Event Extraction as Dependency Parsing (in BioNLP 2011)

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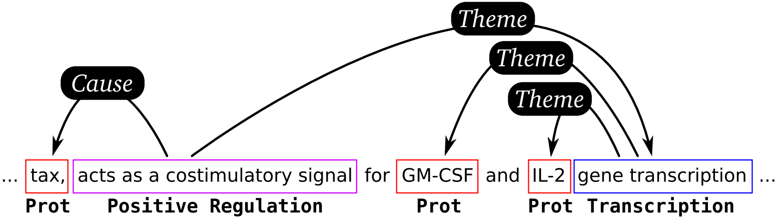
Joint work with **Mihai Surdeanu** and **Christopher D. Manning**

Our approach in two slides...



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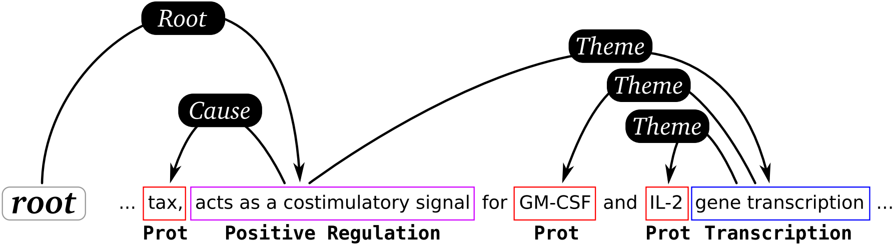

Full details in [McClosky, Surdeanu, and Manning, ACL 2011]

Outline

1. Event Parsing
2. Adapting to BioNLP 2011
3. Experiments
4. Conclusion

Approach

... tax, acts as a costimulatory signal for GM-CSF and IL-2 gene transcription ...

Preprocessing: Segmentation, tokenization

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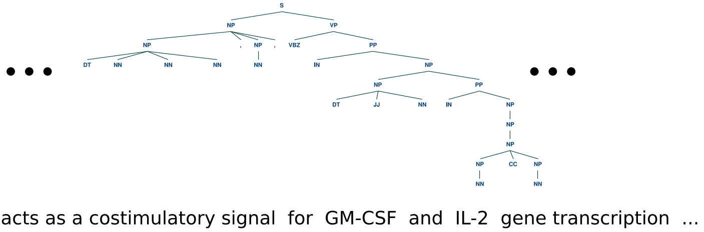

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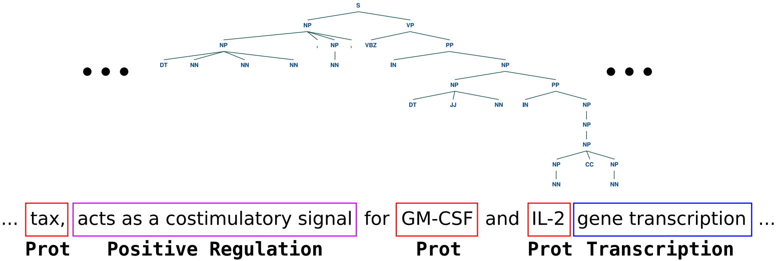
Preprocessing: Segmentation, tokenization, syntactic parsing

Self-trained biomedical parser: [McClosky, 2010]

Approach



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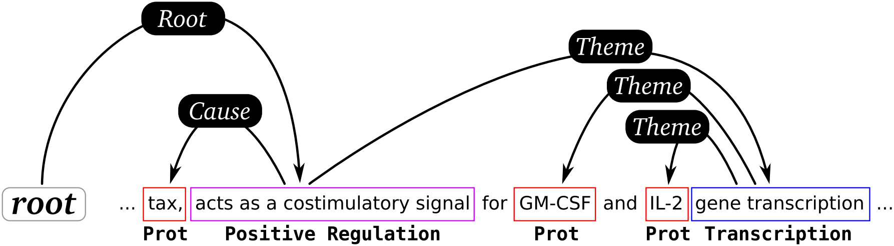
Prot **Positive Regulation** **Prot** **Prot** **Transcription**

Anchor classification: Token classification for event anchors

(similar to [Björne *et al.*, BioNLP 2009])

Approach



Event parsing: Parse anchors and proteins using reranking parser

Maximum-spanning tree based parsing

Why a dependency parser?

- Event structures are non-projective (non-planar)

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- Easy to extend feature extractor
- Support for *n*-best parsing

Adapting to BioNLP 2011

- General improvements
  - Distributional similarity features in anchor detection

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    - Removing nested entities (ID)

Results on Genia development

Decoder(s)	Parser	Reranker
1P	49.0	49.4
2P	49.5	50.5
1N	**49.9**	50.2
2N	46.5	47.9
All	—	**50.7**

Results on Epigenetics development

Decoder(s)	Parser	Reranker
1P	62.3	63.3
2P	62.2	63.3
1N	**62.9**	**64.6**
2N	60.8	63.8
All	—	64.1

(note: issues with our internal evaluator implementation)

Domain adaptation for Infectious Diseases

Model	Precision	Recall	*f*-score
ID	**59.3**	38.0	46.3
ID (×1) + GE	52.0	40.2	45.3
ID (×2) + GE	52.4	41.7	46.4
ID (×3) + GE	54.8	**45.0**	**49.4**
ID (×4) + GE	55.2	43.8	48.9
ID (×5) + GE	55.1	44.7	**49.4**

(parser only with 2N decoder)

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Summary

- New approach to event extraction
    - Parsing can be used for event extraction
    - Reranker further improves performance
- Minimal changes to adapt to new BioNLP domains
- Component in the FAUST system (stay tuned!)
- Code coming soon!
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Questions?