Prédiction des effets indésirables médicamenteux sur Pubmed

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Comment détecter les effets indésirables médicamenteux ?

Nombreux médicaments pour traiter différentes maladies

MAIS il existe des **effets indésirables**

Comment détecter les effets indésirables médicamenteux ?

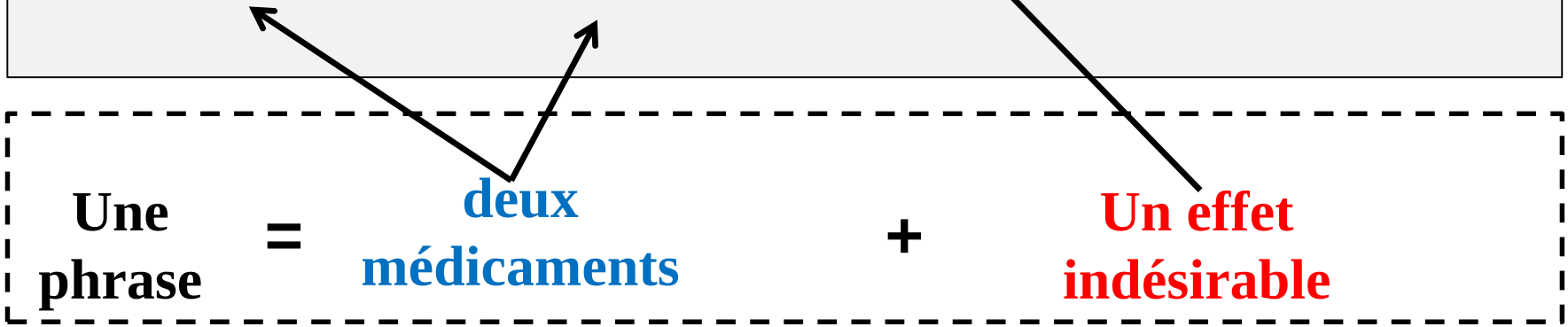
Source : articles scientifiques (fiables + précis)

We report two cases of pseudoporphyria caused by naproxen and oxaprozin. We review the current English language literature on this entity and discuss its clinical features, histology, ultrastructure, etiology, and pathophysiology. A 44-year-old man taking naproxen for chronic low back pain and a 20-year-old woman on oxaprozin for rheumatoid arthritis presented with tense bullae and cutaneous fragility on the face and the back of the hands. In both, skin biopsy showed a cell-poor subepidermal vesicle with festooning of the dermal papillae. Direct immunofluorescence revealed staining at the dermal-epidermal junction and around blood vessels with IgG in the first case and with IgG, IgA, and fibrin in the second case. Urine collections and serum samples yielded normal levels of uro- and coproporphyrins.

Objectif 1 : Identifier les phrases qui contiennent des effets indésirables dans un document

Exemple d'effet indésirable

We report two cases of **pseudoporphyria** caused by **naproxen** and **oxaprozin.**



Objectif 2 : Identifier la position des effets indésirables et médicaments

1 - Identifier les phrases qui contiennent des effets indésirables

phrases positives = phrases qui décrivent des effets indésirables

ADE corpus V2
Harsha Gurulingappa et coll. (2012)
https://sites.google.com/site/adecorpus/home/document

Exemples négatifs (n = 16.695)

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6460590 NEG Clioquinol intoxication occurring in the treatment of acrodermatitis enteropathica with reference to SMON outside of
8600337 NEG "Retinoic acid syndrome" was prevented with short-time treatment of high dose (4 x 1.5 g/m2) cytarabine.
8402502 NEG BACKGROUND: External beam radiation therapy often is avoided in the treatment of rhabdomyosarcoma (RMS) in young chil
8700794 NEG Although the enuresis ceased, she developed throbbing headaches, nausea, vomiting, paresthesia, lethargy, fatigue, an
17662448 NEG A 42-year-old woman had uneventful bilateral laser-assisted subepithelial keratectomy (LASEK) to correct myopia.
6970258 NEG A 16-year-old girl with erosive, polyarticular JRA showed no detectable change in her articular disease following nin
16426169 NEG Resection and use of a cyclooxygenase-2 inhibitor for treatment of pancreatic adenocarcinoma in a cocktail.
18484785 NEG Differences in interpretation by patients and healthcare professionals may cause the observed disparities in serious
17902124 NEG We present a case report of a cytomegalovirus (CMV)-seronegative, 58-year-old male who received a CMV-seropositive d
10099659 NEG Dihydropyrimidine dehydrogenase (DPD) is the rate-limiting enzyme in the catabolism of 5-FU.
19187456 NEG The decedent was also prescribed tramadol, gabapentin, cetirizine, modafinil, carisoprodol, and Xyrem.
12806509 NEG Magnetic resonance imaging of the spinal cord disclosed signal-intensity abnormalities from C4 to C3.
15152828 NEG In this case report we describe the occurrence of oral lichen planus-like lesions as the first manifestation of chro
9417174 NEG The day after the infusion, she no longer complained of diplopia, and her ophthalmoplegia had improved dramatically.
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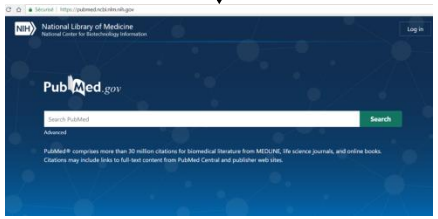
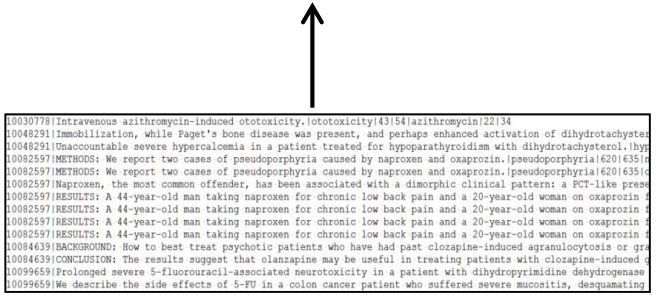
PMID ↓ API Pubmed



Scrapping

~3000 Abstracts



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10030778|Intravenous azithromycin-induced ototoxicity.|ototoxicity|43|54|azithromycin|22|34
10048291|Immobilization, while Paget's bone disease was present, and perhaps enhanced activation of dihydrotachyster
10048291|Unaccountable severe hypercalcemia in a patient treated for hypoparathyroidism with dihydrotachysterol.|hyp
10082597|METHODS: We report two cases of pseudoporphyria caused by naproxen and oxaprozin.|pseudoporphyria|620|635|n
10082597|METHODS: We report two cases of pseudoporphyria caused by naproxen and oxaprozin.|pseudoporphyria|620|635|d
10082597|Naproxen, the most common offender, has been associated with a dimorphic clinical pattern: a PCT-like prese
10082597|RESULTS: A 44-year-old man taking naproxen for chronic low back pain and a 20-year-old woman on oxaprozin f
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10084639|BACKGROUND: How to best treat psychotic patients who have had past clozapine-induced agranulocytosis or gra
10084639|CONCLUSION: The results suggest that olanzapine may be useful in treating patients with clozapine-induced g
10099659|Prolonged severe 5-fluorouracil-associated neurotoxicity in a patient with dihydropyrimidine dehydrogenase
10099659|We describe the side effects of 5-FU in a colon cancer patient who suffered severe mucositis, desquamating
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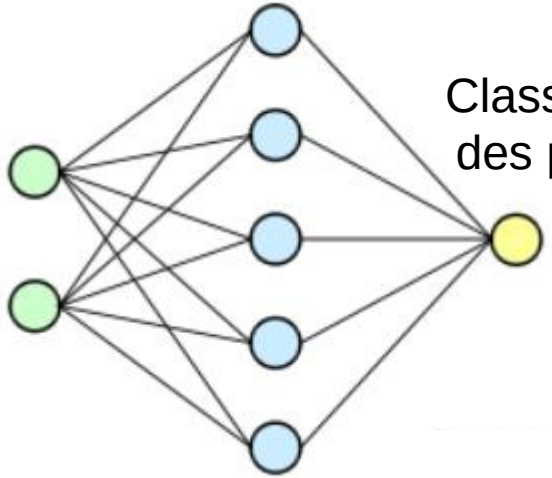
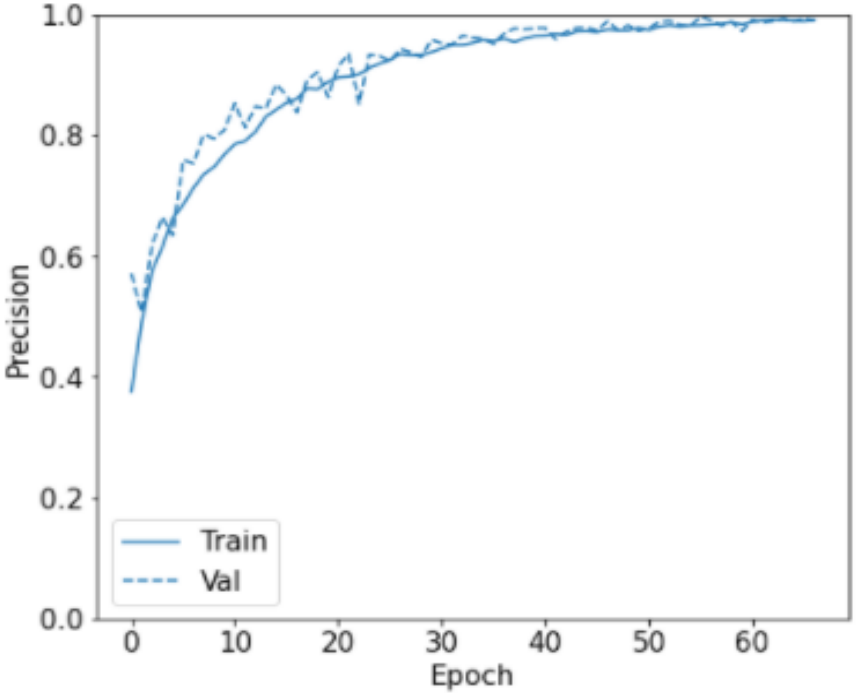
Exemples positifs (n = 4272)

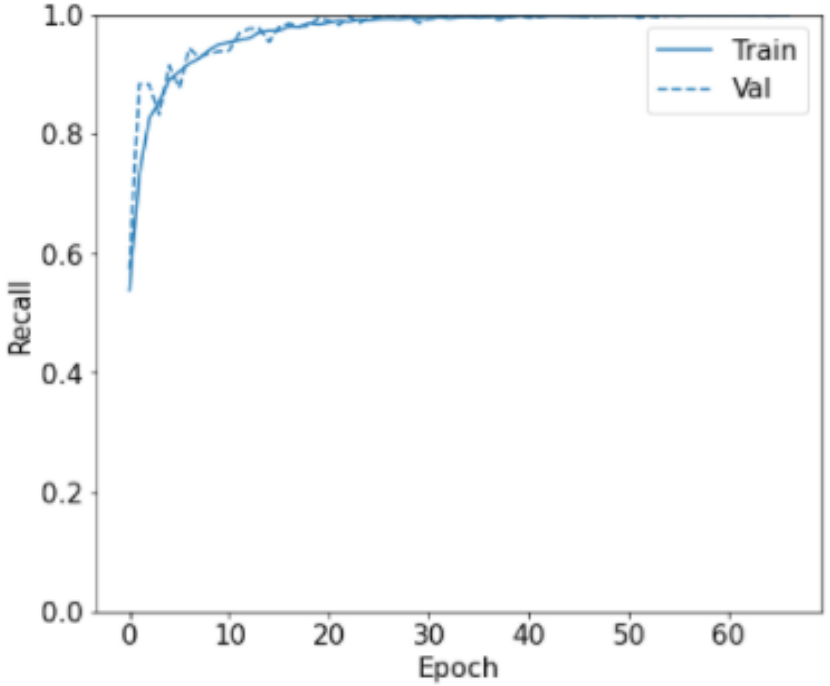


Classification des phrases

Réseau de neurones
Bi - LSTM

RÉPONSE: un classifieur
avec précision 98.12% - recall 99.8%





RÉPONSE : un classifieur
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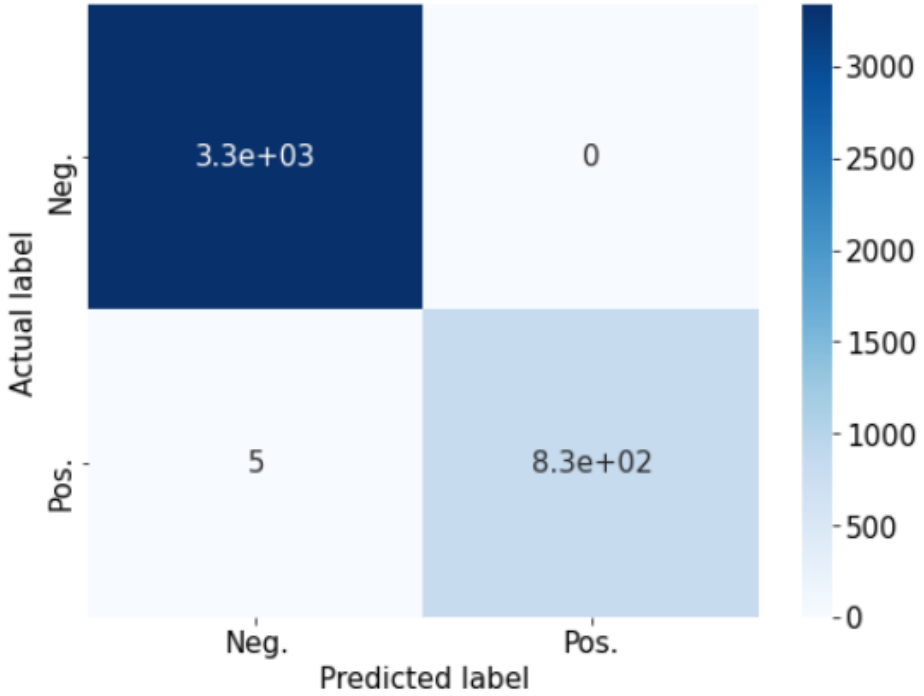
Performance sur
l'ensemble de test



2 - Identifier la position des effets indésirables et médicaments

Named entity recognition = reconnaissance d’entités nommées

We	O
report	O
two	O
cases	O
of	O
pseudoporphyria	**I_ADR**
caused	O
by	O
naproxen	**I_Drug**
and	O
oxaprozin	**I_Drug**

Effet indésirables – **ADR** (Adverse Drug Reaction)

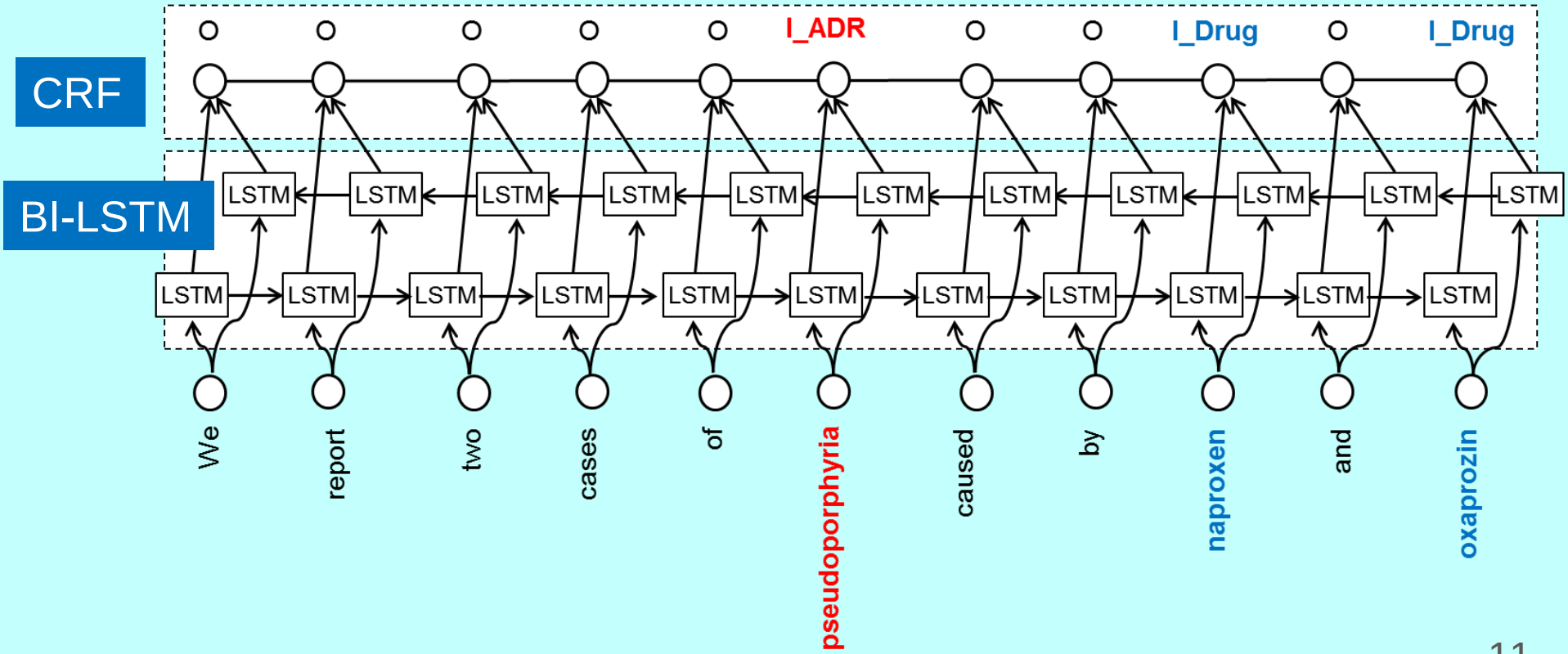
Médicament – **Drug**

I = Inside

O = Outside

Machine Learning	Deep Learning
CRF (Conditional Random Field)	**Bi-LSTM**
	Bi-LSTM + CRF

NOS MODÈLES


CRF
BI-LSTM
O
O
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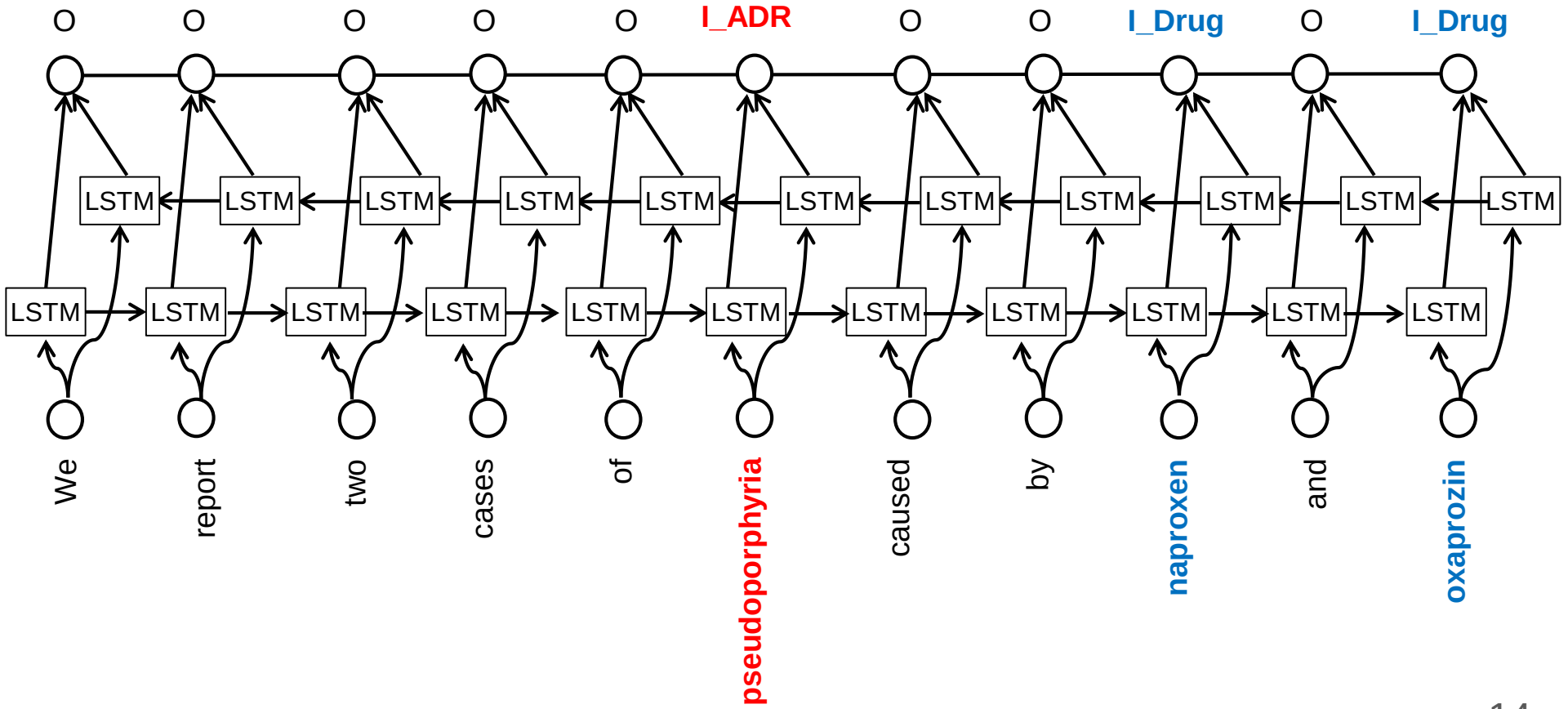
Comparaison avec les publications récentes

		Precision (%)	Recall (%)	F1-Score (%)
Notre contribution	CRF (with POS & TAG)	**92.79**	81.13	86.57
	Bi-LSTM (embedding:40)	85.69	85.59	85.64
	Bi-LSTM + CRF (embedding:40)	92.59	83.50	87.78
Etat de l'art	Ramamoorthy et al. [2018]	88.4	82.4	85.3
	P. Ding et al. [2020] Embedding : 300	86.7	**94.8**	**90.6**

Conclusion

- Classifieur très précis (98.12% - précision, 99.8% rappel)
- Haute précision pour la détection des effets indésirables (92-93%)
- Perspectives
  - Ajouter une/des couches d'Attention
  - Utiliser des word embeddings pré-entrainés
  - Bénéficier du transfert learning avec des approches de type Transformer, par exemple Bio-BERT
  - Mettre les résultats à disposition sous la forme d'une application Flask
  - Publier les résultats dans une revue d'informatique médicale


O
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