The Open Knowledge System for TAC KBP 2017

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CAS K La a N Da a S a T ,
I C T ,
C A a S
S C a C E ,
U C A a S
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Abstract

T a O K S (OKS) C S a KB a TAC KBP 2017. I a , , a , E , a a , , a , a a B S , a . Pa a , a a : RNN- a a a , O IE a I R a E a .

1 Introduction

T a TAC KBP 2017 a a a a a a (KB) . I a a a , a a a C S a T a (KB a a , E) a , a : E D a L (EDL), S F (SL), E N D a C (EN), E A E a a L (EAL), a S .

T C S a KBP a a a a a a a a a a a KB. T KB a C S a 2017 :

- E : a a a a EDL a ;
- SF R a : a (" ") a SF a ;
- E : ( ) a a EN a ;
- E A : a a EAL a ;
- S : S a a a a a B a S (B) a .

F , a a .

T a a a . S 2 a . D - a a a S 3, P - , a a- . S 4 a a . S 5 a a . T S 6, a a a S 7 a a a a S 8 a - S 9. F a , a S 10 a a .

2 The System Architecture

O a a a a

a a

a a

a a S a C NLP (Ma a ., 2014);) a a a - a ;) a a a a ;) a a a a :

1) a a a a a , . . < > a , a a a .

2) a a a a a a .

4 The Event Nugget Detection and Coreference Module

T a a , . ., E D a C a a , R a C a a a E C R . A a a LDC2015 DEFT R ERE E T a A a _R2_V2 a a .

4.1 Event Detection and Classification

O a a a a a a . T a a .

1) .

2) a .

3) a .

4) .

W a CNN- a a a a a . W P-O-S a . A , a a a .

4.2 Realis Classification

W CNN- a a a 4.1 R a a (ACTUAL,GENERIC,OTHER). E a a , a a a .

4.3 Event Coreference Resolution

W a . W a a .

5 The Relation Extraction Module

T a a , a , RNN- a a a , O IE- a a a a I R a E a .

5.1 RNN-based Relation Extraction

O a a a a B a GRU a a . T a a a , a a a . A a a a -GRU . W a a a . T a -GRU a - a a a - a a a a a , a a a a .

5.2 OpenIE-based Relation Extraction

T a O IE a a (a a O IE V4), a a a a . F , a a a a .

O I a E a (O IE) U Wa (UW). A O IE a a a a a , a (a 1, a , a 2) . B a O IE O . W a O a a a a a . I a a a a , a a a . W a a a a a TAC a . F a a , : T U.S. Ba a O a a a

T a a . a
a : (Ba a O a a, ,
U.S.) a (Ba a O a a, a ,)
a (Ba a O a a, a , T a)
a (Ba a O a a, a , a
). T TAC,
a . T
a a (A, B, C) A a B a a ,
C a a , a
O IE a a ,
a a a . N , a
A a C a a E
D . I a - ,
a a a a .
B , a B 41 a
a a a a ,
a , a a .
T a , a 1230864 a
. A a , a
16792 . D ,
a O IE a .

5.3 Implicit Relation Extraction

A a a a
a I R a I a E a ,
a a a . T
a IMPLIE
(S a a , 2015), ,
a a , a
a a .

C a O IE, a
, a a ,
a . N a
a 41 a . F
a , " T " a
" : ", a a a .

E a , a a a 41
a , a a
a a O IE. A
a a a a a a
a a O IE
IMPLIE . T , IMPLIE a
.

5.4 The Combination Strategy

T a
a . I a
a a a ,
a a a a-
.

T , a a
a
a a a a a , a
a a . F
a (. . 1, , 2) a ,
a a
a
a .

F a a a a (. .,
_ _),
. F a a a
a a (. , : a),
10 a a
a .

6 The Sentiment Module

W a SGD a a
. F , a
IMDB
a a. T a a a
a . T
a a SGD a a
. S a , a a a a
a a
F a a a a a
a a . F N a a ,
a a a a a .
A L R a a
SVC a .

7 The Entity Linking and Clustering Module

T a a ,
-
a a . F ,
W a. T
a
a
.

7.1 Query Expansion

I , a a
a . T
a a a :

1) S a . A
a
a .
2) S a W a a a a a
a a . A
.

3) S a W a a a a a
a a . A
.
4) Ca a a
a . A
a
a .

7.2 Candidate Entity Generation

I
, a a a a
a a a
a a a
a a a . Na , a
a S
7.1 a a a a a
KB (. ., W a).

7.3 Entity Linking

I a a
. F ,
a a a
a . S , a ,
a a
a a a
. A a a
. T a a a
:

1) E a . T a
a a a a a
. U a a a a
a .
2) Na a . Na , a
a a a
KB.
3) C a . W K
a a
, a a
a a a
KB TFIDF a .
4) W a a a .
E a
a a a
W a a a .
5) A a , a
a a
a a a a a
a a .
6) Ca a a . A a
a .
7) T . T a
.

F a a a a a .
W a a a a , a
a a a
a , a
a a . T a
EDL2016 a a a.

7.4 NIL Entity Clustering

F NIL , a
NIL a a .
F , a a
a a ,
a , a a a
a ,
a , a a
a a a a a
a .

A a
a . T a a a
. T a a
. A -
a a
a a a a
.

F a a a a
a ,
a a . F a ,
a a a a a a .
I a a a ,
a a a a
.

8 The Inference Module

T a
a a S 4,
a a :

1) R a - a . F a ,
a a a a a ,
a " a " a
" " Ga . S a , " "
a " a ".
2) R a - a . F a ,
: a _ _ , : a _ _ a , :a ,
, a

(&& a -> a , a a a a a a). F a , A 2010 a a 78, a a A a 1932.

3) R a a , a Ta 2.

Ta 2 R a a

A --- B	B --- C	A --- C
		_ a _ a
	a	_ a _ a
a a a	a	_ a _ a a

4) R - a . F a a / / a , a T a , a a a a a a a a .
5) R - a . F a , a CEO, , - , , a a : _ _ _ , a : _ _ .
6) R . F a , a a a S D G .

9 The Post-processing Module

T a F , - . S a , a , a a .

1) T a a a a . F a , a (. . ,), (PER). T a a a S a NER (F a ., 2005).
2) S a a a a . C a a a a a a a XXXX-XX-XX .
3) D a a a . F a , a a a a a 0 a a a 130 .

10 Result Evaluation

T a , a a KB a KB a a a a KB a a . T KB a a a Ta 2, 3, 4 a 5.

F C S a KB Ta , ,

Ta 3 E (M A a , E)

	a			_			a _ a		
	P	R	F1	P	R	F1	P	R	F1
1	50.56	13.87	21.76	32.83	9.01	14.13	35.51	9.74	15.29
2	50.56	13.87	21.76	32.83	9.01	14.13	35.51	9.74	15.29
3	64.32	11.31	19.23	42.05	7.39	12.57	45.36	7.97	13.56

Ta 4 S a (LDC-MAX, E , K3)

	0_P	0_R	0_F	1_P	1_R	1_F	A _P	A _R	A _F
1	0.0545	0.0380	0.0448	0.0000	0.0000	0.0000	0.0040	0.0275	0.0070
3	0.0755	0.0506	0.0606	0.0000	0.0000	0.0000	0.0606	0.0367	0.0114

Conclusion

I a , OKS C S a KB T a KBP 2017. T a a , a , E a a , E a , E N D a C a a a . T a a a a a .

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C X, J a Y, Wa Y, a ., O KN a TAC KBP 2015. I P TAC-KBP 2015.

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