

# Appendix of A Semi-Markov Support Vector Machine Model for High-Precision Named Entity Recognition

Anonymous ACL submission

## 1 O-Score CRF

We implement the idea proposed by [Minkov et al. \(2006\)](#) on the neural CRF model. An additional weight is added to the score of O class of each token. A large positive weight will discourage predicting named entities, whereas a large negative weight will encourage extraction. This weight is the hyper-parameter.

We omit the results of this method from Figure 1 since its performance is clearly worse and far away from the other PR-curves.

## References

Einat Minkov, Richard C Wang, Anthony Tomasic, and William W Cohen. 2006. NER systems that suit user’s preferences: adjusting the recall-precision trade-off for entity extraction. In *Proceedings of the Human Language Technology Conference of the NAACL*, pages 93–96.

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Approach	ORG		LOC		PER	
	pre.	rec.	pre.	rec.	pre.	rec.
	97.64	52.38	99.07	70.02	99.81	64.13
	97.29	64.84	98.32	80.76	99.66	72.29
	97.21	67.01	98.06	84.89	99.17	80.89
	97.04	69.11	97.83	86.51	99.03	82.13
	96.77	70.38	97.67	88.07	98.96	82.5
	96.6	71.76	97.43	88.55	98.89	82.93
	96.56	72.67	96.99	88.97	98.69	83.92
	96.38	73.81	96.89	89.69	98.57	85.41
	96.18	75.74	96.71	89.99	98.53	87.01
	96.05	76.1	96.66	90.17	98.42	88.44
	95.99	76.4	96.49	90.59	98.23	89.05
Thresholded CRF	95.9	77.36	96.19	90.83	98.19	90.66
	95.86	78.15	96.14	91.19	97.96	92.21
	95.75	78.63	95.73	91.49	97.78	92.64
	95.68	78.75	95.58	92.15	97.66	93.01
	95.57	79.29	94.68	92.75	97.49	93.57
	95.47	79.89	94.56	92.81	97.38	94.19
	95.44	80.61	-	-	97.14	94.68
	95.12	80.92	-	-	-	-
	94.93	81.1	-	-	-	-
	94.76	81.7	-	-	-	-
	94.71	82	-	-	-	-
	94.6	82.3	-	-	-	-
	94.16	82.48	-	-	-	-
	96.02	21.79	100	32.97	96.97	93.14
	95.5	24.26	99.85	38.91	96.68	93.75
	95.44	25.23	99.43	41.55	96.44	95.36
	93.92	57.62	99.2	44.36	96.26	95.55
	93.9	59.36	98.88	47.66	-	-
	93.85	59.72	98.07	51.92	-	-
	93.81	60.2	98	52.76	-	-
	93.73	63.94	97.69	55.7	-	-
O-score CRF	93.58	65.86	97.57	57.73	-	-
	93.55	66.35	97.2	64.63	-	-
	93.53	67.01	97.05	65.17	-	-
	92.79	70.56	96.69	66.55	-	-
	92.38	78.09	96.4	67.39	-	-
	91.79	86.15	96.11	68.11	-	-
	91.75	86.33	96.07	68.94	-	-
	91.63	86.39	95.79	69.48	-	-
	91.46	87	95.63	70.8	-	-
	90.81	88.02	95.58	72.6	-	-
	96.17	75.62	96.44	87.71	98.56	88.74
	95.75	77.36	96.15	88.25	98.51	89.80
	95.64	77.90	94.96	90.41	98.39	90.66
	95.28	78.93	94.85	90.59	98.28	91.71
	95.08	79.17	94.74	90.65	98.22	92.15
Bootstrap CRF	94.75	80.37	94.64	91.07	98.17	92.76
	94.41	81.34	94.48	91.37	97.79	93.20
	94.22	81.52	94.43	91.49	97.61	93.51
	94.06	82.00	94.32	91.55	97.50	94.00
	94.02	82.30	94.22	91.85	-	-
	93.84	82.60	93.84	92.21	-	-
	94.49	82.60	95.70	90.77	97.91	92.76
SSVM	93.74	83.80	95.55	91.31	97.66	93.01
	93.17	84.53	95.08	91.61	-	-
	94.98	81.94	96.25	90.89	98.92	85.10
	94.71	82.96	95.86	91.73	98.72	85.90
Semi-Markov SSVM	94.49	83.62	95.02	92.69	98.54	87.51
	94.26	84.05	-	-	98.29	88.93
	93.80	85.55	-	-	98.10	89.36
	-	-	-	-	97.85	92.76

Table 1: The precision and recall values that are used to plot Figure 1.