Basic natural language processing for Swiss German texts

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Long-term contribution

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Funding

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Agreement with Spitch

Specific tasks

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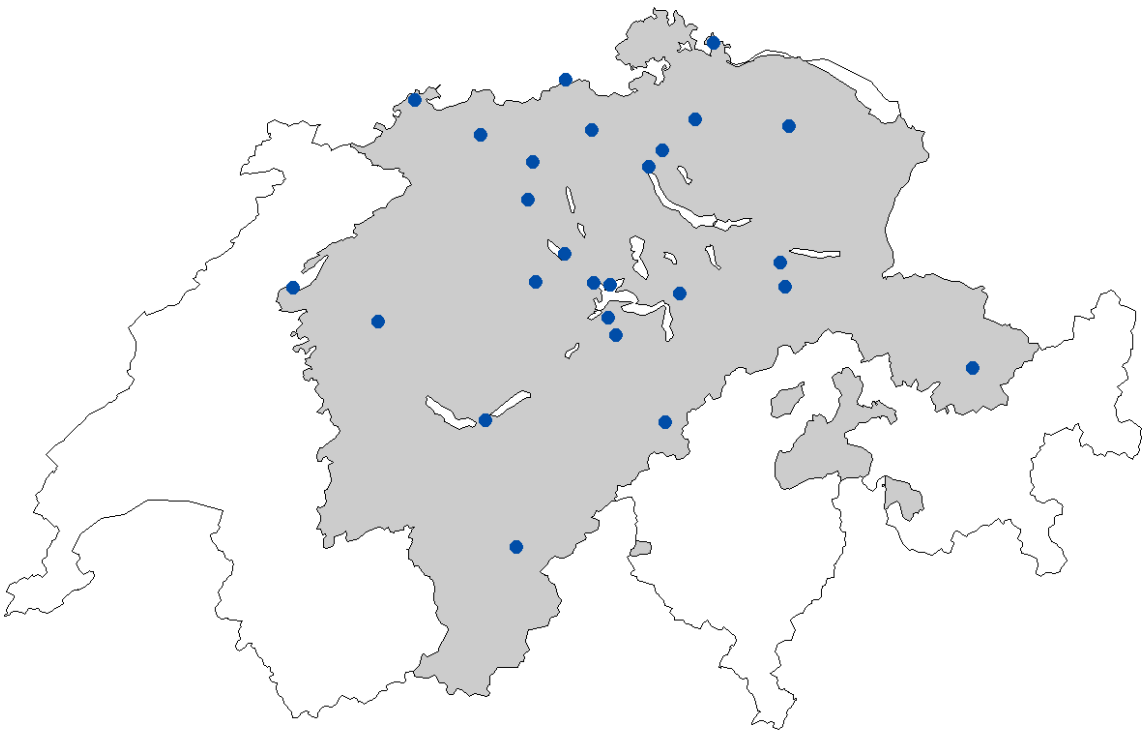
Data

Oral history project ArchiMob

The ArchiMob corpus sample



Some numbers

44 documents selected by Janine Richner-Steiner and Matthias Friedli, supervised by Elvira Glaser

Release 1.0 (2016):

- **34** documents, around **500 000** word tokens
- **23**/**44** documents transcribed in the period 2004–2014
- **11**/**44** documents transcribed in 2015, in collaboration with Spitch

Next release (2017):

- **43** documents, around **650 000** word tokens
- **6**/**44** documents transcribed in 2016
- **3**/**44** in progress

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Format

Current format

```
<u start="media_pointers#d1007-T1604" xml:id="d1007-u951" who="person_db#EJos1007">
  <w normalised="ja" tag="ADV" xml:id="d1007-u951-w1">je</w>
  <w normalised="dann" tag="ART" xml:id="d1007-u951-w2">de</w>
  <w normalised="hat" tag="VAFIN" xml:id="d1007-u951-w3">het</w>
  <w normalised="man" tag="PIS" xml:id="d1007-u951-w4">me</w>
  <w normalised="noch" tag="ADV" xml:id="d1007-u951-w5">no</w>
  <w normalised="gelugt" tag="VVPP" xml:id="d1007-u951-w6">gluegt</w>
  <w normalised="gedacht" tag="VVFIN" xml:id="d1007-u951-w7">tänkt</w>
  <w normalised="das ist" tag="KOUS+" xml:id="d1007-u951-w8">dasch</w>
  <w normalised="jetzt" tag="ADV" xml:id="d1007-u951-w9">ez</w>
  <w normalised="der" tag="ART" xml:id="d1007-u951-w10">de</w>
  <w normalised="general" tag="NN" xml:id="d1007-u951-w11">genneraal</w>
  <w normalised="ja" tag="ITJ" xml:id="d1007-u951-w12">jaa</w>
  <w normalised="das" tag="PDS" xml:id="d1007-u951-w13">das</w>
  <w normalised="ist" tag="VAFIN" xml:id="d1007-u951-w14">isch</w>
  <w normalised="en" tag="PPER" xml:id="d1007-u951-w15">en</w>
  <w normalised="jetzt" tag="ADV" xml:id="d1007-u951-w16">ez</w>
</u>
```

Content

je	ja	ITJ
de	dann	ADV
het	hat	VAFIN
me	man	PIS
no	noch	ADV
gluegt	gelugt	VVPP
tänkt	gedacht	VVPP
dasch	das_ist	PDS+
ez	jetzt	ADV
de	der	ART
genneraal	general	NN

jaa	ja	ITJ
das	das	PDS
ischsch	ist	VAFIN
en	en	PPER
ez	jetzt	ADV

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Transcription

Transcription

je	ja	ITJ
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ez	jetzt	ADV
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genneraal	general	NN
jaa	ja	ITJ
das	das	PDS
ischsch	ist	VAFIN
en	en	PPER
ez	jetzt	ADV

Manual transcription

1. 16 documents - Nisus Writer
   - No segmentation (only turns)
   - No text to speech alignment
   - Converted into XML, added segmentation and alignment

2. 7 documents - FOLKER (Schmidt, 2012)
   - Segmented into chunks of 4-10 seconds
   - XML and alignment output

3. 11 documents - EXMARaLDA (Schmidt, 2012)
   - same as FOLKER, just more convenient

Some details

- Based on Dieth guidelines, but gradually simplified
- Utterance as the basic unit
- Turns not explicitly annotated
- Inconsistence in writing (pronouns and clitics)
- Pauses, repetitions
- Incomprehensible speech

Normalisation

je	ja	ITJ
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tänkt	gedacht	VVPP
dasch	das_ist	PDS+
ez	jetzt	ADV
de	der	ART
genneraal	general	NN
jaa	ja	ITJ
das	das	PDS
ischsch	ist	VAFIN
en	en	PPER
ez	jetzt	ADV

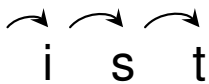
Approach

- Manual normalisation of 6 documents, VARD2 and IGT
- Automatic normalisation
  - Character-level machine translation (CSMT) with MOSES
  - Training on the 6 manually normalised documents

CSMT

Translation model: $p(normalised|transcribed)$

Language model: $p(normalised_i|normalised_{i-1})$



Current state of the art

Yves **Scherrer** and Nikola **Ljubešić** (KONVENS 2016)

- Larger translation units (utterances instead of words)
- Language model augmented with German spoken data
- Improved tuning
- Result: 90.46 % accuracy

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Part-of-speech tagging

Part-of-speech

je	ja	ITJ
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me	man	PIS
no	noch	ADV
gluegt	gelugt	VVPP
tänkt	gedacht	VVPP
dasch	das_ist	PDS+
ez	jetzt	ADV
de	der	ART
genneraal	general	NN
jaa	ja	ITJ
das	das	PDS
ischsch	ist	VAFIN
en	en	PPER
ez	jetzt	ADV

Tagger development

STTS+ tag set

	Train	Test	% Acc.	% OOV
Starting	TüBa-D/S	Normalised	70.31	24.21
	NOAH	Original	60.56	30.72
Removed punctuation	TüBa-D/S	Normalised	70.68	24.21
	NOAH	Original	73.09	30.72
Adapted	NOAH + ArchiMob	Original	**90.09**	–

Current activities

Tagger adaptation:

- Active learning: gradually add ArchiMob data in the train set
- CRF tagger

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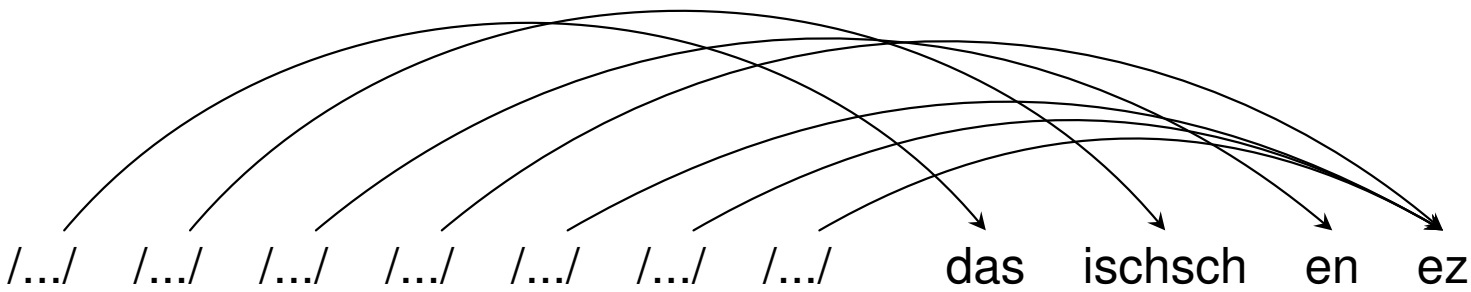
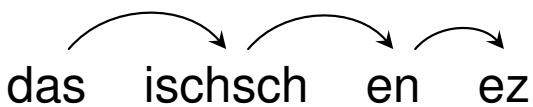
Speech-to-text

Speech-to-text

Acoustic model: $p(\textit{transcribed}|\textit{sound})$



Language model: $p(\textit{transcribed}_i|\textit{transcribed}_{i-1})$



Approach

- Improving Spitch prototype with new language models
- Our own speech-to-text development with Kaldi
- Manual transcription

Next steps

Next steps

- Continue transcription, PoS tagging, normalisation
- Neural transducers (deep learning) for normalisation
- Subword language models for speech-to-text
- New data

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Your feedback!