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Neural Architecture for Temporal Relation Extraction: A Bi-LSTM Approach for Detecting Narrative Containers

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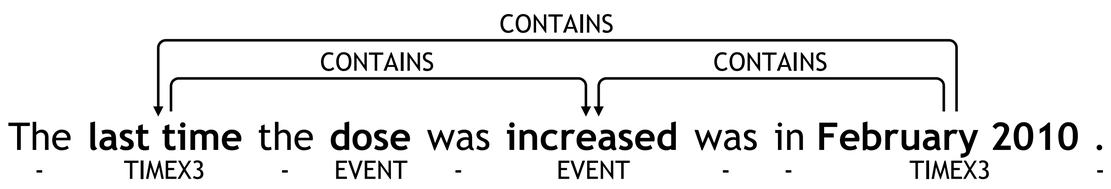
Objective

Extract containment relations from clinical narratives



Data

→ **THYME corpus** (Styler IV et al., 2014): clinical and pathological documents from the Mayo Clinic

→ Relations between **medical events** and/or **temporal expressions**

→ **Within and cross-sentence relations**

Features

Source	Attribute	Value
Corpus	Contextual Modality	Actual, Hypothetical, Hedged, Generic or no-value
	Degree	Most, Little, N/A or no-value
	Polarity	Pos, Neg or no-value
	Type	Aspectual, Evidential, N/A or no-value
	DocTimeRel	Before, Before-Overlap, Overlap, After or no-value
	Entity	EVENT , TIMEX 3 or no-entity
cTAKES	Entity Type	DiseaseDisorderMention, LabMention, MedicationEventMention, MedicationMention, ProcedureMention, SignSymptomMention or no-value
	Semantic Type	List of semantic types extracted from the training corpus or no-value

Intra-sentence Classifier Performance

	P	R	F1
No features	0.670	0.681	0.675
+ GS features	**0.701**	0.661	0.680
+ cTAKES features	0.663	**0.704**	**0.683**

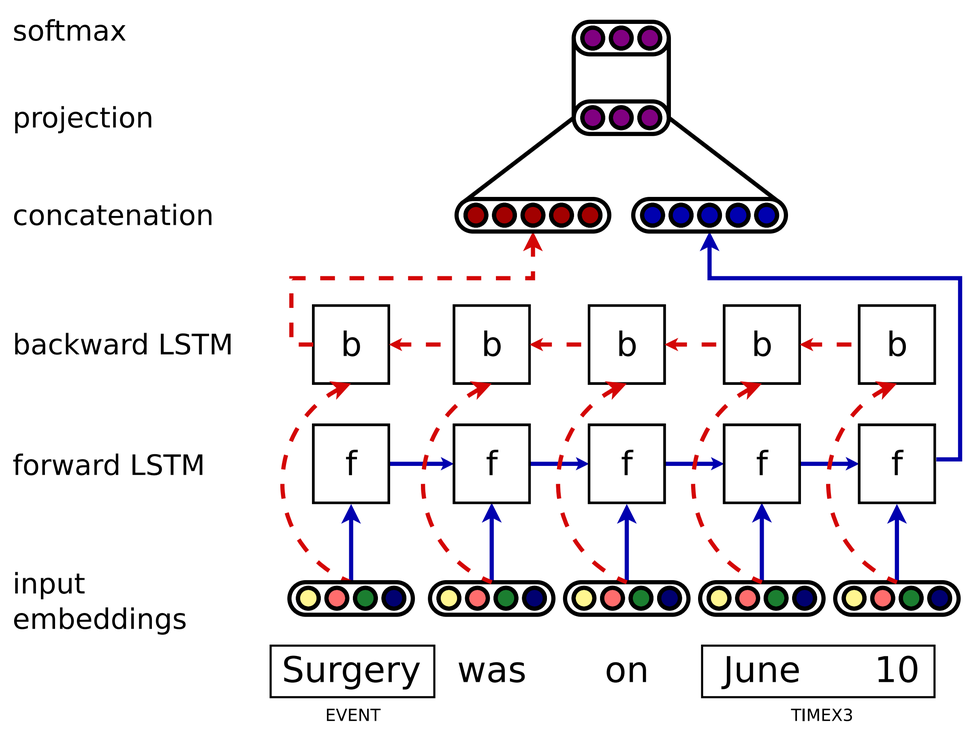
Inter-sentence Classifier Performance

	P	R	F1
No features	0.421	**0.498**	0.456
+ GS features	**0.504**	0.462	**0.482**
+ cTAKES features	0.486	0.408	0.443

Network Architecture

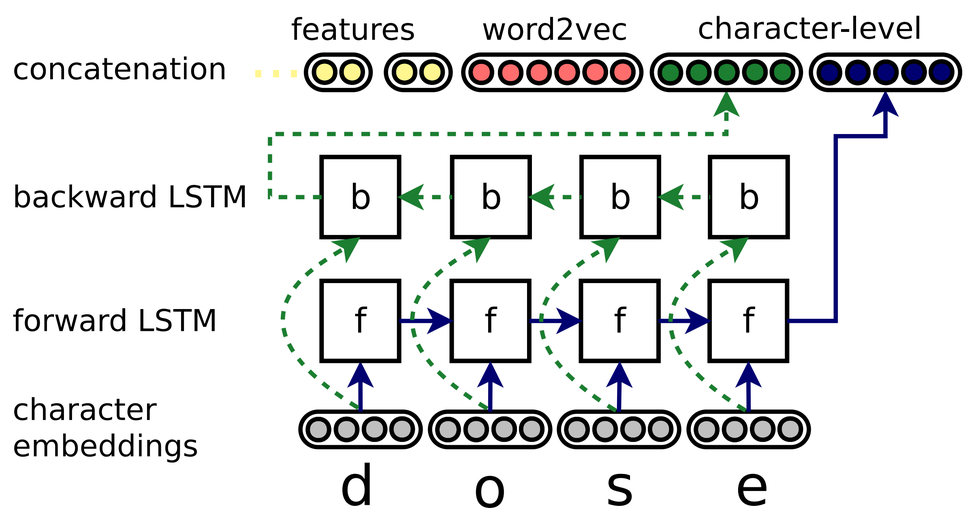
Containment Relation Extraction

- Based on a Bi-LSTM architecture
- Process the center context between two entities



Input Embeddings

1. A character-based embedding
2. A word embedding
3. One embedding per gold standard attribute
4. One embedding per cTAKES attribute



Results - All Relations

	P	R	F1
Baseline (closest)	0.459	0.154	0.231
Lee et al. (2016)	0.588	0.559	0.573
Lin et al. (2016)	0.669	0.534	0.594
No features	0.646	0.568	0.605
+ GS features	**0.687**	0.549	0.610
+ cTAKES features	0.657	**0.575**	**0.613**

Acknowledgements

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