SHINRA2020-ML

Categorizing 30 language Wikipedia into Extended Named Entity categories

2020.12.9

Language Information Access Technology Team, AIP, RIKEN

Task Overview

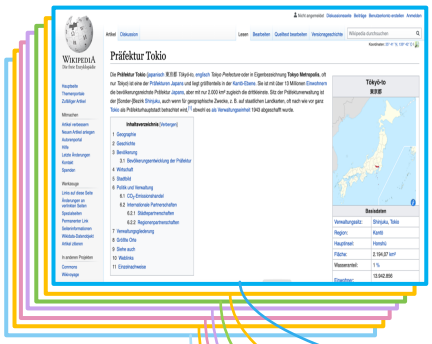
SHINRA2020-ML: Classification task

- Task: to classify Wikipedia pages into 219 ENE categories (multi-label classification)
- Target languages: Participants can choose one or more of the 30 languages(*1)
- Evaluation metrics: Micro-average F1 measure

*1: English, Spanish, French, German, Chinese, Russian, Portuguese, Italian, Arabic, Indonesian, Turkish, Dutch, Polish, Persian, Swedish, Vietnamese, Korean, Hebrew, Romanian, Norwegian, Czech, Ukrainian, Hindi, Finnish, Hungarian, Danish, Thai, Catalan, Greek, Bulgarian.

Overview of SHINRA2020-ML: Classification task

German Wikipedia (classified)



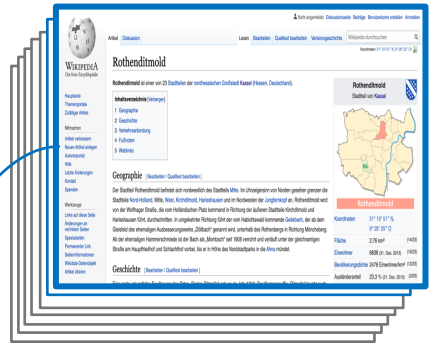
316K pages

Training

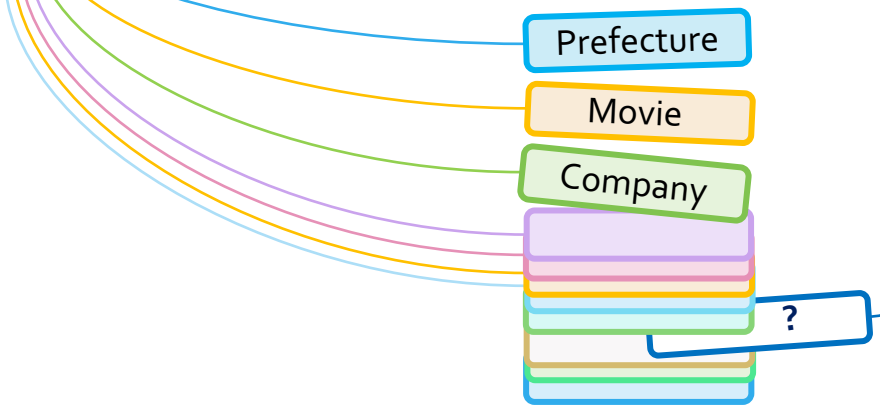
Model

Prediction

German Wikipedia (unclassified)



1,946K pages



219 categories (ENE ver.8.0)

Target Languages (30) : English, Spanish, French, German, Chinese, Russian, Portuguese, Italian, Arabic, Indonesian, Turkish, Dutch, Polish, Persian, Swedish, Vietnamese, Korean, Hebrew, Romanian, Norwegian, Czech, Ukrainian, Hindi, Finnish, Hungarian, Danish, Thai, Catalan, Greek, Bulgarian.

Extended Named Entity

[ENE version 8] http://ene-project.info/ene8/?lang=en

Motivation

Explanation in QA

Game 1, Final J!: Feb 15, 2011

U.S. CITIES: Its largest airport is named for a World War II hero; its second largest, for a World War II battle

Watson: Toronto (0.14) – WRONG! (Correct Ans: Chicago)

Explanation

TORONTO is the only city which comes to my mind. I know it is wrong, because It's a city in Canada, not in the US. It's largest airport is Toronto Pearson International Airport. Pearson is named for the 14th Prime Minister of Canada, who became the second ambassador to the US during WWII and played important role in founding UN. So, he is a WWII hero. But the second largest airport is Billy Bishop Toronto City Airports. Billy Bishop was a Canadian WWI flying ace, which is not WWII battle.

Structured Knowledge Base

Toronto (CITY)	
country	Canada
…	
airport	Pearson Inter. Airport

Pearson Inter. Airport (AIRPORT)	
Location	Ontario
…	
Name Origin	Lester B. Pearson

Lester B Pearson (PERSON)	
birthday	23 April 1897
…	
Career	Ambassador to US, One of the founders of UN

DBpedia Freebase WIKIDATA yago BabelNet

Existing KB are very noisy

The Strategy

- Top-down design
  - Use a name ontology well designed
- Bottom-up population
  - Populate by Crowdsourcing or by AI

But how to make it?

- Utilize evaluation project
  - We will prepare training/test data (like KBP, CoNLL)
  - We will not open the test data, the participants have to run the system for the entire resource
  - The outputs of participants are gathered and we create the resource using all of them (Ensemble Learning)
  - We can apply Active Learning and Bootstrapping, too

The focus is "Resource Construction"
NOT evaluation

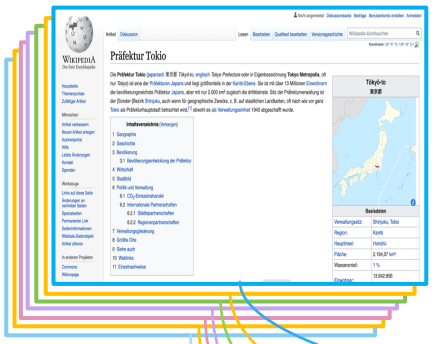
Resource by Collaborative Contribution

Resource by Collaborative Contribution

SHINRA2020-ML Task Detail

Overview of SHINRA2020-ML: Classification task

German Wikipedia (classified)



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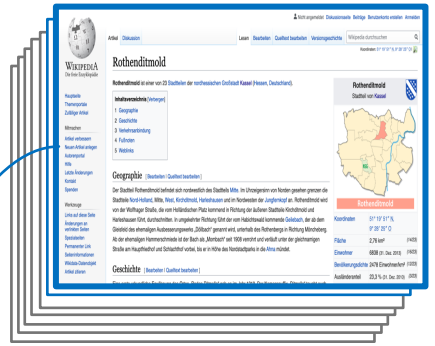

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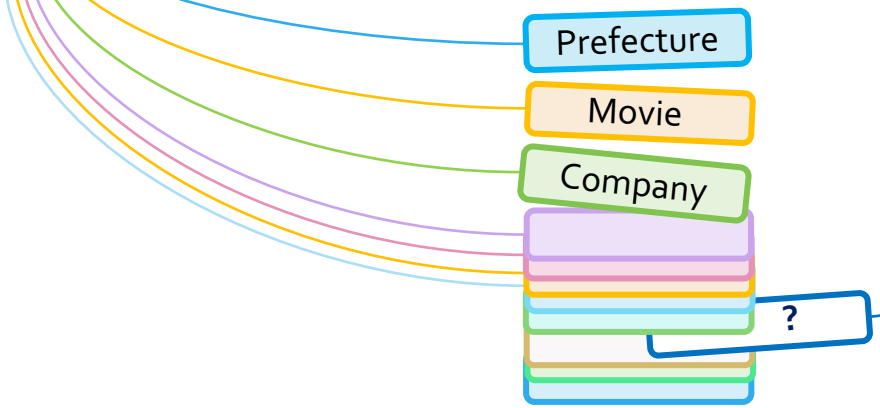

219 categories (ENE ver.8.0)

Target Languages (30) : English, Spanish, French, German, Chinese, Russian, Portuguese, Italian, Arabic, Indonesian, Turkish, Dutch, Polish, Persian, Swedish, Vietnamese, Korean, Hebrew, Romanian, Norwegian, Czech, Ukrainian, Hindi, Finnish, Hungarian, Danish, Thai, Catalan, Greek, Bulgarian.

Languages and statistics

Language	Number of Users	Number of pages	Pages with links from jp	Link ratio
English	35,464,188	5,790,377	510,840	8.8
Spanish	5,289,422	1,500,013	283,539	18.9
French	3,334,739	2,074,648	359,783	17.3
German	3,101,292	2,262,582	316,652	14.0
Chinese	2,663,839	1,041,039	290,631	27.9
Russian	2,451,838	1,523,013	280,565	18.4
Portuguese	2,199,869	1,014,832	238,065	23.5
Italian	1,770,376	1,496,975	304,174	20.3
Arabic	1,611,381	661,205	75,773	11.5
Japanese	1,432,174	1,136,222	-	-
Indonesian	1,027,019	451,336	121,598	26.9
Turkish	1,021,218	321,937	118,107	36.7
Dutch	970,607	1,955,483	223,354	11.4
Polish	934,491	1,316,130	248,229	18.9
Persian	795,312	660,487	181,710	27.5
Swedish	652,290	3,759,167	200,555	5.3

Language	Number of Users	Number of pages	Pages with links from jp	Link ratio
Vietnamese	643,871	1,200,157	123,745	10.3
Korean	549,017	439,577	210,271	47.8
Hebrew	484,630	236,984	103,137	43.5
Romanian	461,670	391,231	98,897	25.3
Norwegian	450,588	501,475	144,751	28.9
Czech	440,040	420,195	137,144	32.6
Ukrainian	437,029	881,572	181,122	20.5
Hindi	425,415	129,141	31,828	24.6
Finnish	406,339	450,537	156,445	34.7
Hungarian	403,368	443,060	128,712	29.1
Danish	343,249	242,523	91,811	37.9
Thai	343,054	129,294	62,441	48.3
Catalan	312,980	601,473	150,829	25.1
Greek	265,153	157,566	63,427	40.3
Bulgarian	245,986	248,913	93,434	37.5

Distributed Data

- Japanese Wikipedia categorized by Extend Named Entity [JSON]
  - excluding list articles, disambiguation pages, minor pages (less than 5 inter-link)
- Language links for 31 language Wikipedias [JSON]

- Wikipedia contents in 31 languages
  - Wikipedia Dump [XML]
  - Cirrus Search Dump [JSON]

- Extend Named Entity Definition (English/Japanese) [JSON]

※ The time stamp of All Wikipedia related data is January 20, 2019

Schedule

- January, 2020: Data release
- April: Homepage & CFP open
- August 31: Registration & Result submission deadline
- September 16: Evaluation results due back to participants
- December 8-11: NTCIR-15 Conference (NII, Tokyo)

Participants

(including non-active participants)

# of groups	10 (7 active participants)
nationality	Japan(4), Vietnam (2), India (1), Taiwan (1), Australia(1), Finland(1), Portugal(1)
affiliation types	University (6), Company (4), Institute (1)
target languages	8: Arabic, French 7: Chinese, German, Hindi, Italian, Portuguese, Spanish, Thai, Turkish 6: Bulgarian, Czech, Dutch, English, Indonesian, Korean, Norwegian, Polish, Russian, Vietnamese 5: Catalan, Danish, Finnish, Hebrew, Hungarian, Persian, Romanian, Ukrainian 4: Greek, Swedish
# of target languages	30(4), 28(1), 15(1), 9(1), 6(1), 1(2)

Evaluation Results (1)

Group ID		FPTAI	LIAT	PribL	PribL	RH312	ousia	uomfj	uomfj	uomfj	FPTAI	HUKB	HUKB	HUKB	LIAT
Method ID		BERT	ML-BERT	BERTGRU	BERTLINCONCAT	RnnGnnXlmr	RoBERTa+wiki2vec+wikidata	jointrep	jointrepPostprocess	jointrepUnionPostprocess	BERT	AB	ABC	AC	ML-BERT
Late Submission											Y	Y	Y	Y	Y
ar	Arabic	73.25	63.16	76.27	75.45	-	70.52	64.55	64.55	64.55	73.25	30.98	30.98	13.51	-
bg	Bulgarian	83.77	75.20	-	-	82.13	-	83.07	83.07	83.07	83.28	60.86	61.06	28.09	-
ca	Catalan, Valencian	52.55	76.28	-	-	-	-	79.82	79.82	79.82	81.10	42.34	42.54	16.26	-
cs	Czech	84.47	79.46	-	81.19	-	-	81.29	81.29	81.29	83.74	52.61	52.61	18.86	-
da	Danish	82.30	74.80	-	-	-	-	80.56	80.56	80.56	81.74	49.01	49.01	13.99	-
de	German	22.62	79.49	80.24	79.83	-	81.86	81.03	81.03	81.03	81.26	53.72	53.82	26.81	-
el	Greek, Modern (1453-)	84.40	72.43	-	-	-	-	-	-	-	84.10	7.51	7.51	7.51	-
en	English	82.23	78.56	81.27	80.12	-	-	82.73	82.57	82.68	81.96	45.11	45.11	11.92	-
es	Spanish, Castilian	80.60	77.73	80.30	80.72	-	80.94	81.39	81.39	81.39	80.60	49.21	49.11	19.50	-
fa	Persian	81.70	75.42	-	-	-	-	80.38	80.38	80.38	81.52	45.59	45.59	15.66	-
fi	Finnish	83.62	79.13	-	-	-	-	80.91	80.91	80.91	83.36	53.15	53.45	17.06	-
fr	French	21.59	76.88	77.93	78.52	80.31	81.01	78.21	78.21	78.21	80.68	43.84	43.74	11.23	-
he	Hebrew	83.79	79.11	-	-	-	-	81.09	81.09	81.09	84.21	59.95	60.05	15.78	-
hi	Hindi	76.43	16.49	-	-	71.70	69.75	66.67	66.67	66.67	75.65	39.70	39.51	22.02	-
hu	Hungarian	85.46	78.93	-	-	-	-	85.02	85.02	85.02	84.78	69.15	69.44	26.09	-
id	Indonesian	81.93	72.45	-	-	77.56	-	78.51	78.51	78.51	81.65	44.07	44.47	16.28	-
it	Italian	26.55	81.36	81.92	81.89	-	81.21	82.02	82.02	82.02	82.81	45.55	45.55	12.06	-
ko	Korean	83.67	80.38	81.51	81.04	-	-	82.51	82.51	82.51	83.77	63.68	63.98	13.95	-
nl	Dutch, Flemish	83.29	79.86	80.95	81.26	-	-	81.64	81.64	81.64	83.17	42.36	42.45	17.12	-
no	Norwegian	80.53	76.50	-	78.39	-	-	78.79	78.79	78.79	80.17	34.58	34.58	11.33	-
pl	Polish	84.53	80.60	82.73	83.46	-	-	84.52	84.52	84.52	84.07	62.72	63.51	32.55	-
pt	Portuguese	83.23	78.49	82.36	81.88	-	81.40	80.87	80.87	80.87	82.70	42.32	42.62	16.10	-
ro	Romanian, Moldavian, Moldovan	84.60	76.17	-	-	-	-	80.83	80.83	80.83	84.60	57.60	57.70	28.50	-
ru	Russian	84.08	79.09	82.60	83.07	-	-	82.90	82.90	82.90	83.44	42.04	42.24	11.30	-
sv	Swedish	83.18	71.63	-	-	-	-	-	-	-	83.44	50.32	50.62	21.98	79.58
th	Thai	81.26	49.58	-	-	76.77	76.36	65.02	65.02	65.02	81.16	39.98	40.38	24.05	-
tr	Turkish	86.50	77.19	84.36	83.23	83.28	-	84.85	84.85	84.85	86.03	61.88	62.48	16.73	-
uk	Ukrainian	83.12	78.71	-	-	-	-	81.61	81.61	81.61	82.61	60.29	60.19	22.51	-
vi	Vietnamese	80.34	75.24	-	-	-	-	77.06	77.06	77.06	80.42	60.38	60.48	22.14	-
zh	Chinese	81.25	77.97	78.38	79.37	-	79.76	78.58	78.58	78.58	80.60	21.22	21.42	17.57	-

Evaluation Results (2)

ISO 639-1	Language	Group ID	Method	Precision	Recall	F1	Majority Voting F1	Oracle F1	Num Groups	Num Methods
tr	Turkish	FPTAI	BERT	84.22	88.92	86.50	87.38	92.71	7	12
hu	Hungarian	FPTAI	BERT	82.89	88.19	85.46	85.49	91.18	5	9
ro	Romanian, Moldavian, Moldovan	FPTAI	BERT	81.40	88.07	84.60	84.47	91.97	5	9
pl	Polish	FPTAI	BERT	82.01	87.22	84.53	85.27	91.55	6	11
cs	Czech	FPTAI	BERT	81.31	87.88	84.47	84.52	90.59	6	10
el	Greek, Modern (1453-)	FPTAI	BERT	81.34	87.70	84.40	75.76	90.26	4	6
he	Hebrew	FPTAI	BERT	80.50	88.28	84.21	84.34	92.22	5	9
ru	Russian	FPTAI	BERT	81.59	86.73	84.08	84.73	90.50	6	11
bg	Bulgarian	FPTAI	BERT	80.94	86.81	83.77	84.74	91.04	6	10
ko	Korean	FPTAI	BERT	80.44	87.39	83.77	84.22	91.95	6	11
fi	Finnish	FPTAI	BERT	79.98	87.61	83.62	83.61	90.46	5	9
sv	Swedish	FPTAI	BERT	80.20	86.94	83.44	82.21	91.38	5	9
nl	Dutch, Flemish	FPTAI	BERT	81.27	85.41	83.29	83.85	90.73	6	11
pt	Portuguese	FPTAI	BERT	79.80	86.97	83.23	83.98	93.17	7	12
uk	Ukrainian	FPTAI	BERT	80.05	86.43	83.12	83.92	89.81	5	9
it	Italian	FPTAI	BERT	79.98	85.84	82.81	83.72	92.77	7	12
en	English	uomfj	jointrep	81.77	83.71	82.73	82.66	89.60	6	11
da	Danish	FPTAI	BERT	79.47	85.33	82.30	80.93	90.49	5	9
id	Indonesian	FPTAI	BERT	78.23	86.01	81.93	81.44	90.40	6	10
de	German	ousia	RoBERTa+wiki2vec+wikidata	82.59	81.15	81.86	82.45	90.63	7	12
fa	Persian	FPTAI	BERT	79.35	84.18	81.70	81.09	88.54	5	9
es	Spanish, Castilian	uomfj	jointrepUnionPostprocess	82.20	80.59	81.39	82.88	89.25	7	12
th	Thai	FPTAI	BERT	78.07	84.72	81.26	81.14	90.69	7	11
zh	Chinese	FPTAI	BERT	78.83	83.82	81.25	80.83	89.45	6	11
ca	Catalan, Valencian	FPTAI	BERT	77.34	85.25	81.10	80.57	91.11	5	9
fr	French	ousia	RoBERTa+wiki2vec+wikidata	81.09	80.93	81.01	81.92	90.32	8	13
no	Norwegian	FPTAI	BERT	77.58	83.71	80.53	81.27	89.44	6	10
vi	Vietnamese	FPTAI	BERT	77.61	83.43	80.42	80.16	91.62	6	10
hi	Hindi	FPTAI	BERT	73.67	79.41	76.43	73.67	84.51	7	11
ar	Arabic	PribL	BERTGRU	76.80	75.74	76.27	73.39	90.89	8	13
MAX				84.22	88.92	86.50	87.38	93.17	8	13
MIN				73.67	75.74	76.27	73.39	84.51	4	6

Plan for SHINRA2021-ML

- Continue the same categorization task in 30 languages
- Provide the results of 2020 outputs
  - Encourage the following research topics
    - Unsupervised Ensemble learning
    - Unsupervised active learning
- Independent from NTCIR-16

- We will do some other tasks in SHINRA2021-JP
  - Crowdsourcing for improving the system outputs
  - Entity Linking for structured KB

Organizers

Chair

Satoshi Sekine

Organizing Committee

Masako Nomoto　Kouta Nakayama　Asuka Sumida　Koji Matsuda　Maya Ando

PC Members

Jiewen Wu (A*STAR, Singapore)
Christophe Gravier (Université de Lyon, France)
Hsin-Hsi Chen (National Taiwan University, Taiwan)
Haizhou Li (National University of Singapore, Singapore)
Virach Sornlertlamvanich (Thammasat Univercity, Thailand / Musashino University, Japan)
Massimo Poesio (Mary Queen University of London, England)
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Miloslav Konopik (University of West Bohemia, Czech Republic)
Steven Skiena (Stony Brook University, USA)
Catherine Legg (Deakin University, Australia)

Links

- SHINRA2020-ML homepage

  http://shinra-project.info/shinra2020ml/?lang=en

- Communication
  - Email to the organizer

  shinra2020ml-info@googlegroups.com

  - Slack among the participants and the organizer

  http://shinra2020-ml.slack.com