Table 4: Impact of input formats

		Vulnerability Type	Root Casue	Attack Vector	Attacker Type
Precision	i-ao	0.945	0.779	0.708	0.884
	i-ar	0.943	0.746	0.701	0.882
	i-fu	0.946	0.783	0.703	0.888
Recall	i-ao	0.945	0.793	0.716	0.897
	i-ar	0.945	0.770	0.710	0.892
	i-fu	0.946	0.796	0.717	0.899
F1	i-ao	0.943	0.780	0.704	0.885
	i-ar	0.943	0.745	0.699	0.880
	i-fu	0.946	0.788	0.706	0.889

Table 5: Impact of word embeddings

		Vulnerability Type	Root Casue	Attack Vector	Attacker Type
Precision	CVE	0.946	0.783	0.703	0.888
	SecurityFocus	0.942	0.779	0.701	0.883
	*Google news	0.932	0.759	0.687	0.869
Recall	CVE	0.946	0.796	0.717	0.899
	SecurityFocus	0.944	0.792	0.716	0.894
	*Google news	0.935	0.784	0.688	0.885
F1	CVE	0.946	0.788	0.706	0.889
	SecurityFocus	0.942	0.783	0.703	0.883
	*Google news	0.933	0.761	0.687	0.871

Table 6: Impact of model architectures

		Vulnerability Type	Root Casue	Attack Vector	Attacker Type
Precision	Early Fusion	0.946	0.783	0.703	0.888
	*Late Fusion	0.921	0.751	0.671	0.844
Recall	Early Fusion	0.946	0.796	0.717	0.899
	*Late Fusion	0.927	0.770	0.680	0.872
F1	Early Fusion	0.946	0.788	0.706	0.889
	*Late Fusion	0.923	0.755	0.669	0.850

Table 7: Impact of neural network design

		Vulnerability Type	Root Casue	Attack Vector	Attacker Type
Precision	1-L CNN	0.946	0.783	0.703	0.888
	2-L CNN	0.933	0.765	0.673	0.852
	1-L BiLSTM	0.939	0.761	0.682	0.867
	2-L BiLSTM	0.939	0.770	0.688	0.870
	1-L BiLSTM+Attention	0.941	0.769	0.690	0.873
	2-L BiLSTM+Attention	0.943	0.778	0.692	0.876
Recall	1-L CNN	0.946	0.796	0.717	0.899
	2-L CNN	0.935	0.775	0.701	0.878
	1-L BiLSTM	0.938	0.778	0.706	0.882
	2-L BiLSTM	0.941	0.780	0.703	0.883
	1-L BiLSTM+Attention	0.943	0.778	0.713	0.887
	2-L BiLSTM+Attention	0.945	0.792	0.714	0.889
F1-Measure	1-L CNN	0.946	0.788	0.706	0.889
	2-L CNN	0.932	0.768	0.677	0.859
	1-L BiLSTM	0.938	0.765	0.684	0.871
	2-L BiLSTM	0.940	0.770	0.683	0.874
	1-L BiLSTM+Attention	0.940	0.770	0.692	0.873
	2-L BiLSTM+Attention	0.943	0.778	0.694	0.878

Table 8: Ablation results for predicting vulnerability type

Ablated aspect	Root cause	Affected product	Impact	Attacker type	Attack vector
Precision	0.943	0.925	0.821	0.939	0.888
Recall	0.943	0.927	0.822	0.941	0.896
F1	0.943	0.925	0.821	0.939	0.890

Table 9: Ablation results for predicting root cause

Ablated aspects	Vul-type	Affected product	Impact	Attacker type	Attack vector
Precision	0.740	0.734	0.739	0.781	0.780
Recall	0.751	0.741	0.755	0.793	0.795
F1	0.745	0.730	0.736	0.785	0.784

Table 10: Ablation results for predicting attacker type

Ablated aspect	Vul-type	Root cause	Affected product	Impact	Attack vector
Precision	0.852	0.873	0.850	0.883	0.864
Recall	0.876	0.892	0.874	0.895	0.871
F1	0.861	0.878	0.847	0.881	0.863

Table 11: Ablation results for predicting attack vector

Ablated aspect	Vul-type	Root cause	Affected product	Impact	Attacker type
Precision	0.659	0.696	0.568	0.680	0.670
Recall	0.693	0.701	0.601	0.700	0.674
F1	0.665	0.695	0.572	0.683	0.669

Impact of datasize 0n F1

Percentage	Vulnerability type	Root cause	Attack Vector	Attacker type
10	0.882	0.707	0.584	0.81
20	0.908	0.732	0.612	0.835
30	0.922	0.743	0.656	0.851
40	0.93	0.758	0.666	0.864
50	0.935	0.773	0.674	0.872
60	0.935	0.777	0.686	0.876
70	0.939	0.782	0.694	0.882
80	0.942	0.785	0.701	0.886
90	0.944	0.782	0.701	0.888
100	0.946	0.788	0.705	0.889

1-cnn

Vulnerability type

micro avg	0.948	0.948	0.948

macro avg	0.871	0.815	0.837
weighted avg	0.946	0.946	0.946

Root cause

micro avg	0.796	0.796	0.796
macro avg	0.480	0.458	0.464
weighted avg	0.783	0.796	0.788

Attack Vector

micro avg	0.721	0.721	0.721
macro avg	0.537	0.495	0.402
weighted avg	0.703	0.717	0.706

Attacker type

micro avg	0.895	0.895	0.895
macro avg	0.799	0.602	0.658
weighted avg	0.888	0.899	0.889