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Applying CNL Authoring Support to Improve Machine Translation of Forum Data

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Agenda

- About ACCEPT
- CNL and MT
- Acrolinx CNL
- User-Generated Content
- Our Approach
- Examples
- Application Scenarios
- Evaluation
- Next Steps

ACCEPT Project

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- Enabling machine translation for the emerging community content paradigm.
- Allowing citizens across the EU better access to communities in both commercial and non-profit environments.

Grant agreement : No. 288769

ACCEPT Consortium

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Big Idea: Get more out of Community Forums

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- Make user-generated content (UGC) easier to read
- Make UGC easier to translate with Machine Translation
  (it can't be translated manually)
- UGC is more trusted and more used than company content
- Companies are now trying to make UGC better
  - By "moderating" or "curating" it.

UGC, CNL and Machine Translation (MT)

- Fix content before MT: pre-editing rules (CNL)
- Fix content after MT: post-editing rules (CNL)

MT and CNL

- CNL and Rules-based MT (RBMT): proven in many cases
  - Symantec with Systran (e.g. thesis: J. Roturier)
  - Thicke, J. Kohl, etc.
- CNL and Statistical MT (SMT): not so clear
  - Working with Moses, Google and Bing
  - Depends on text and training corpus
  - Depends on language pairs

CNL @ Acrolinx

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- Acrolinx founded 02.02.02 out of DFKI
- NLP
  - Hybrid system: rule-based with statistical components
  - Multi-level system: Base NLP + Rules Engine
  - Multilingual (EN, DE, FR, JP, ZH, SV, …)
  - Highly scalable
    - (50k words per second / 10 million words per month)
  - “Looking for errors”
    - More like Information Extraction than Parsing
  - Working with “ill-formed” text

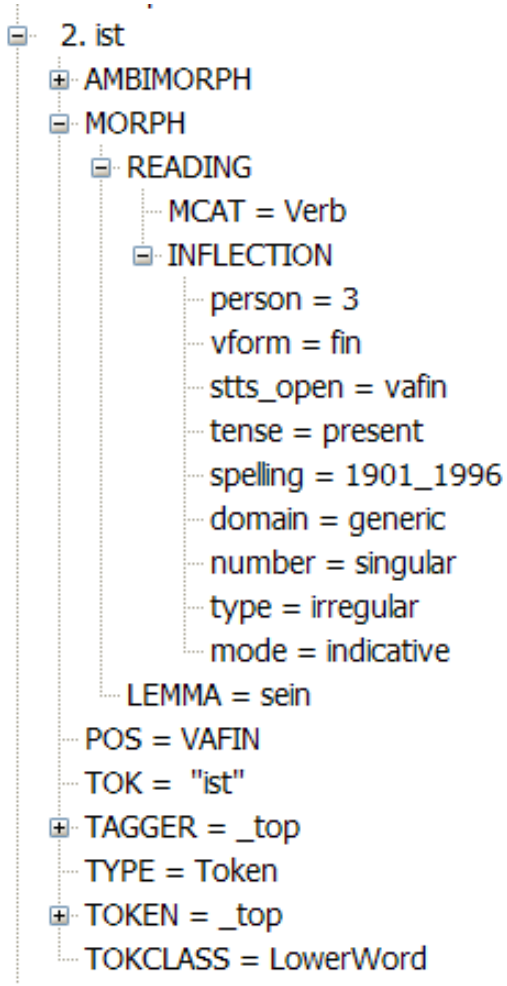
Components of the NLP System @ Acrolinx

- Tokenizer, Segmentizer
- Morphology
- Decomposition
- POS Tagger, Mecab (for JA and ZH)
- Word Guesser

Additional information

- Terminology (Chunks)
- Gazetteer (Lists of different words)
- Context Information (XML, Word style)

Feature Structure



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Acrolinx Rule Engine for Writing CNL

- “on top” of the basic components
- Acrolinx rule formalism
- Allows user to specify objects based on the information available in the feature structure
- Describing the “locality” of the issue
- Continuous further development of rule formalism based on needs
  - e.g. MT more suggestion possibilities are required

Rule Example

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```
//example: a dogs
TRIGGER(80) == @det_sg^1 [{@mod|@noun}]*! @noun_pl^2
                    -> ($det_sg, $noun_pl)
                    -> { mark : $det_sg, $noun_pl;}

//example: a dogs -> a dog
SUGGEST(10)  ==   $det_sg []* $noun_pl
       -> {   suggest: $det_sg -> $det_sg, $noun_pl ->
  $noun_pl/generateInflections([number="singular"]);
              }
```

UGC, CNL and Machine Translation (MT)

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- **Fix content before MT: pre-editing rules (CNL)**
- Fix content after MT: post-editing rules (CNL)

- “Extend” training data

Pecularities of UGC

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- Informal/spoken language
  - colloquialism
  - truncations
  - Interjections
  - …
- Use of first person/second person
- Many “questions”
- Ellipses
- In French: lack of accents
- …

UGC – English examples

Yes, both the file/app server running Backup Exec ("SERVER01" above) and the SQL server ("SERVER03" above) are running Windows Server 2000. I do not know what AOFO is or where I would check if it's running.

Ahh OK. As a test - for that job that fails - edit the backup job properties and go to the Advanced Open File section. BTW AOFO = Advanced Open File

Holy crap, Colin, that's exactly what I needed! Thank you. I ran another test job last night with AOFO unchecked and it successfully backed up the PROFXENGAGEMENT database on the SQL server

Style Rule Examples for MT (EN)

- avoid parenthetical expressions in the middle of a sentence
- avoid colloquialism
- avoid interjections
- avoid informal language
- avoid complex sentences
- missing end of sentence

UGC – French examples

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- 512MO ram de **dique** dur, mais **la**, cela a toujours **fonctionner** normalement avant Cela fait 4 jours que le **probleme** est apparu quand des mises **a** jours Windows ont été faites.

Grammar and Style Rule Examples for MT (FR)

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- confusion de mots (word confusion)
  - la vs. là
  - ce vs. se
  - a vs. à
- mots simples (simple words)
- évitez questions directes (avoid direct questions)
- évitez le langage familier (avoid informal language)
- évitez moi (avoid specific form of first person pronoun)

UGC, CNL and Machine Translation (MT)

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- Fix content before MT: pre-editing
- Fix content after MT: post-editing

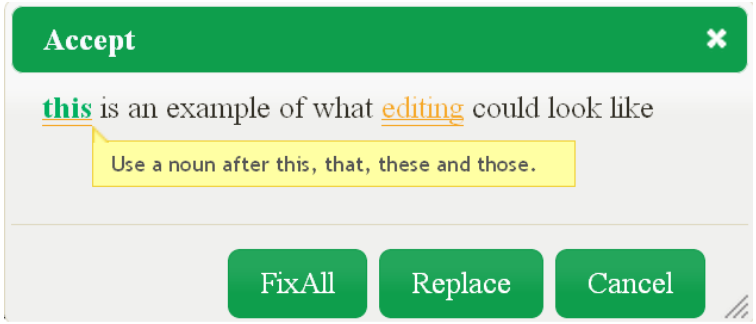
- **“Extend” training data**

Use CNL to enhance corpus (University Geneva)

- Not always possible to pre-edit
- Second person typically not in training corpus, but how to get rid of it?
- Use CNL approach (rule formalism) to generate additional training data with second person
  vous cliquez -> tu cliques

Application Scenarios

- Interactive (Plug-ins to forums)



- Automatic (also for training data)

Automatic pre-editing

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- Automatic pre-editing replaces suggestion automatically

  instalation -> installation

- generally very difficult because precision needs to be very high
- tests done with autoApplyClient

AutoApplyClient

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- automatically replaces marked sections of text with the top-ranked improvement suggestion given by Acrolinx

- Use Cases
  - automatic pre-editing
  - evaluation

Automatic pre-editing

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- idea to work with sequential rule sets
  - some rules need to apply before others
  - order rules into different rule sets wrt their order in which they have to apply

- EN: currently 6 rule sets
- FR: tests started last week!

Automatic Pre-editing: Step 1

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- I am trying to setup that feature, but it doesnot work What am I missing?

  ---------- segmentation rules ----------

- I am trying to setup that feature, but it doesnot work. What am I missing?

Automatic Pre-editing: Step 2

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- I am trying to setup that feature, but it doesnot work. What am I missing?

---------- spelling ----------

- I am trying to setup that feature, but it does not work. What am I missing?

Automatic Pre-editing: Step 3

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- I am trying to setup that feature, but it does not work. What am I missing?

---------- specific grammar rules ----------

- I am trying to set up that feature, but it does not work. What am I missing?

Evaluation

- Automatically apply Acrolinx rules
- Evaluate with respect to
  - BLEU (Bilingual Evaluation Understudy)
  - GTM (General Text Matcher)
  - TER (Translation Error Rate)

Evaluation

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- MT is improved
  - Automatic correction correlates with human evaluation

	Human		GTM		BLEU		TER	
	+	-	+	-	+	-	+	-
Use relative pronouns such as that and which	33%	4%	26%	19%	26%	7%	15%	15%
Confusion between noun and adjective	23%	8%	46%	0%	46%	0%	38%	8%
Avoid contractions	27%	12%	31%	12%	31%	8%	27%	19%

Further work

- Focus more on corpus
  - unknown word in the training data
  - check frequency of rules in the training data to infer whether rule is relevant
- Post-editing for SMT
- More evaluation

Thank You!

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