Migrating LINA Laboratory to Apache UIMA

Stegos Afantenos et Matthieu Vernier

Équipe TALN - **L**aboratoire **I**nformatique **N**antes **A**tlantique

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Overview

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Some words on LINA-TALN

1. LINA-TALN is a computational linguistics laboratory conducting research in the following domains :
   - Terminology extraction
   - Grammatical acquisition
   - Semantic annotation in texts
   - Discourse analysis
2. Natural Language Processing (NLP) Applications : Machine translation, Information extraction, Opinion mining, Plagiarism detection, etc
3. LINA-TALN is participating in various projects financed either from regional or national sources (PIITHIE, BLOGOSCOPIE, MILES, etc).

General problem

Computational linguistic researchers have developed many tools and components ...

1. **Reusability** – How can we share components ?
   - With encapsulated functionality
   - Written in different programming languages
2. **Interoperability** – How can we integrate (configure) different components in complex NLP pipelines ?
   - Without tremendous programming overhead
3. **Testability**, Maintainability – How can we test complex NLP pipelines ?
   - With easy modifiability (switching parameters)
4. **Portability** – How can we adapt complex NLP pipelines to new domains, languages, apps ?

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- Whence the need for a common platform.

A simple example of interoperability problems

Alice's adventures in wonderland

Alice was beginning to get very tired of sitting by her sister on the bank, and of having nothing to do.

One way of tokenizing

Alice/was/beginning/to/get/very/
tired/of/sitting/by/her/sister/
on/the/bank/,/and/of/having/
nothing/to/do/.

A second way of tokenizing

Alice	by	having
was	her	nothing
beginning	sister	to
to	on	do
get	the	.
very	bank	
tired	,	
of	and	
sitting	of	

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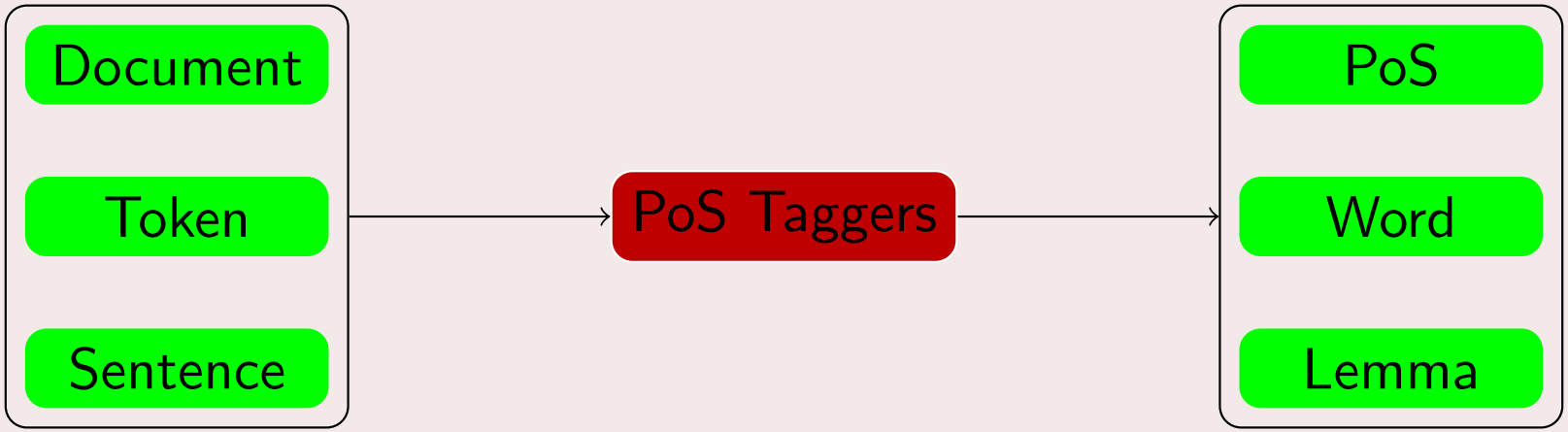
- All researchers need to do is clearly define their type system
- Then, each one can go on and write its own code (Analysis Engine, according to the jargon)
- UIMA takes care of the rest, allowing for easy chaining of modules, which can be local or distributed in various machines inside the same laboratory.

Some annotators (Treetagger, Brill, Flemm)



- The annotation type Word is a *meta*-annotation for 25 annotation types, including nouns, pronouns, verbs etc.
- In LINA-TALN we have been working for more than a year now on the definition of a common type system to be used by our team members and maybe by the community at large.

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- UIMA, with the Simple Rest Server provides an easy to use framework for the exchange on information based on the REST protocol
- In case the other laboratories use UIMA the SOAP or jVinci protocols are also available.

UIMA at LINA

1. Definition of a basic Type System for french preprocessing NLP task (tokenizer, grammatical tagging)
2. Development of UIMA wrappers for existing tools : *TreeTagger*, *Brill*, *Flemm*
3. Rewriting of *Nemesis* in UIMA : named entity annotation tool
4. Using UIMA in our Masters courses in order to teach "good practices" of NLP development.
5. Several academic and industrial projects :
   - ANR CMantic : semantic search engine development
   - ANR Piithie : semantic and discursive analysis by REST web service for plagiarism detection
   - ANR Blogoscopie : opinion mining in blogs

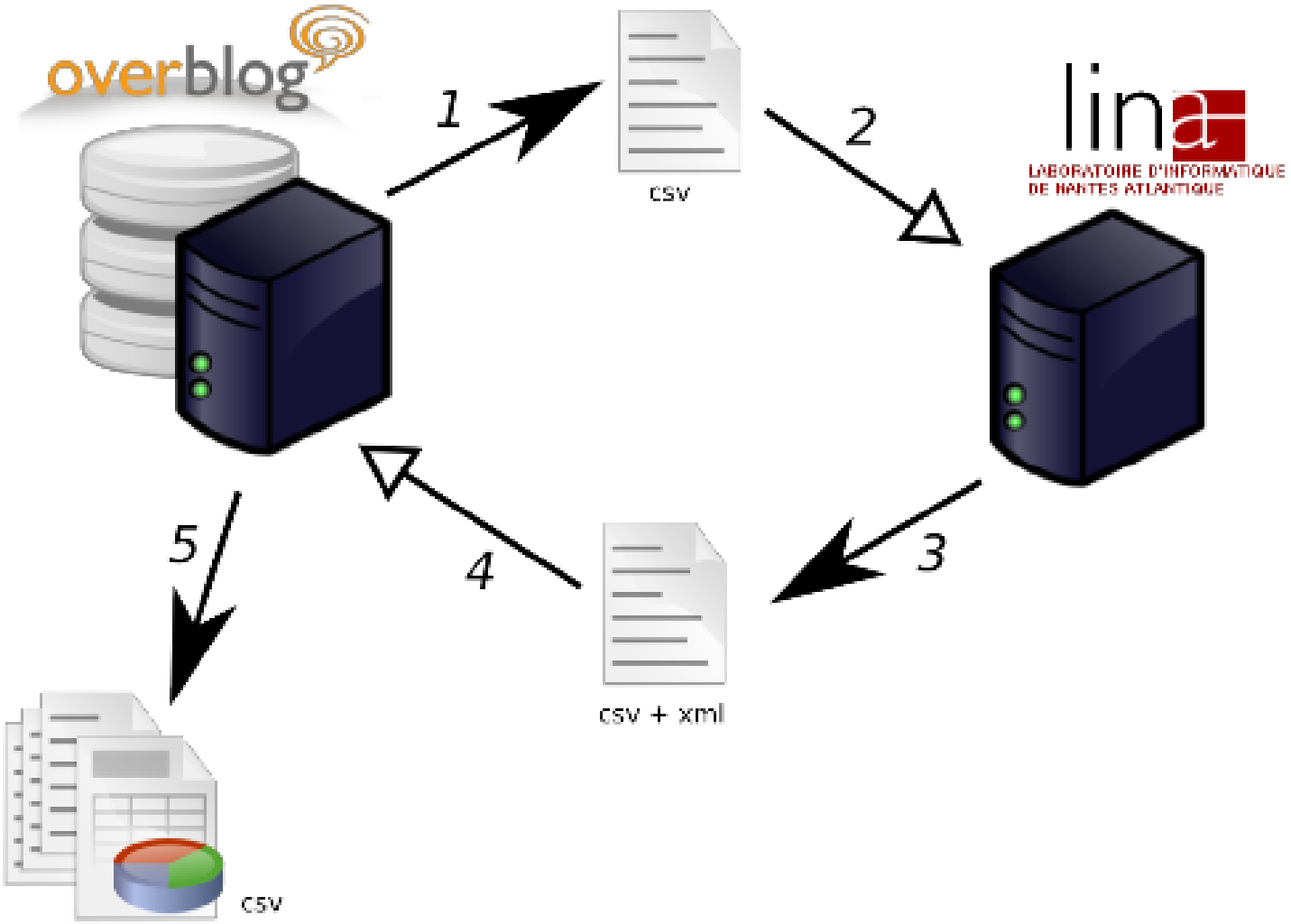
Overview

UIMA in Blogoscopie project

- Objective : *What do peoples think about a subject at a particular date ?*
  - Automatic annotation and categorization of local opinions expressed in blogs
  - Automatic annotation of evaluated subjects
- Industrial partner : OverBlog (1st french blog platform)
- Tools needed for this NLP :
  - Morphological/Syntax annotator (TreeTagger),
  - Dictionary annotator (Opinion words like *interesting, to hate, etc*)
  - Rules annotator (*NEG + ADV + Opinion Word*, e.g. "not very useful"),
  - Machine learning algorithms,
  - etc

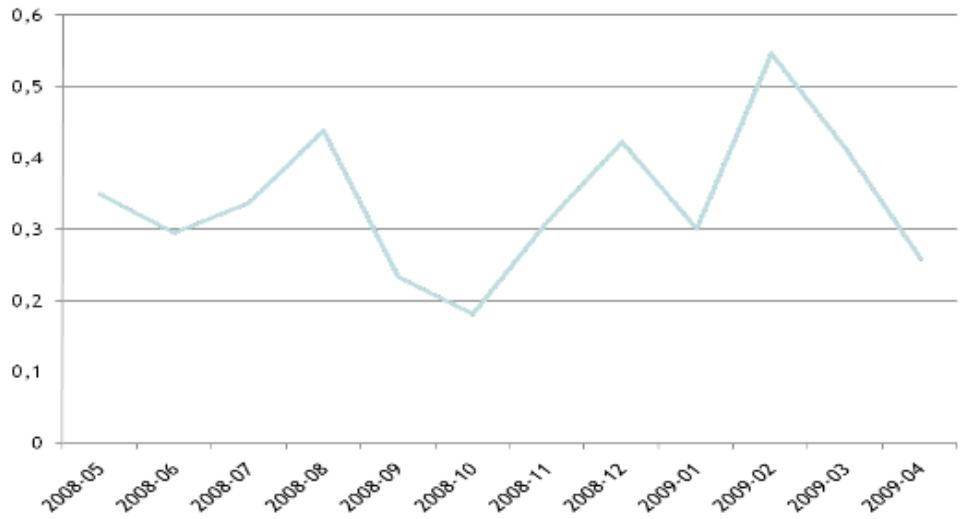
UIMA in Blogoscopie project

Industrial integration workflow via a REST WebService



UIMA in Blogoscopie project

From text collection to (graphical) informations in the same workflow



Input : All texts dealing with *Raymond Domenech* since 1 year
Output : Graphical evolution of positive/negative ratio for R. Domenech

UIMA in Piithie project

- Objective : *Detection of text re-use*
  - Plagiarized texts
  - Tracking of a document's impact
- Industrial partners : Advestigo, Sinequa
- Tools needed for this NLP :
  - Morphological/Syntax annotator (Brill/Flemm),
  - Named Entities annotator (Nemesis)
  - Terminology extraction (Acabit)
  - Discursive markers analysis

Overview

Toward a french community around UIMA

- 1st French Meeting around UIMA : July, 8th-9th in Nantes (RMLL/LSM) with academics and industrials
- Toward a portal to work collaboratively
  1. Software repository (UIMA components, bug reports, patches, etc)
  2. Experience exchanges (publications related with UIMA and NLP)
  3. Component and resource Developments for french
  4. Converging Type Systems for common annotations (morphosyntax, document, collection)
  5. http ://www.uima-fr.org
- Facilitate common projects with other laboratories and industrials