ALVIS

A Robust Linguistic Infrastructure for Efficient Semantic Content Analysis

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Overview

- ALVIS: STREP FP6 project
- Coordination: Wray Buntine (Helsinki University of Technology)
- Goal: Building an infrastructure for open source search engines, using a peer-to-peer and subject-specific technology
  - P2P Large-scale Information Retrieval
  - Subject specific Information Retrieval

ALVIS consortium

Participant name	Country Short name	Technical Lead
Helsinki University of Technology, Helsinki Institute for Information Technology HIIT	Finland / HUT	Wray BUNTINE
Institut National de la Recherche Agronomique, Unité Mathématique, Informatique et Génome	France / INRA	Claire NEDELLEC
Ecole Polytechnique Fédérale de Lausanne, Distributed Information Systems Lab	Switzerland / EPFL	Karl ABERER
Lund University, Department of Information Technology	Sweden / ULUND	Anders ARDÖ
Technical University of Denmark, Center of Knowledge Technology	Denmark / DTU	Gert SCHMELTZ PEDERSEN
Index Data Aps	Denmark / INDEX DATA	Marc CROMME
Exalead SA	France / EXALEAD	Francois LAGUNAS
Université Paris-Nord, Laboratoire d'Informatique	France / PARIS 13	Adeline NAZARENKO
ALMA Bioinformatics, S.L.	Spain / AB	Christian BLASCHKE
Jozef Stefan Institute, Department of Intelligent Systems	Slovenia / JSI	Marko GROBELNIK
Tsinghua University, Department of Computer Science and Technology	China / TU	Lizhu ZHOU

Rationale & Objectives

- Development path based on open source
- Collaboration between Information extraction and data mining
- Target specific user categories, don’t compete with the majors
- Enable different user experiences with simple semantic capability
- Empower European-centric search initiatives

A P2P approach

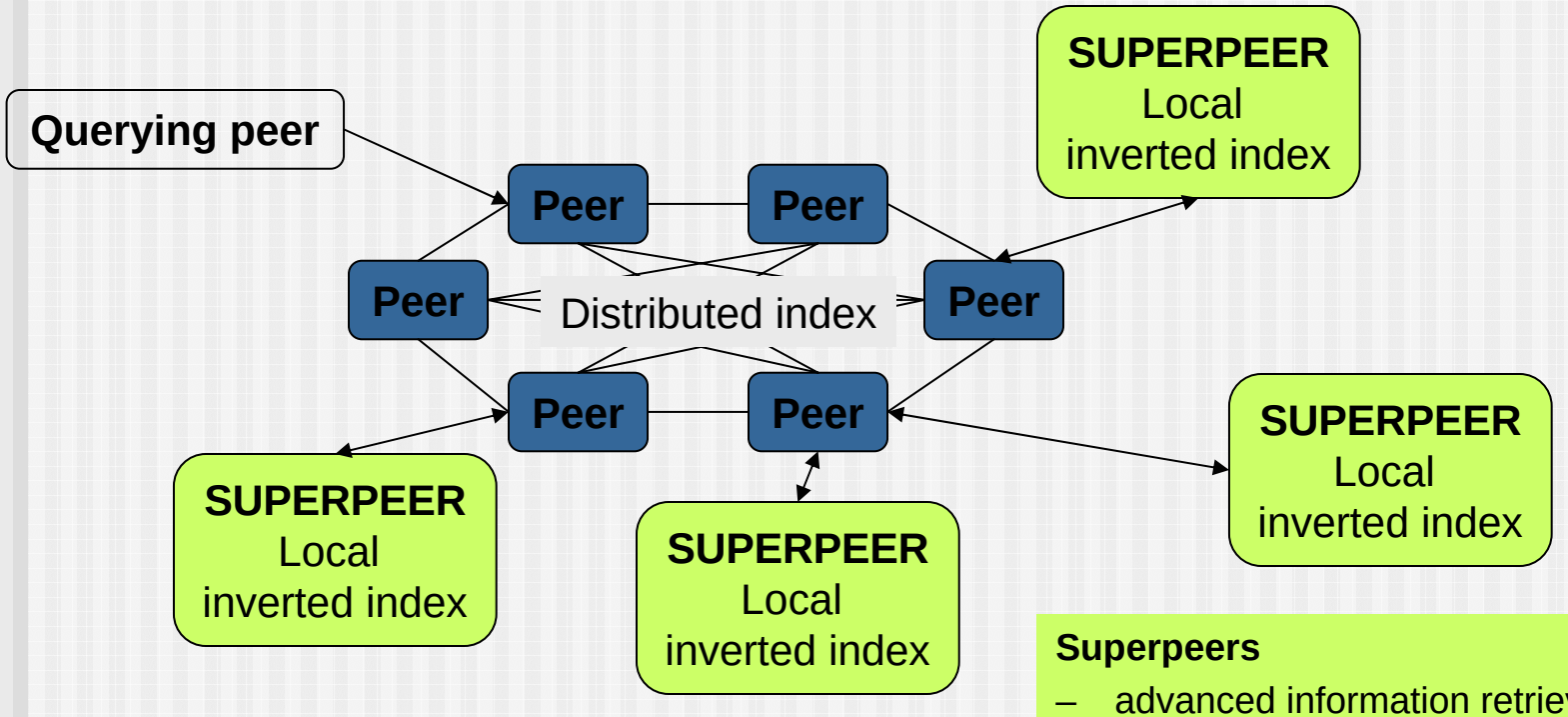
Rationale

- scalability
- self-organisation
- fault-tolerance

Architecture with two types of nodes

- *Peers* building the distributed P2P overlay network
- *Superpeers*, stand-alone components hosting document collections

Architecture Overview



Peers

- maintenance of an inverted index of superpeers' document collections
- efficient querying of its distributed index

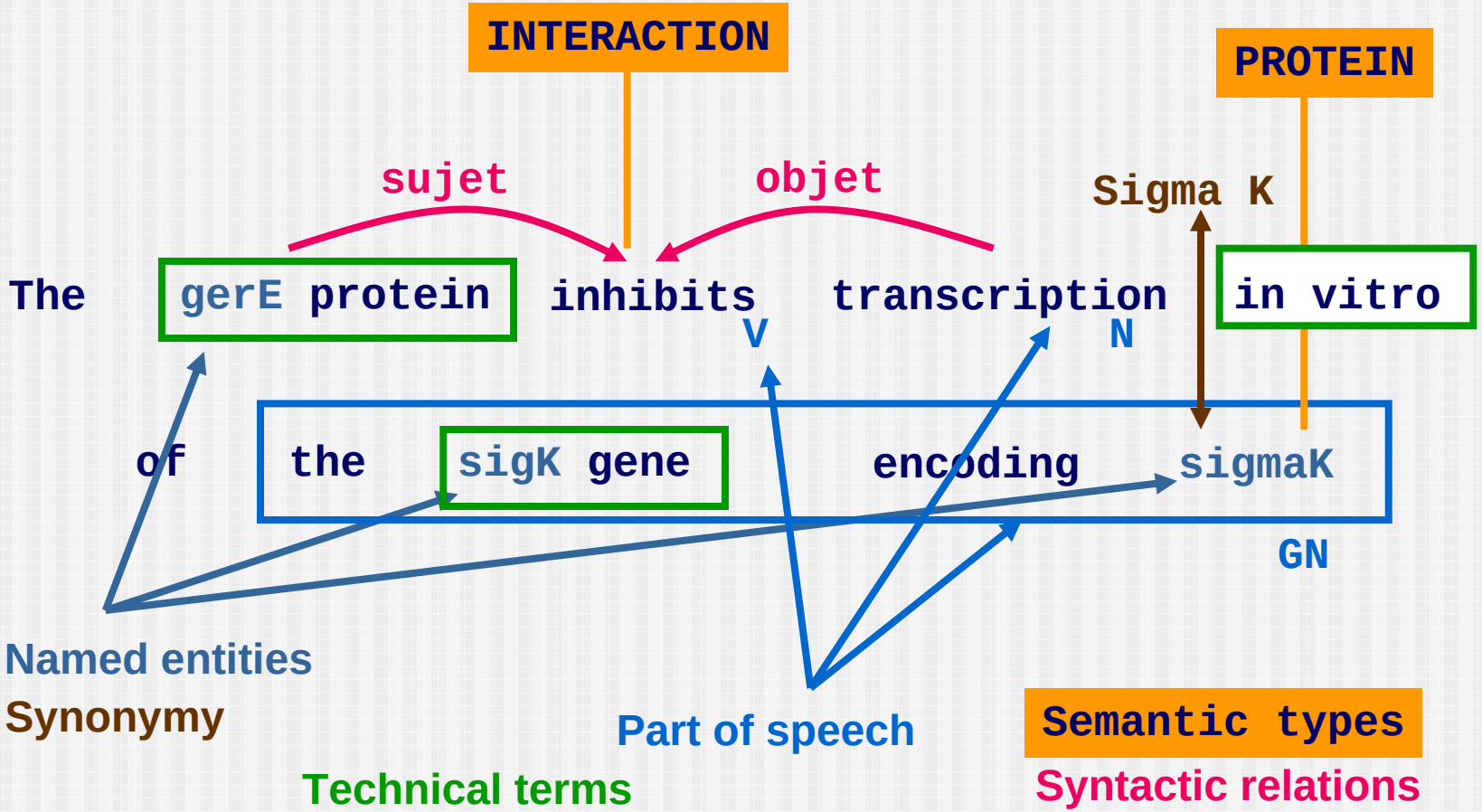
Superpeers

- advanced information retrieval services
- sophisticated processing of document collections to build semantically rich indexes enhanced by various ranking strategies
- complex structured queries

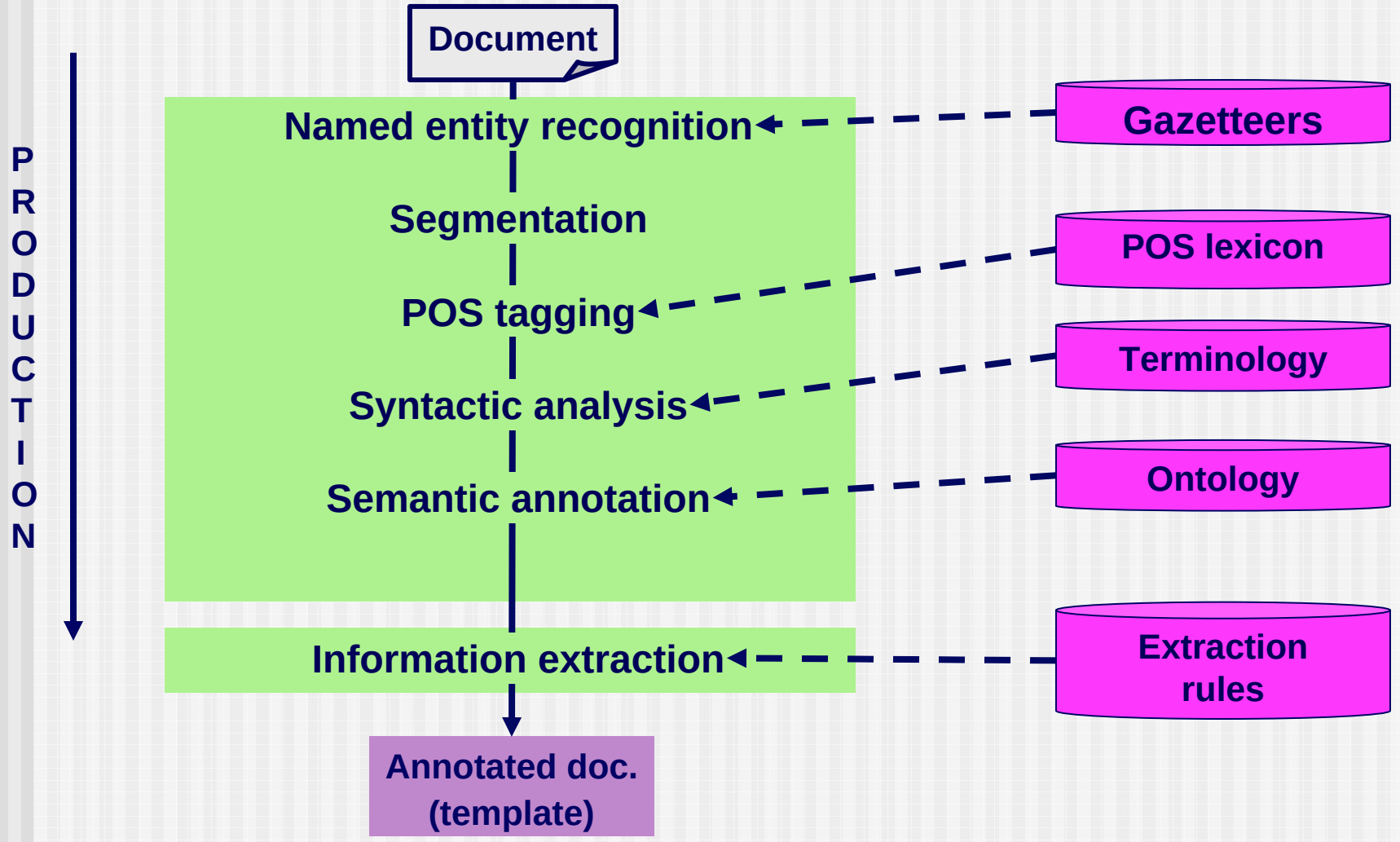
Text analysis

- University Paris 13 is mainly involved in natural language processing (NLP) for IR
- Semantic annotation
  - Technical term analysis
  - Named entity recognition
- Extraction of relevant information (IE)
  - Acquisition of structured information from texts

Annotations layers



NLP Architecture



Recycling existing NLP tools

POS tagging	**Brill, TreeTagger**	**« inhibits » is a verb**
Syntactic analysers	**IFSP, Link Parser**	**« gerE protein » is the subject of « inhibits »**
Term extractors	**ACABIT, SYNTEX**	**« in vitro » is a technical expressions**

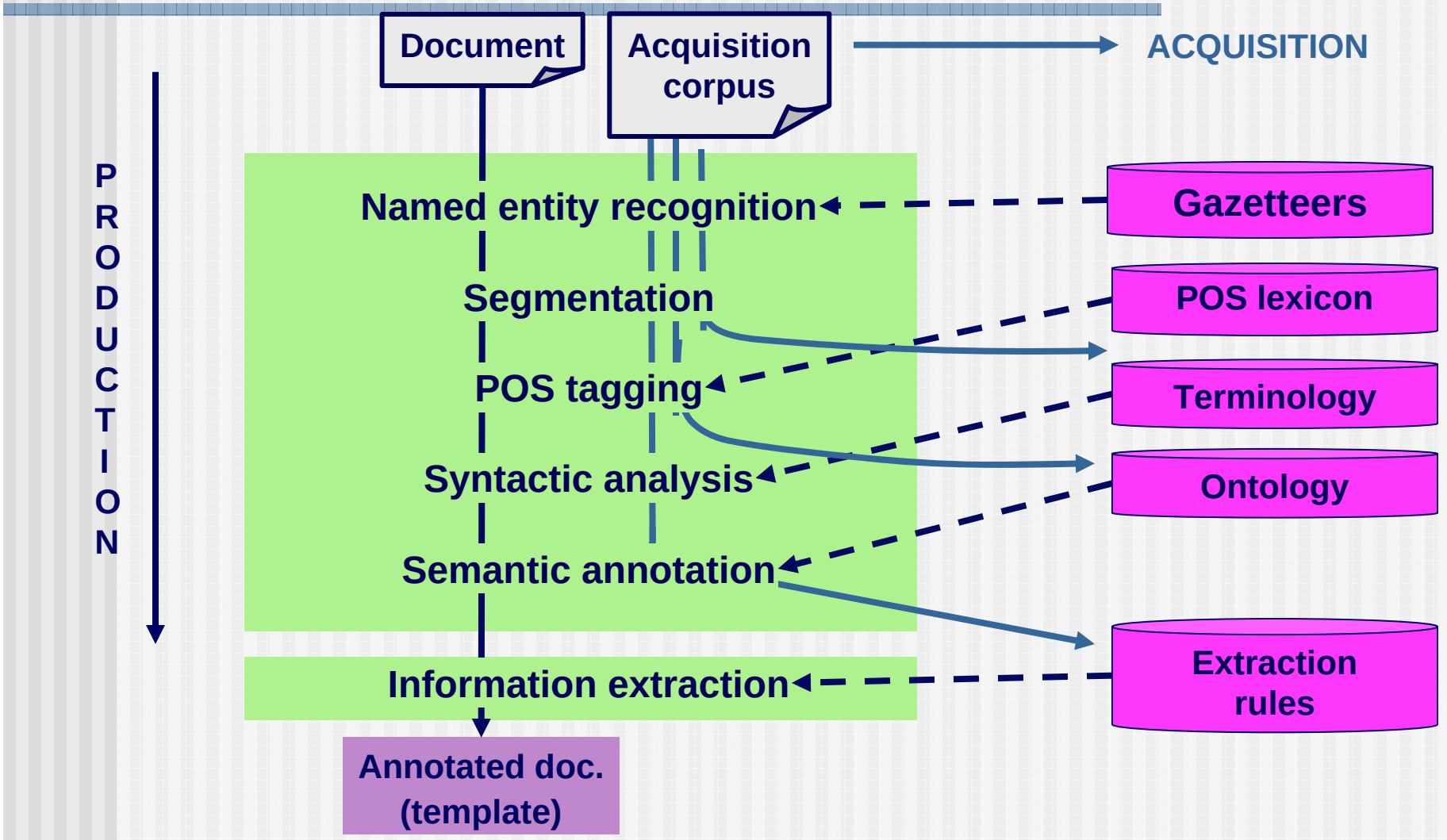
NLP tools achieve poor results when applied on specialized corpora

- Subject-verb relation: precision < .7
- Coordination: precision < .4

Tool and resource tuning

- Objective: a quick and efficient adaptation of resources and tools for a new domain
- Strategy
  - Acquire domain knowledge from representative corpora
  - Enhance tool performance with this specific knowledge (terminology, specific grammars…)
  - Use all the information available from previous analysis steps

Mixing acquisition with production

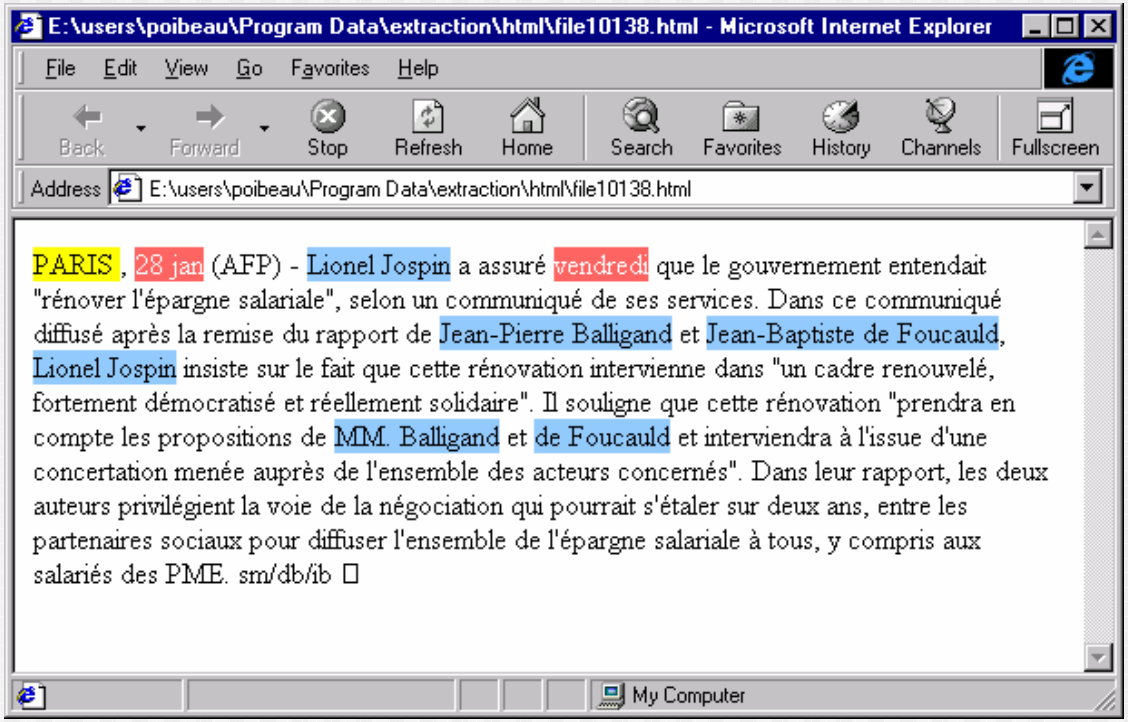


Conclusion and perspectives

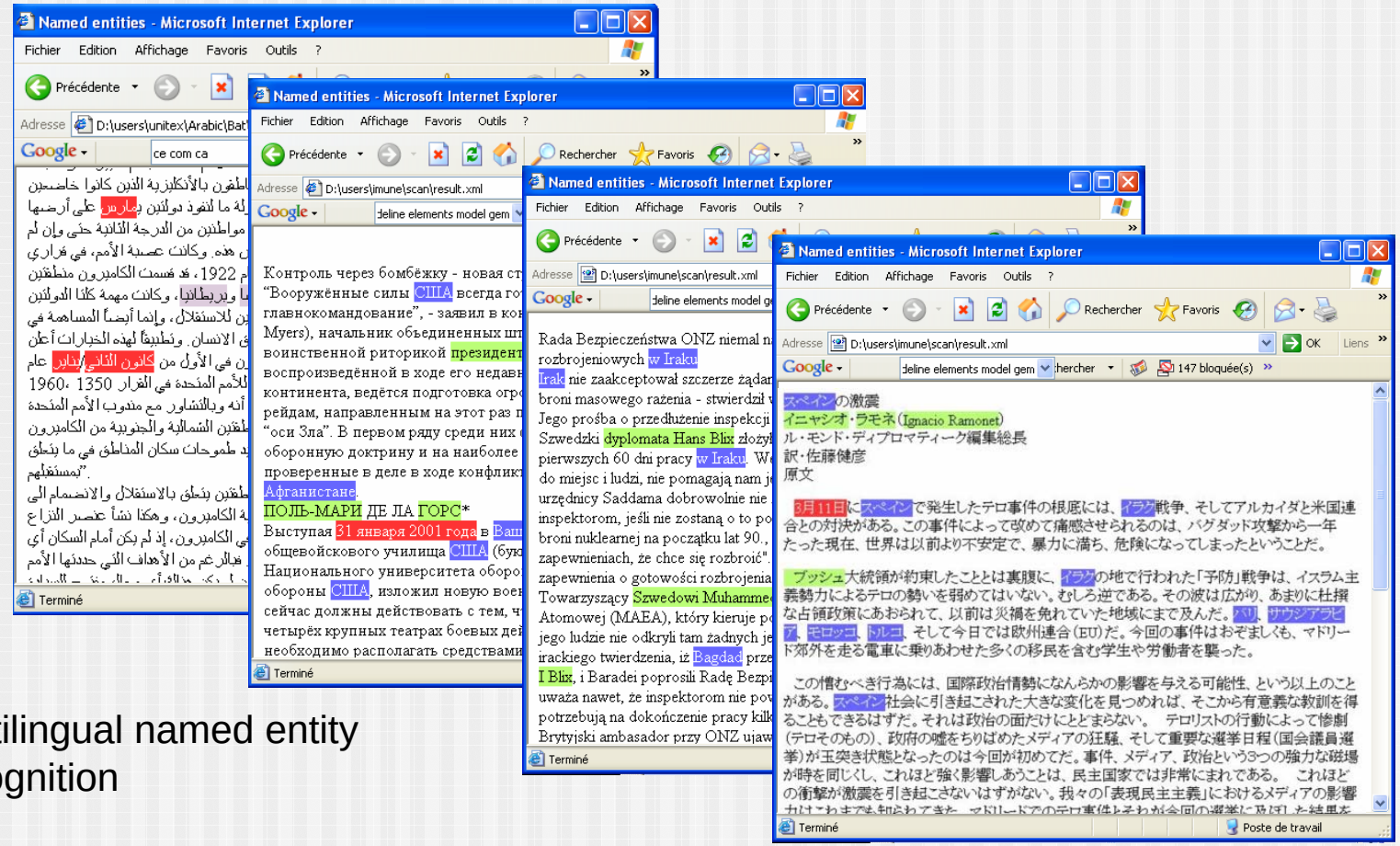
Overview…

- An annotation platform integrating different annotation layers
  - Annotation standards (UTF-8, ISO TC37/SC4)
  - Open source software
  - Multilingualism (mainly English and French, but Chinese and Slovenian ongoing)
  - Scalability (Towards Gb)
- Tool and resource tuning
  - Named entity, term analysis…
  - Syntactic analysis for accurate IE performances

Semantic annotation



Multilingualism



Multilingual named entity recognition

Information extraction