-01	.000**	3.74
	28. Var. betweenness centrality	3.56E-03	2.71E-03	.017*	-2.43
	29. Var. current flow betweenness centrality	3.76E-03	2.68E-03	.002**	-3.12
	30. Var. eigenvector centrality	6.07E-03	5.18E-03	.004**	-2.91
	31. Var. harmonic centrality	2.96E+01	2.66E+01	.020*	-2.35
	32. Var. Newman betweenness centrality	3.56E-03	2.70E-03	.016*	-2.44

Classifier	Features	Train Set Accuracy	Test Set Accuracy
Gradient Boosting	proposed metrics	0.9924	0.9860
	w2v + lexical	0.6336	0.5839
	LSI + lexical	0.6183	0.5909
Logistic Regression	proposed metrics	0.9733	0.9825
	w2v + lexical	0.5992	0.5979
	LSI + lexical	0.6183	0.5874
Random Forest	proposed metrics	0.9885	0.9790
	w2v + lexical	0.6489	0.6084
	LSI + lexical	0.6450	0.6014