TICCLops = TICCL + CLAM

Martin REYNAERT and Maarten VAN GOMPEL

Tilburg centre for Cognition and Communication - ILK

Tweede CLARIN-NL Bijeenkomst, Utrecht. 28 October, 2010

Outline

1. Introduction
2. Section 1: TICCL
3. Section 2: TICCLops
   - Introduction to TICCLops project (Call 1 - CLARIN-NL-09-011)
   - Introduction to CLAM
4. CLAM: Technical Details
5. CLAM: Setup
   - Setup
   - Providing a Service
6. TICCLops: the user experience

TEXT-INDUCED CORPUS CLEAN-UP: Introduction

TICCL for TYPOS and OCR-errors

- Tool to perform large scale, unsupervised spelling correction of corpora
- Based on indexing with Anagram Hashing
- Spelling correction = reduction of lexical variation caused by typos, OCR-errors, historical orthographical changes...
- Lexical variants are linked to their most likely canonical form
- Output: lists and ’enriched’ OCR-ed texts
- Production version developed according to KB specifications, second half 2008

TEXT-INDUCED CORPUS CLEAN-UP: Journal paper

- International Journal of Document Analysis and Recognition (Springer)
- Title: Character confusion versus focus word-based correction of spelling and OCR variants in corpora
- Author: Martin Reynaert
- CLARIN-NL acknowledgement
- Online publication: next week, in Open Access

TICCL online processing system

- A demonstration project which will allow CLARIN users to submit their corpora for fully automatic spelling correction and normalization by TICCLops, the online processing version of our core component TICCL. This system should be widely applicable in all manner of curation projects and lexicographical work.
- Start Date: 1 February 2010
- End Date: 31 July 2010

TICCLops: PARTNERS

- Coordination & Technology Provider:
  Tilburg centre for Creative Computing (TiCC) - Tilburg
  - Martin Reynaert: Researcher
  - Maarten van Gompel - Scientific Programmer
- User & Data Provider:
  National Library (Koninklijke Bibliotheek - KB) - The Hague
  - Astrid Verheusen - Head Digitisation Department
- CLARIN Center & Data Provider:
  Institute for Dutch Lexicology (INL) - Leiden
  - Remco van Veenendaal - Head TST-Centrale

Research Data

- Staten-Generaal Digitaal: 180 years of OCR-ed Acts of Parliament and related documents, i.e. in historical and contemporary spelling. (http://www.statengeneraaldigitaal.nl)
- Database of Digitized Daily Newspapers: 8 million pages, goes back to 1618. (http://kranten.kb.nl).
- Collections of recently digitized copyright-free books and magazines (forthcoming: Google Books: 160,000 books)

TICCLops: TICCL online processing system

- In the course of the project we developed a more generic solution than initially proposed:

  Computational Linguistics Application Mediator: CLAM

- TICCLops and CLAM form the basis for several work packages in the Dutch-Flemish CLARIN project TTNWW (tokenization, text conversion, POS-tagging, lemmatization, NER, shallow parsing)
- CLAM was made available to other projects and was adopted by Call 1 project ADELHEID

Introduction to CLAM

Observation

There are a lot of specialised command-line NLP tools available.

Problems

1. Tools often available only locally, installation and configuration can be tough
2. Not very user-friendly for the untrained general public or technically-challenged researchers
3. How to connect one tool to another?

Solution

Making NLP tools available as full-fledged webservices.

Advantages

1. Services available over the web.
2. User-friendly interface built-in in the webservice
3. Great for demo purposes
4. Greater for only providing access to what is fit for general use
5. Multiple webservices can be chained in a workflow

Our Focus

1. A *universal* approach: *wrapping*
   - Turn almost *any* NLP tool into a webservice with *minimal effort*
   - NLP tool = Given input files and a custom set of parameters, produce output files
   - No need to alter the tool itself
2. Machine-parsable interface & Human-friendly interface

Wrapping Approach

1. NLP application: blackbox
2. Wrapper script
3. CLAM Webservice

Technical Details

RESTful Webservice

RESTful Webservice (as opposed to SOAP, XML-RPC)

1. Resource-oriented: "Representations" of "resources" (projects)
2. Using HTTP verbs
3. Lightweight
4. Returns human-readable, machine-parseable XML adhering to a CLAM XML Scheme Definition
5. User authentication in the form of HTTP Digest Authentication

Python

Written entirely in Python 2.5

1. NLP tools, wrapper scripts, and clients may be in any language
2. But: Readily available API when writing wrapper scripts and clients in Python.
3. Integrated into Apache for production work, lightweight solutions also available

Built-in User Interface

User interface automatically generated from XML using XSLT (in browser)

1. Webservice *directly* accessible from webserver
2. Web 2.0 interface: xHTML Strict, jquery (javascript), AJAX, CSS

Setup

CLAM Setup

Projects are the main resources, users start a new project for each experiment/batch.

Three states:

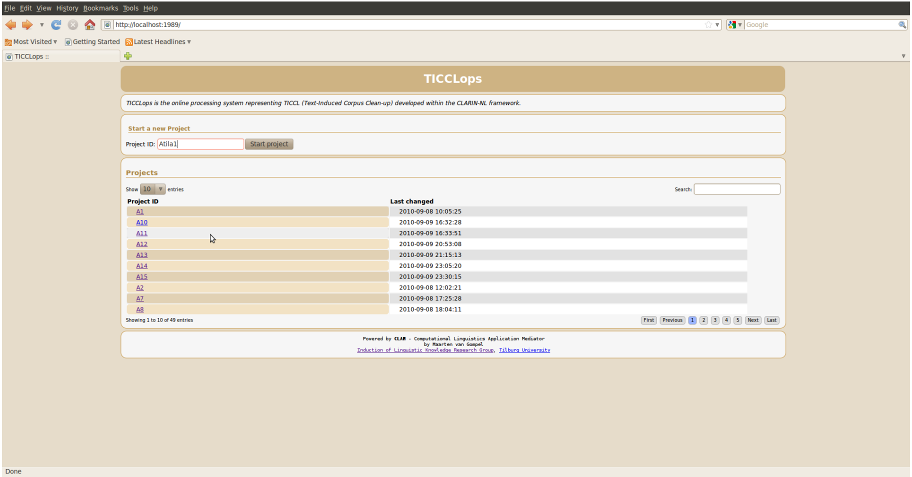
- **Status 0)** Parameter selection and file upload
- **Status 1)** System in progress
  - Actual NLP tool runs at this stage only
  - Users may safely close browser, shut down computer, and come back later in this stage
- **Status 2)** System done, view/download output files

Providing a Service

In order to make a webservice:

1. Write a service configuration file (in Python, but no Python experience required).
   - General meta information about your system (name, description, etc..)
   - Definition of parameters accepted by your system/wrapper script
   - Definition of input formats and output formats
   - Definition of users and authentication method
2. Write a wrapper script for your system
   - Wrapper script is invoked by CLAM, and should in turn invoke the actual system
   - Acts as glue between CLAM and your NLP Application.
   - Can be written in any language (python users may benefit from the CLAM API)
   - Not always necessary, NLP applications can be invoked directly by CLAM as well.

TICCLops: Start-up screen



TICCLops

TICCLops is the online processing system representing TICCL (Text-Induced Corpus Clean-up) developed within the CLARIN-NL framework.

Start a new Project

Project ID: Atila1 [Start project]

Projects

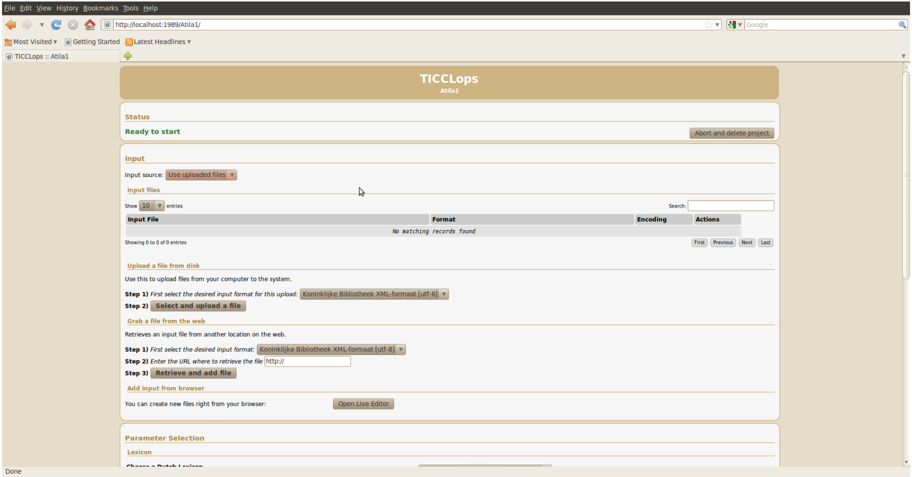
Show 10 ▾ entries Search:

Project ID	Last changed
A1	2010-09-08 10:05:25
A10	2010-09-09 16:32:28
A11	2010-09-09 16:33:51
A12	2010-09-09 20:53:08
A13	2010-09-09 21:15:13
A14	2010-09-09 23:05:20
A15	2010-09-09 23:30:15
A2	2010-09-08 12:02:21
A7	2010-09-08 17:25:28
A8	2010-09-08 18:04:11

Showing 1 to 10 of 49 entries

Powered by CLAM - Computational Linguistics Application Mediator
by Maarten van Gompel
Induction of Linguistic Knowledge Research Group, Tilburg University

TICCLops: Corpus Upload


File Edit View History Bookmarks Tools Help
http://localhost:1989/Atila1/
Google
Most Visited
Getting Started
Latest Headlines
TICCLops :: Atila1
Done

TICCLops

Atila1

Status

Ready to start

Input

Input source: Use uploaded files

Input files

Show 10 entries   Search:

Input File	Format	Encoding	Actions
No matching records found			

Showing 0 to 0 of 0 entries

Upload a file from disk

Use this to upload files from your computer to the system.

Step 1) *First select the desired input format for this upload:* Koninklijke Bibliotheek XML-formaat [utf-8]

Step 2) Select and upload a file

Grab a file from the web

Retrieves an input file from another location on the web.

Step 1) *First select the desired input format:* Koninklijke Bibliotheek XML-formaat [utf-8]

Step 2) *Enter the URL where to retrieve the file* http://

Step 3) Retrieve and add file

Add input from browser

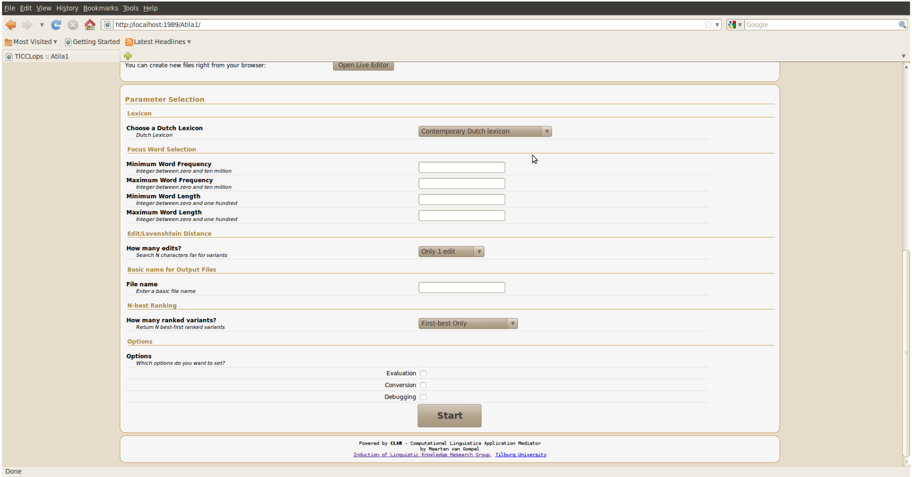
You can create new files right from your browser:

Parameter Selection

Lexicon

Choose a Dutch Lexicon

TICCLops: Parameter Selection



You can create new files right from your browser: Open Live Editor

Parameter Selection

Lexicon

Choose a Dutch Lexicon
Dutch Lexicon — Contemporary Dutch lexicon ▾

Focus Word Selection

Minimum Word Frequency
Integer between zero and ten million

Maximum Word Frequency
Integer between zero and ten million

Minimum Word Length
Integer between zero and one hundred

Maximum Word Length
Integer between zero and one hundred

Edit/Levenshtein Distance

How many edits?
Search N characters far for variants — Only 1 edit ▾

Basic name for Output Files

File name
Enter a basic file name

N-best Ranking

How many ranked variants?
Return N best-first ranked variants — First-best Only ▾

Options

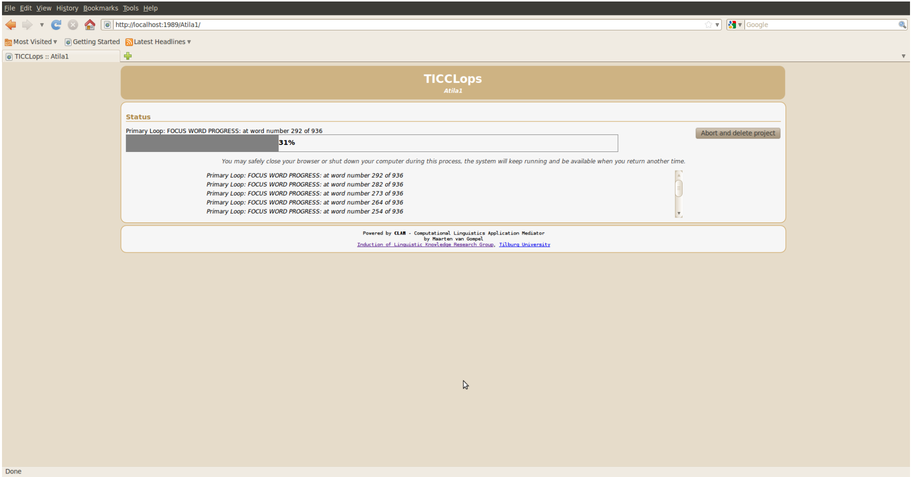
Options
Which options do you want to set?

Evaluation □
Conversion □
Debugging □

Start

Powered by **CLAM** - Computational Linguistics Application Mediator
by Maarten van Gompel
Induction of Linguistic Knowledge Research Group, Tilburg University

TICCLops: Progress Monitoring


File Edit View History Bookmarks Tools Help
http://localhost:1989/Atila1/
Google
Most Visited
Getting Started
Latest Headlines
TICCLops :: Atila1

TICCLops

Atila1

Status

Primary Loop: FOCUS WORD PROGRESS: at word number 292 of 936

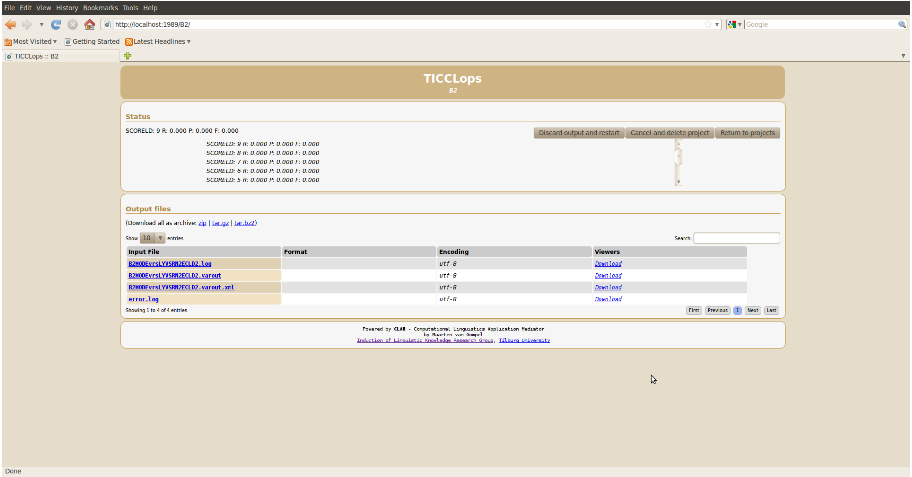
31%

You may safely close your browser or shut down your computer during this process, the system will keep running and be available when you return another time.

```
Primary Loop: FOCUS WORD PROGRESS: at word number 292 of 936
Primary Loop: FOCUS WORD PROGRESS: at word number 282 of 936
Primary Loop: FOCUS WORD PROGRESS: at word number 273 of 936
Primary Loop: FOCUS WORD PROGRESS: at word number 264 of 936
Primary Loop: FOCUS WORD PROGRESS: at word number 254 of 936
```

Powered by **CLAM** - Computational Linguistics Application Mediator
by Maarten van Gompel
Induction of Linguistic Knowledge Research Group, Tilburg University

TICCLops: Output


File Edit View History Bookmarks Tools Help
http://localhost:1989/B2/
Google
Most Visited
Getting Started
Latest Headlines
TICCLops :: B2
TICCLops
B2
Discard output and restart
Cancel and delete project
Return to projects
Done

Status

SCORELD: 9 R: 0.000 P: 0.000 F: 0.000

SCORELD: 9 R: 0.000 P: 0.000 F: 0.000
SCORELD: 8 R: 0.000 P: 0.000 F: 0.000
SCORELD: 7 R: 0.000 P: 0.000 F: 0.000
SCORELD: 6 R: 0.000 P: 0.000 F: 0.000
SCORELD: 5 R: 0.000 P: 0.000 F: 0.000

Output files

(Download all as archive: zip | tar.gz | tar.bz2)

Show 10 entries — Search:

Input File	Format	Encoding	Viewers
B2MODEvrsLYVSRN2ECLD2.log		*utf-8*	*Download*
B2MODEvrsLYVSRN2ECLD2.varout		*utf-8*	*Download*
B2MODEvrsLYVSRN2ECLD2.varout.xml		*utf-8*	*Download*
error.log		*utf-8*	*Download*

Showing 1 to 4 of 4 entries — First Previous 1 Next Last

Powered by **CLAM** - Computational Linguistics Application Mediator
by Maarten van Gompel
Induction of Linguistic Knowledge Research Group, Tilburg University

Thanks!!

Thank you for your attention!

Papers about TICCL are available at:
`http://ilk.uvt.nl/`

TICCLops = TICCL + CLAM

Martin REYNAERT and Maarten VAN GOMPEL

Tilburg centre for Cognition and Communication - ILK

Tweede CLARIN-NL Bijeenkomst, Utrecht. 28 October, 2010