

Table 1: Model Performance Comparison across Different Strategies and Layers

Model	Strategy	Layers	F2-Score	Balanced Accuracy	Precision	Recall	F1-Score
KoSimCSE	Full Text	1	0.6683	0.8313	0.6864	0.6779	0.6652
		2	0.5733	0.7622	0.8967	0.5269	0.6615
		3	0.5562	0.7573	0.7847	0.5206	0.6216
		4	0.3634	0.6659	0.5799	0.3339	0.4203
		5	0.2205	0.6107	0.1956	0.2277	0.2104
	Noun Verb Adj	1	0.6261	0.7999	0.7275	0.6100	0.6562
		2	0.4293	0.6933	0.8448	0.3903	0.5114
		3	0.5689	0.7642	0.7613	0.5352	0.6283
		4	0.4700	0.7136	0.7518	0.4330	0.5415
		5	0.3987	0.6878	0.4983	0.3809	0.4297
	Noun Verb	1	0.4238	0.7062	0.4774	0.4210	0.4349
		2	0.5395	0.7491	0.8315	0.5031	0.6100
		3	0.4139	0.6928	0.8150	0.3900	0.4584
		4	0.2704	0.6187	0.6145	0.2382	0.3399
		5	0.1925	0.5867	0.5274	0.1754	0.2280
KR-SBERT	Full Text	1	0.6743	0.8241	0.7845	0.6562	0.7073
		2	0.6400	0.8004	0.8663	0.6050	0.7042
		3	0.6747	0.8215	0.8296	0.6490	0.7207
		4	0.6134	0.7890	0.8281	0.5843	0.6703
		5	0.6142	0.7836	0.8929	0.5699	0.6954
	Noun Verb Adj	1	0.6671	0.8174	0.8219	0.6410	0.7134
		2	0.6771	0.8224	0.8286	0.6506	0.7236
		3	0.6695	0.8193	0.7986	0.6453	0.7110
		4	0.5987	0.7776	0.8402	0.5596	0.6698
		5	0.6491	0.8065	0.8194	0.6187	0.7022
	Noun Verb	1	0.6693	0.8184	0.8158	0.6429	0.7152
		2	0.6528	0.8070	0.8411	0.6187	0.7120
		3	0.6186	0.7901	0.8116	0.5858	0.6768
		4	0.6620	0.8125	0.8343	0.6301	0.7169
		5	0.6727	0.8167	0.8658	0.6373	0.7339
DistilUSE	Full Text	1	0.3769	0.6644	0.8453	0.3311	0.4757
		2	0.4216	0.6879	0.7514	0.3813	0.5024
		3	0.4023	0.6767	0.8321	0.3563	0.4989
		4	0.3902	0.6704	0.9005	0.3423	0.4943
		5	0.3465	0.6497	0.8793	0.3011	0.4478
	Noun Verb Adj	1	0.3923	0.6719	0.8416	0.3465	0.4896
		2	0.3095	0.6337	0.7995	0.2704	0.3966
		3	0.4029	0.6772	0.8322	0.3574	0.4986
		4	0.3330	0.6443	0.8624	0.2905	0.4277
		5	0.3318	0.6445	0.8575	0.2919	0.4213
	Noun Verb	1	0.3594	0.6561	0.8491	0.3144	0.4580
		2	0.1759	0.5744	0.6090	0.1494	0.2399
		3	0.3885	0.6715	0.7860	0.3476	0.4741
		4	0.3157	0.6353	0.8882	0.2720	0.4160
		5	0.3774	0.6659	0.7972	0.3361	0.4647

Model	Strategy	Layers	F2-Score	Balanced Accuracy	Precision	Recall	F1-Score
Ko-SRoBERTa	Full Text	1	0.6386	0.8103	0.7018	0.6333	0.6539
		2	0.3456	0.6564	0.5951	0.3145	0.4073
		3	0.5717	0.7897	0.5519	0.6062	0.5491
		4	0.3722	0.5562	0.4092	0.3663	0.3863
		5	0.1409	0.5624	0.2670	0.1261	0.1713
	Noun Verb Adj	1	0.3648	0.6865	0.3867	0.3931	0.3515
		2	0.5580	0.7609	0.7398	0.5301	0.6098
		3	0.3735	0.6732	0.5095	0.3508	0.4141
		4	0.6014	0.7876	0.6773	0.5866	0.6262
		5	0.3137	0.6404	0.5829	0.2825	0.3771
	Noun Verb	1	0.4271	0.7102	0.4389	0.4305	0.4267
		2	0.2938	0.6407	0.6020	0.2888	0.3143
		3	0.4045	0.6921	0.4895	0.3907	0.4296
		4	0.1782	0.5807	0.2956	0.1622	0.2094
		5	0.1830	0.5854	0.2323	0.1738	0.1988
Qwen	Full Text	1	0.7501	0.8981	0.4739	0.8780	0.6155
		2	0.7909	0.9194	0.5473	0.8899	0.6778
		3	0.7790	0.8473	0.6567	0.8170	0.7281
		4	0.7794	0.8892	0.5461	0.8727	0.6718
		5	0.7481	0.8710	0.5000	0.8541	0.6308
	Noun Verb Adj	1	0.6745	0.9031	0.3427	0.8899	0.4948
		2	0.7725	0.9108	0.5458	0.8621	0.6684
		3	0.7662	0.8695	0.5284	0.8634	0.6556
		4	0.7523	0.8573	0.5357	0.8369	0.6532
		5	0.7287	0.8369	0.5475	0.7944	0.6483
	Noun Verb	1	0.7506	0.9085	0.4630	0.8886	0.6088
		2	0.7498	0.8764	0.4966	0.8594	0.6294
		3	0.7456	0.9219	0.4578	0.8846	0.6033
		4	0.7758	0.8605	0.5979	0.8382	0.6980
		5	0.7102	0.8173	0.5600	0.7613	0.6453
BGE-M3	Full Text	1	0.6588	0.8096	0.8967	0.6193	0.7298
		2	0.6760	0.8138	0.8416	0.6276	0.7239
		3	0.6572	0.8098	0.8725	0.6195	0.7237
		4	0.4909	0.7213	0.9363	0.4425	0.5899
		5	0.6384	0.7972	0.9099	0.5943	0.7185
	Noun Verb Adj	1	0.6712	0.8198	0.8091	0.6597	0.7137
		2	0.6515	0.8183	0.7298	0.6365	0.6769
		3	0.6187	0.7923	0.8335	0.5845	0.6811
		4	0.5850	0.7718	0.8419	0.5436	0.6605
		5	0.6740	0.8267	0.7817	0.6535	0.7089
	Noun Verb	1	0.6328	0.7954	0.8926	0.5909	0.7091
		2	0.6196	0.7888	0.8909	0.5776	0.6970
		3	0.6378	0.7978	0.9011	0.5957	0.7146
		4	0.6397	0.7998	0.8763	0.5996	0.7112
		5	0.5499	0.7510	0.9093	0.5020	0.6430

Model	Strategy	Layers	F2-Score	Balanced Accuracy	Precision	Recall	F1-Score
MiniLM	Full Text	1	0.4443	0.6964	0.9046	0.3945	0.5485
		2	0.4396	0.6982	0.7090	0.4038	0.5089
		3	0.4072	0.6784	0.9348	0.3579	0.5141
		4	0.3839	0.6678	0.9061	0.3369	0.4865
		5	0.4073	0.6802	0.9187	0.3621	0.5040
	Noun Verb Adj	1	0.3223	0.6448	0.5630	0.2918	0.3827
		2	0.4495	0.7039	0.7576	0.4141	0.5213
		3	0.4345	0.6983	0.7781	0.4022	0.5030
		4	0.4531	0.7004	0.9178	0.4022	0.5592
		5	0.2681	0.6204	0.4951	0.2442	0.3171
	Noun Verb	1	0.3539	0.6567	0.7788	0.3162	0.4332
		2	0.5214	0.7367	0.8452	0.4768	0.6074
		3	0.3123	0.6345	0.9040	0.2703	0.4084
		4	0.3603	0.6575	0.7602	0.3192	0.4472
		5	0.5191	0.7373	0.7943	0.4797	0.5939