Natural Language Processing for Computer-Assisted Language Learning & Research on Language Acquisition

https://spraakbanken.gu.se/eng/icall/joint6thNLP4CALL-2ndNLP4LA2017
Gintarė Grigonytė
Stockholm University

Kristina Nilsson Björkenstam
Stockholm University
13 submissions
3 reviews
7 accepted papers

36 PC members (=reviewers)
### Papers & authors, 2017

<table>
<thead>
<tr>
<th>Country</th>
<th>Submitted</th>
<th>Accepted</th>
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<tr>
<td>Sweden</td>
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We seem nice!

<table>
<thead>
<tr>
<th>Workshop year</th>
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</table>

We seem nice!

... but we are strict – it's your papers that are GOOD!
Bente Ailin Svendsen
University of Oslo, Norway

Torsten Zesch
University of Duisburg-Essen, Germany
38 registrations
+Drop-in

Estonia 2
Finland 5
Germany 4
Norway 2
Sweden 21
Switzerland 2
NLP + CALL = ICALL

Natural Language Processing + technical competence

Computer Assisted Language Learning + pedagogical competence
By combining CALL and LA

- We have extended the previous workshop concept in two dimensions:
  - L2 + L1 acquisition
  - NLP + corpus linguistics, psychology, cognitive science, and phonetics
The benefit

- shared ideas, tools, and methods
- broadening the community
- providing an environment for new and exciting collaborations
<table>
<thead>
<tr>
<th>Time</th>
<th>Program point.</th>
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<tbody>
<tr>
<td>9.00</td>
<td>Opening, Elena Volodina</td>
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<tr>
<td>9.30</td>
<td>Morning session 1. Chair: Kristina Nilsson Björkenstam</td>
</tr>
<tr>
<td>9.30</td>
<td>Allison Adams and Sara Stymne. Learning with Learner Corpora: using the TLE for Native Language Identification. [pdf]</td>
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<tr>
<td>10.00</td>
<td>Coffee break</td>
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<tr>
<td>10.30</td>
<td>Morning session 2. Chair: Lars Borin</td>
</tr>
<tr>
<td>10.30</td>
<td>Xiaobin Chen and Detmar Meurers. Developmental Benchmark of Syntactic Complexity. [pdf]</td>
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<tr>
<td>11.00</td>
<td>Johannes Graën and Gerold Schneider. Crossing the Border Twice: Reimporting Prepositions to Alleviate L1-Specific Transfer Errors. [pdf]</td>
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<tr>
<td>11.30</td>
<td>Invited talk by Torsten Zesch: Automatically *** gap-fill exercise items.</td>
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<tr>
<td>12.30</td>
<td>Lunch</td>
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<tr>
<td>13.30</td>
<td>Afternoon session 1. Chair: Elena Volodina</td>
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<tr>
<td>13.30</td>
<td>Anisia Katinskaia, Roman Yangarber and Javad Nouri. Tools for Language Learning and Supporting Endangered Languages. [pdf]</td>
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<tr>
<td>14.00</td>
<td>Björn Rudzewitz, Ramon Zial, Kordula De Kuthy and Detmar Meurers. Developing a Web-based Workbook for English Supporting the Interaction of Students and Teachers. [pdf]</td>
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<tr>
<td>15.00</td>
<td>Coffee break</td>
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9.30 First talk

~ 50 minutes till coffee

~20 min intro
Common pitfalls when developing ICALL applications
Pitfalls ...

... are based on

- our own experience
- our own observations
- comments from non-ICALLers
- comments from reviewers
ICALL tools for Second language (L2) learning

Target group

Language skill

Data & resources

Tools & algorithms

Evaluation

Prototypes
Challenges & lessons

- Data
- NLP researchers vs teachers → two different worlds?
- End-user applications → prototypes vs maintenance
Data
Two types of data

- Produced **by** L2 learners
  - essays
  - exercise logs
  - errors
  - interviews

- Produced by experts **for** L2 learners
  - reading comprehension texts
  - exercises
  - recordings of listening excerpt
Challenges: L2 learner-produced data

- Electronic L2 essays/logs are very difficult to collect
  - NOT available online
  - Need learner permits
  - Need learner variables (gender, age, native language, etc)
  - Sensitive in nature
  - Those who have it – don't want or CAN'T share
L2 essay collection

- Collaboration with parents (children)
  - if you find any willing to sign permits
  - ethical committee clearance
- Collaboration with teachers (children + adults)
  - if you find any teachers willing to collaborate
  - if you manage to convince students to sign permits'
- If you succeed:
  - decipher names in their hand-writing
  - digitize, anonymize, store, annotate for metadata
L2 essay pre-processing

SweLL workflow

Essay collection
ongoing → CEFK-grading teachers → Digitization → Manual registration editor in Lärka → Automatic annotation Korp pipeline

Learner variables
Collected through permits*

Student variables:
- Age/birthyear
- Gender
- Mother tongue(s)
- Residence time in Sweden
- Education level

Essay variables
- Assigned CEFR level
- Essay setting (exam/home)
- Use of extra materials
- Academic term and date
- (Title, topic, genre, grade)

Assessors
Minimum of two trained assessors

Inter-annotator agreement
- A degree to which several annotators agree about assigning attributes
- Reported for SW103 subcorpus
- KRippendorff’s alpha for pairwise agreement = 0.80
- 0.80 = good annotation quality (Artstein & Poesio 2008)

SweLL digitization principles
1. Do not reveal author identity
   - *reveling names — replace with MN
   - *addresses — replace with MN-street
2. Do not correct errors
   - *if several interpretations possible — make positive assumption, i.e., that the learner made no mistake
3. Preserve illegible handwriting
   - *illegible text — replace with @
   - *shredded text — leave as is

* http://spraakbanken.gu.se/sites/spraakbanken.gu.se/files/tflstand_eng-24042013_v03.pdf
Curios “time & effort” fact: Data vs experiments

Essay corpus, SweLL-corpus, creation and SweLL-based publications
Lesson 1

• Do not underestimate the time it takes to collect and prepare data
Time-effect ratio consequences

- Researchers skip compiling own data
  - use what is available
  - in the end often targeting English
# SweLL corpus

<table>
<thead>
<tr>
<th>Sub-corpus</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
<th>C1</th>
<th>Unknown</th>
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<td>-</td>
<td>-</td>
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<td>SpIn</td>
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<td>83</td>
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<td>Total</td>
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<td>83</td>
<td>75</td>
<td>74</td>
<td>89</td>
<td>2</td>
<td>339</td>
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Permission
to use learner essays for research purposes

I, (name, surname) ___________________________

grant my permission to the University of Gothenburg, Språkbanken, to use my essays for research purposes (check one alternative),

☐ only for restricted use by approved user groups and protected by password
☐ for unrestricted use provided my identity will remain anonymous

Personal information:

Gender: ☐ Woman ☐ Man Age ________________

Mother tongue (one or more) __________________________

Residence time in Sweden: ______ years ______________ months

Education level: ☐ Elementary school nr of years __________

☐ High school nr of years __________

☐ Upper secondary school nr of years __________

☐ College/University nr of years __________

☐ Post-graduate studies nr of years __________

Place and date Signature:
Digitization & anonymization principles

Swell digitization principles

1. Do not reveal author identity
   * revealing names → replace with NN
   * addresses → replace with NN-street

2. Do not correct errors
   * if several interpretations possible → make positive assumption, i.e. that the learner made no mistake

3. Preserve illegible handwriting
   * each illegible letter → replace with @
   * stricken text → leave out
Laws and regulation
that need to be taken into consideration

- Personal Privacy Act (European-wide)
- Ethical Review Act
- Freedom of writing (government) → public access
- Copyright
Data: essays

Copyright (agreement)

PPA (befogenhets avtal)

Pers.info. liability (PA)

University of Gothenburg

Stockholm university

Umeå university

Uppsala university

PPA, Ethical Review approval + partner agreement

PUL (mission agreement)

Public access principle (info on non-usage)

Database UGOT (Personal data representatives) (PPA, Personuppgiftsbiträdesavtal)
Lesson 2

• Take time to study legal regulations, not to “waste” the previously collected data

  → There are loopholes, but not without information loss
Different worlds?
L2 vs NLP researchers
or do we really work interdisciplinary?

- Terminology (e.g. corpora & annotation vs genre pedagogy & processability theory)
- Example: normalization
Two views

• Teachers
  → want control

• NLP researchers
  → want to automatize
Two views

• Teachers
  → want control
  → keep to fixed practices
  → want 100% correctness
  → sceptic about automatic solutions

• NLP researchers
  → want to automatize
  → want to revolutionize
  → work within reasonable margins
  → enthusiastic about automatic solutions
ARE YOU THE NEW ENGLISH TEACHER?

YES I AM!
Two views

- Teachers
  → want control
  → keep to fixed practices
  → want 100% correctness
  → sceptic about automatic solutions

- NLP researchers
  → want to automatize
  → want to revolutionize
  → work within reasonable margins
  → enthusiastic about automatic solutions
Meeting half-way?

- Educational Testing Service (ETS)
  → from Criterion/e-rater to Language Muse (20 years)
  → http://languagemuse.10clouds.com/

- WERTI/VIEW
  → no automatic pre-selection of exercise text
Lesson 3

- Take time to study what makes L2 researchers & L2 teachers “tick”, and vice versa

- Be ready to compromise → on both sides
Application life cycle
ICALL tools for L2 learning
ICALL tools for L2 learning
ICALL tools for Second language (L2) learning

Target group

Language skill

Data & resources

Tools & algorithms

Evaluation

Prototypes
ICALL tools for L2 learning

Application-development and maintenance versus Prototype-development (and evaluation)
Some add-ons have been disabled

The following add-ons have not been verified for use in Firefox. You can find replacements or ask the developer to get them verified.

Learn more about our efforts to help keep you safe online.

Developers interested in getting their add-ons verified can continue by reading our manual.

- VIEW could not be verified for use in Firefox and has been disabled. More Information
  VIEW (disabled)
  VIEW is an intelligent computer-assisted language learning (ICALL) system designed to provide supplementary lan… More

- WERTi could not be verified for use in Firefox and has been disabled. More Information
  WERTi (disabled)
  WERTi is an intelligent computer-assisted language learning (ICALL) system designed to provide supplementary la… More

Remove
Remove
Lesson 4
more of an insight

- (Most?) ICALL research remains within ICALLers’ “comfortable zone”, i.e. on their desks; at the best goes into a prototype

- Researchers can at most develop prototypes as a “proof-of-concept”, but cannot maintain full-scale applications

- There is a need for a new type of funding, the one that would bring research findings to end-users
Lesson X...

...to be continued

• ...

• ...
We need to

• re-examine our practices

• take these issues to discussion

• make newcomers aware of the pitfalls
We need to
get back to these issues now and then

“The kids don’t listen, so I have to repeat myself. I’m always repeating myself. You know, always saying the same thing more than once. I say it once, and then they make me say it again...”
"The kids don’t listen, so I have to repeat myself. I’m always repeating myself. You know, always saying the same thing more than once. I say it once, and then they make me say it again..."