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WojoodNER 2023: The First Arabic Named Entity Recognition Shared Task

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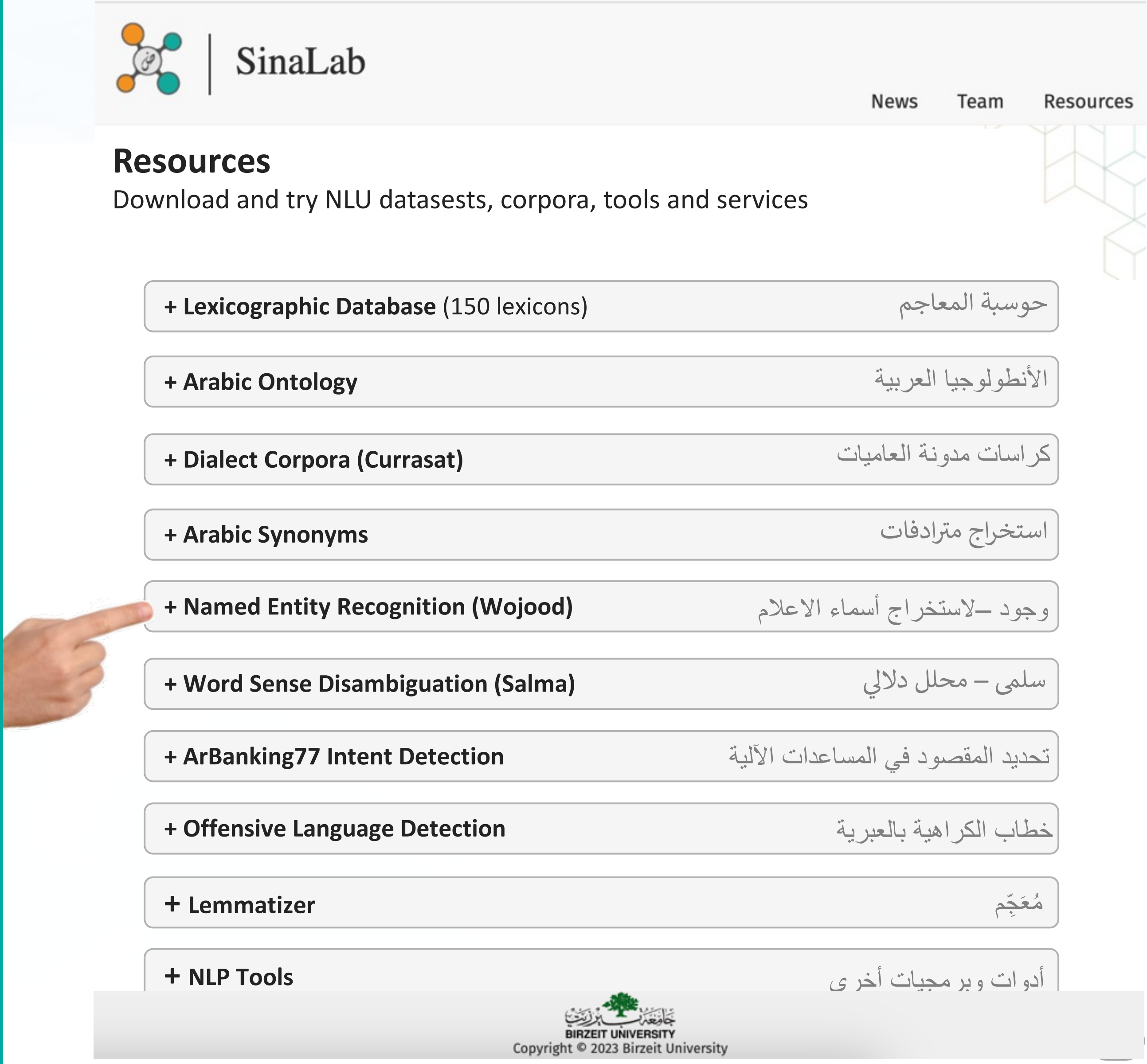

Resources

Download and try NLU datasests, corpora, tools and services

+ **Lexicographic Database** (150 lexicons)	حوسبة المعاجم
+ **Arabic Ontology**	الأنطولوجيا العربية
+ **Dialect Corpora (Currasat)**	كراسات مدونة العاميات
+ **Arabic Synonyms**	استخراج مترادفات
+ **Named Entity Recognition (Wojood)**	وجود –لاستخراج أسماء الاعلام
+ **Word Sense Disambiguation (Salma)**	سلمى – محلل دلالي
+ **ArBanking77 Intent Detection**	تحديد المقصود في المساعدات الآلية
+ **Offensive Language Detection**	خطاب الكراهية بالعبرية
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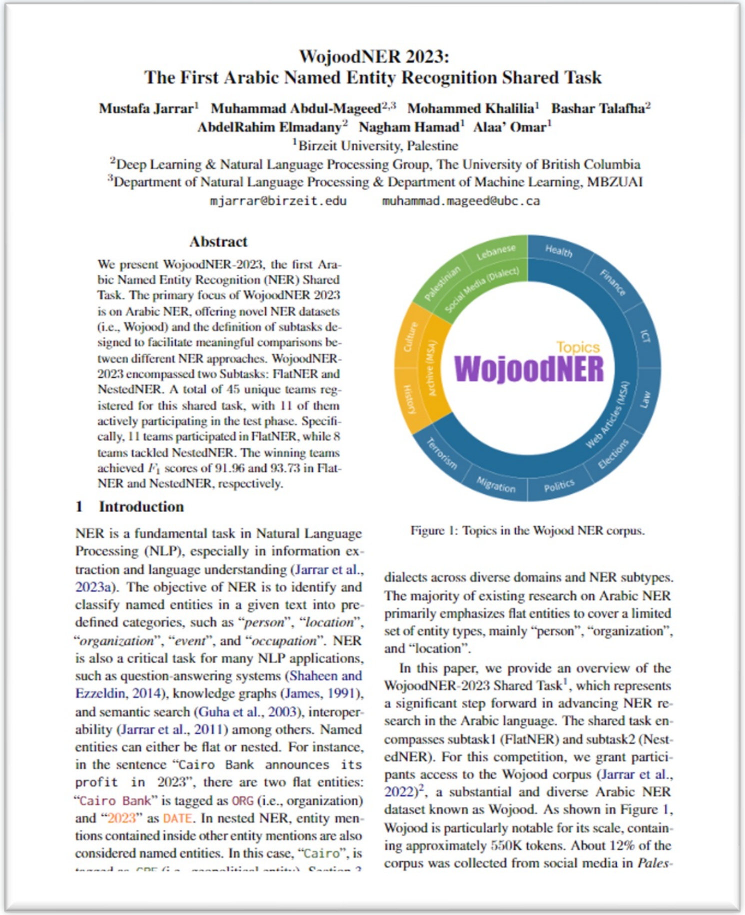

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The First Arabic Named Entity Recognition Shared Task

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Abstract

We present WojoodNER-2023, the first Arabic Named Entity Recognition (NER) Shared Task. The primary focus of WojoodNER 2023 is on Arabic NER, offering novel NER datasets (i.e., Wojood) and the definition of subtasks designed to facilitate meaningful comparisons between different NER approaches. WojoodNER-2023 encompassed two Subtasks: FlatNER and NestedNER. A total of 45 unique teams registered for this shared task, with 11 of them actively participating in the test phase. Specifically, 11 teams participated in FlatNER, while 8 teams tackled NestedNER. The winning teams achieved F_1 scores of 91.96 and 93.73 in FlatNER and NestedNER, respectively.

1 Introduction

NER is a fundamental task in Natural Language Processing (NLP), especially in information extraction and language understanding (Jarrar et al., 2023a). The objective of NER is to identify and classify named entities in a given text into predefined categories, such as "*person*", "*location*", "*organization*", "*event*", and "*occupation*". NER is also a critical task for many NLP applications, such as question-answering systems (Shaheen and Ezzeldin, 2014), knowledge graphs (James, 1991), and semantic search (Guha et al., 2003), interoperability (Jarrar et al., 2011) among others. Named entities can either be flat or nested. For instance, in the sentence "Cairo Bank announces its profit in 2023", there are two flat entities: "Cairo Bank" is tagged as ORG (i.e., organization) and "2023" as DATE. In nested NER, entity mentions contained inside other entity mentions are also considered named entities. In this case, "Cairo", is tagged as GPE (i.e., geopolitical entity). Section 3

Figure 1: Topics in the Wojood NER corpus.

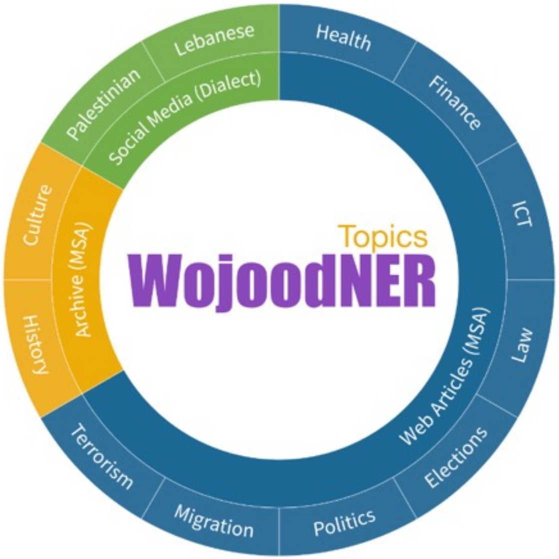
dialects across diverse domains and NER subtypes. The majority of existing research on Arabic NER primarily emphasizes flat entities to cover a limited set of entity types, mainly "person", "organization", and "location".

In this paper, we provide an overview of the WojoodNER-2023 Shared Task[1], which represents a significant step forward in advancing NER research in the Arabic language. The shared task encompasses subtask1 (FlatNER) and subtask2 (NestedNER). For this competition, we grant participants access to the Wojood corpus (Jarrar et al., 2022)[2], a substantial and diverse Arabic NER dataset known as Wojood. As shown in Figure 1, Wojood is particularly notable for its scale, containing approximately 550K tokens. About 12% of the corpus was collected from social media in *Pales-*

Mustafa Jarrar, Muhammad Abdul-Mageed, Mohammed Khalilia, Bashar Talafha, AbdelRahim Elmadany, Nagham Hamad, and Alaa Omer. 2023. WojoodNER 2023: The First Arabic Named Entity Recognition Shared Task. In Proceedings of the First Arabic Natural Language Processing Conference (ArabicNLP 2023).

WojoodNER-2023 Shared Task

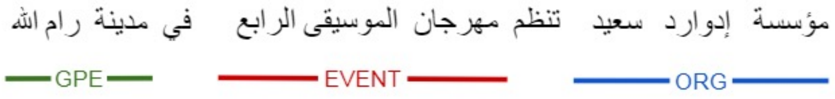
- WojoodNER-2023 is recognized as the inaugural shared task in Arabic Named Entity Recognition (NER).
- 88 % of Wojood contains nine different domains:
  - Health, finance, politics, ICT, terrorism, migration, history and culture, and law and elections.
- 12% of the corpus was collected from social media in Palestinian and Lebanese dialects.
- **550K tokens**



Topics in the Wojood NER corpus.

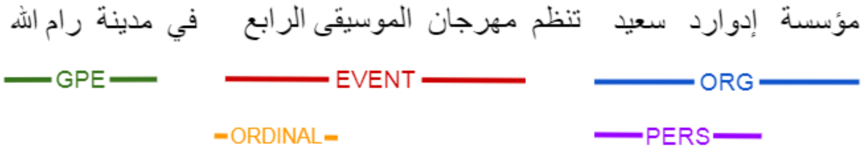
Task Description

- Subtask1 – FlatNER: each token in the data is labeled with only one tag. A flat NER dataset is derived from the nested NER.


مؤسسة إدوارد سعيد تنظم مهرجان الموسيقى الرابع في مدينة رام الله
ORG
EVENT
GPE

Flat NER example

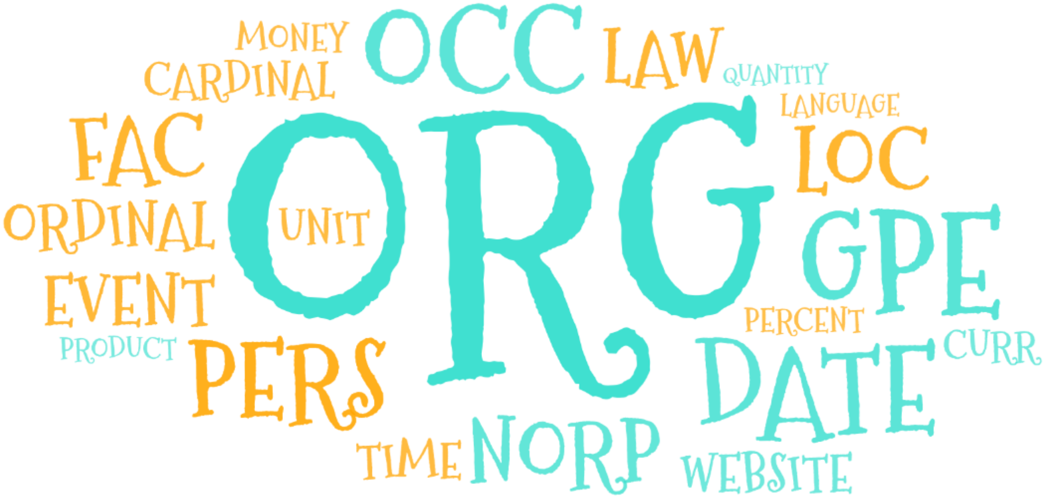
- Subtask2 – NestedNER: each token can have one or more tags


مؤسسة إدوارد سعيد تنظم مهرجان الموسيقى الرابع في مدينة رام الله
ORG
EVENT
GPE
PERS
ORDINAL

Nested NER example

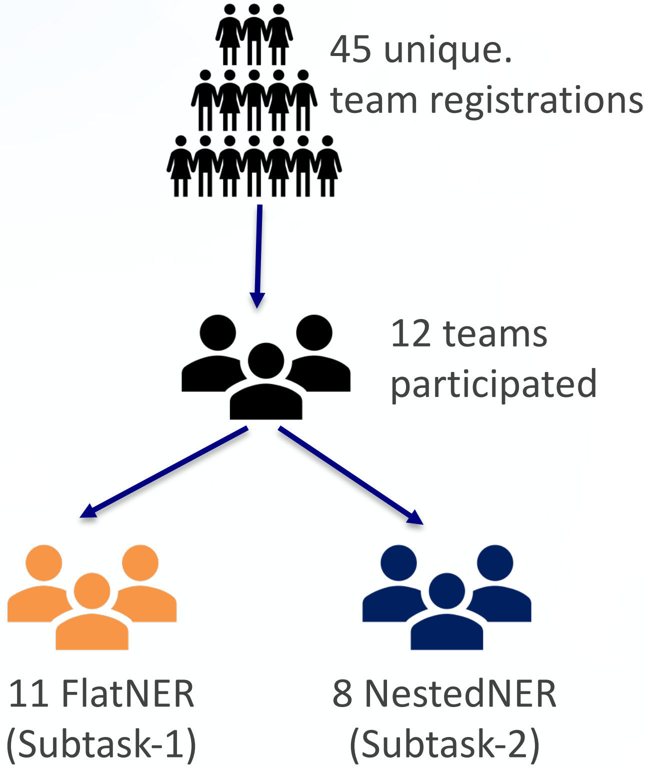
Shared Task Datasets

- **Splitting**: The data is split in to 70%, 10%, and 20% for training, development, and test dataset, respectively at the domain level.



21 Entity types in the Wojood dataset

Shared Task Teams & Results



45 unique. team registrations

12 teams participated

11 FlatNER (Subtask-1)

8 NestedNER (Subtask-2)

Team	Affiliation	Task
Alex-U 2023 NLP (Hussein et al., 2023)	Alexandria University	1,2
AlexU-AIC (Elkordi et al., 2023)	Alexandria University	1,2
AlphaBrains (Ehsan et al., 2023)	University of Gujrat, Pakistan	1,2
ARATAL	IPSA	1
El-Kawaref (Elkaref and Elkaref, 2023)	German University in Cairo	1
ELYADATA (Laouirine et al., 2023)	ELYADATA	1,2
Fraunhofer IAIS	Fraunhofer IAIS	1
LIPN (El Khbir et al., 2023)	LIPN, Université Paris 13	1,2
Lotus (Li et al., 2023)	MBZUAI	1,2
R00	Jordan University of Science and Technology	1,2
Think NER	Ulm University	1,2
UM6P & UL (El Mahdaouy et al., 2023)	Mohammed VI Polytechnic University	1,2

List of teams that participated in either one or both subtasks.

Shared Task Teams & Results

- All the models submitted to the shared task adopt the transfer learning approach, leveraging pre-trained models trained on various data sources.

- The top-performing models addressed the challenge of identifying nested entities of the same type

Rank	Team	F1	Precision	Recall
1	LIPN	91.96	92.56	91.36
2	El-Kawaref	91.95	91.43	92.48
3	ELYADATA	91.92	91.88	91.96
4	Alex-U 2023 NLP	91.80	91.61	92.00
5	Think NER	91.25	90.76	91.73
6	ARATAL	91.13	90.49	91.77
7	UM6P & UL	91.13	90.70	91.57
8	AlexU-AIC	91.13	91.33	90.92
	Baseline-I (ARBERTv2)	89.20	88.32	90.09
	Baseline-II (AraBERTv2)	87.33	86.00	88.00
9	AlphaBrains	87.15	87.45	87.58
10	Lotus	83.39	80.90	86.04
11	R00	76.99	76.67	77.31
12	Fraunhofer IAIS	64.45	65.53	63.40

Results of Subtask 1 - FlatNER

Shared Task Teams & Results

- All the models submitted to the shared task adopt the transfer learning approach, leveraging pre-trained models trained on various data sources.

- The top-performing models addressed the challenge of identifying nested entities of the same type

Results of Subtask 2 - NestedNER

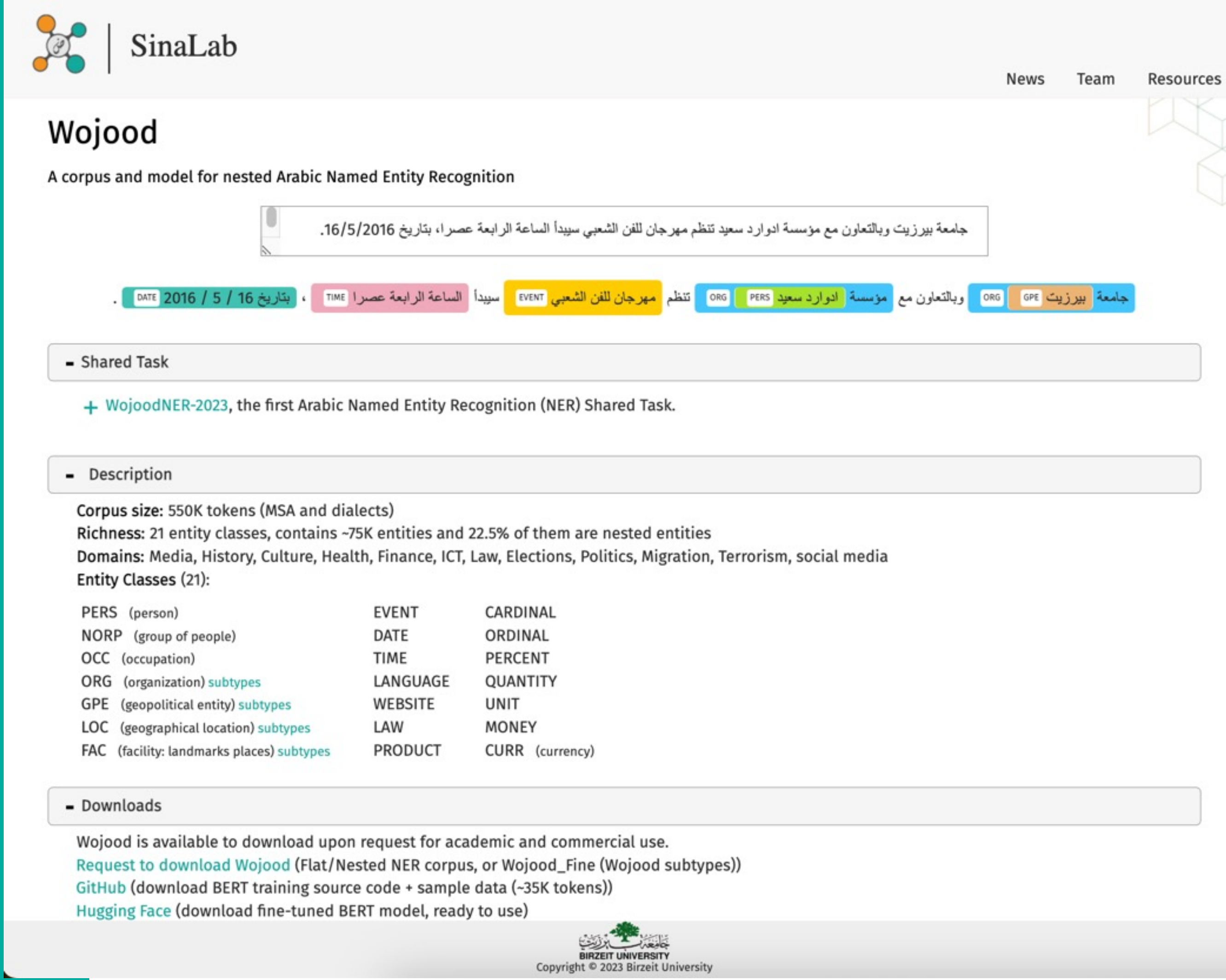
Rank	Team	F1	Precision	Recall
1	ELYADATA	93.73	93.99	93.48
2	UM6P & UL	93.03	92.46	93.61
3	AlexU-AIC	92.61	92.10	93.13
4	LIPN	92.45	92.31	92.59
	Baseline-I (ARBERTv2)	91.68	91.01	92.35
5	Think NER	91.4	90.03	92.82
	Baseline-II (AraBERTv2)	91.06	90.74	91.38
6	Alex-U 2023 NLP	90.01	89.39	90.63
7	AlphaBrains	88.84	88.45	89.23
8	Lotus	76.02	82.19	70.72

Post-Evaluation

Download Datasets

ArabicNER

ArabicNER-Wojood



Wojood

A corpus and model for nested Arabic Named Entity Recognition

جامعة بيرزيت وبالتعاون مع مؤسسة ادوارد سعيد تنظم مهرجان للفن الشعبي سيبدأ الساعة الرابعة عصرا، بتاريخ 16/5/2016.

جامعة بيرزيت GPE ORG وبالتعاون مع مؤسسة ادوارد سعيد PERS ORG تنظم مهرجان للفن الشعبي EVENT سيبدأ الساعة الرابعة عصرا TIME ، بتاريخ 16 / 5 / 2016 DATE .

- Shared Task

+ WojoodNER-2023, the first Arabic Named Entity Recognition (NER) Shared Task.

- Description

Corpus size: 550K tokens (MSA and dialects)
Richness: 21 entity classes, contains ~75K entities and 22.5% of them are nested entities
Domains: Media, History, Culture, Health, Finance, ICT, Law, Elections, Politics, Migration, Terrorism, social media
Entity Classes (21):

PERS (person)	EVENT	CARDINAL
NORP (group of people)	DATE	ORDINAL
OCC (occupation)	TIME	PERCENT
ORG (organization) subtypes	LANGUAGE	QUANTITY
GPE (geopolitical entity) subtypes	WEBSITE	UNIT
LOC (geographical location) subtypes	LAW	MONEY
FAC (facility: landmarks places) subtypes	PRODUCT	CURR (currency)

- Downloads

Wojood is available to download upon request for academic and commercial use.
Request to download Wojood (Flat/Nested NER corpus, or Wojood_Fine (Wojood subtypes))
GitHub (download BERT training source code + sample data (~35K tokens))
Hugging Face (download fine-tuned BERT model, ready to use)

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