

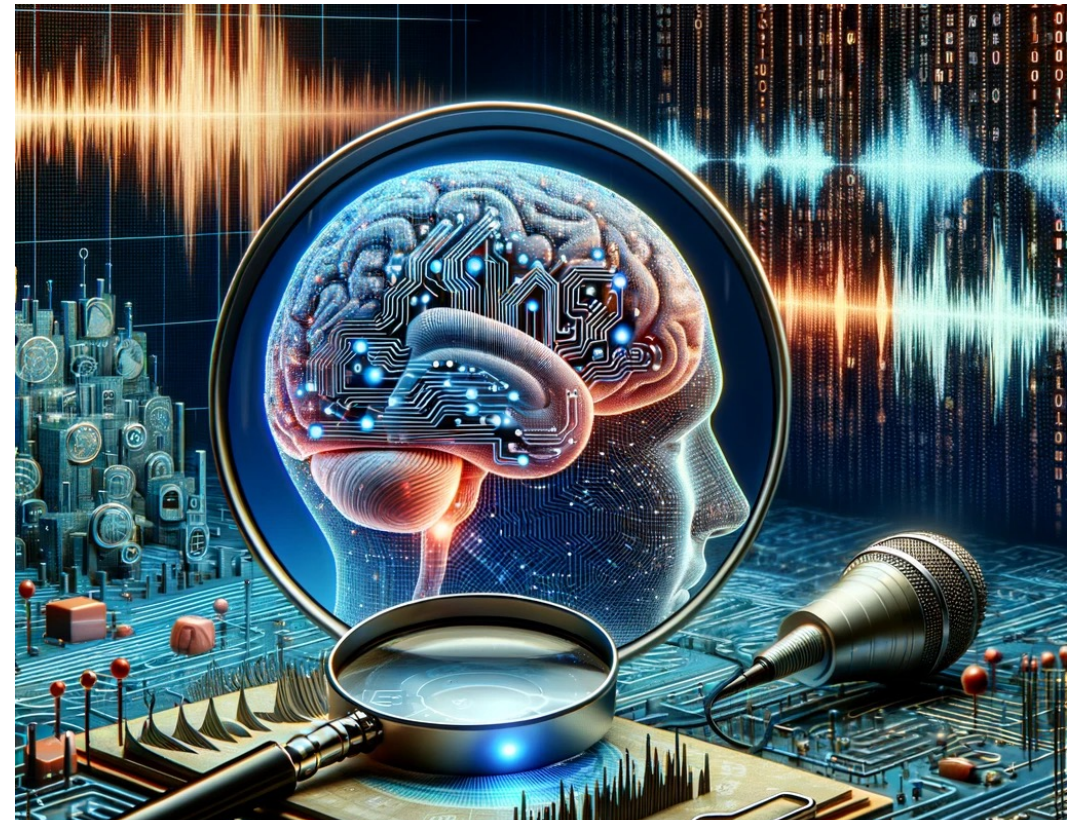


University of  
Zurich<sup>UZH</sup>

Department of Computational Linguistics

# BA/MA projects at the Department of CL

Jeannette Roth  
Daniel Friedrichs





## BA Thesis (Study regulations § 25 - § 28)

- ❖ **Credits:** 15 ECTS, compulsory, graded
- ❖ **Duration:** 1 semester
- ❖ **Submission Deadlines:** June 1 (spring semester) / December 1 (fall semester)
- ❖ **Thesis:** Individual, no co-authorship
- ❖ **Supervisor Qualifications:** Master's degree or higher
- ❖ **Booking:** Via Student Portal in the standard booking period

## MA Thesis (Study regulations § 33 - § 35)

- ❖ **Credits:** 30 ECTS, compulsory, graded
- ❖ **Duration:** 2 semesters
- ❖ **Submission Deadlines:** June 1 (spring semester) / December 1 (fall semester)
- ❖ **Thesis:** Individual, no co-authorship
- ❖ **Supervisor Qualifications:** Must hold a PhD
- ❖ **Booking:** Via Student Portal in the standard booking period



# Process and Organisation

## Before booking

In the semester before your thesis

Think about a topic idea or a field you're interested in

Check on the website which researchers at the Department work on these topics

Contact your future supervisor with your idea

OR VISIT INFO EVENT



Agree on a topic

## Booking

Fill the form "Topic\_Sheet\_Final\_Thesis.pdf" and upload the signed form to Seafire

Book the module (Bachelor's or Master's Thesis)

Fill in the form that the Office of Student Affairs will send you by email with your provisional title. You will receive this email about one week after the end of the booking period.

Work on your Thesis

## Submitting

Deadline to submit:  
1st of June (Spring Semester)  
or 1st of December (Fall Semester)

Fill in the form that the Office of Student Affairs will send you by email with your definitive title. You will receive this email about one week after the submission date. In case of a Master's thesis: upload the thesis via the provided link.

Wait for grade

## Result

If you submitted in time and if your supervisor gives you a passing grade (i.e. 4 or more), your thesis is accepted.

Congratulations!



## You can find more information via these links:

Faculty of Arts and Social Sciences:

<https://www.phil.uzh.ch/en/studies/studyessentials/graduation.html>

[https://www.phil.uzh.ch/dam/jcr:092773b8-9a44-44a4-a666-c81c6c8f8aa1/STO\\_Allgemeiner\\_Teil\\_EN.pdf](https://www.phil.uzh.ch/dam/jcr:092773b8-9a44-44a4-a666-c81c6c8f8aa1/STO_Allgemeiner_Teil_EN.pdf) (study regulations)

Computational Linguistics:

<https://www.cl.uzh.ch/en/studies/studies-BA-MA/teaching/bachelor-thesis.html>

<https://www.cl.uzh.ch/en/studies/studies-BA-MA/teaching/master-thesis.html>





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**Today: 28 projects**



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**Daniel Friedrichs**

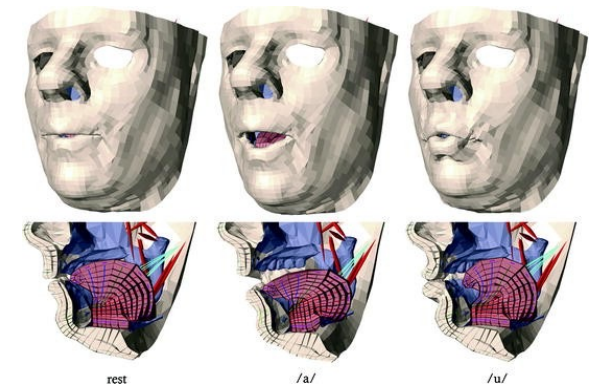
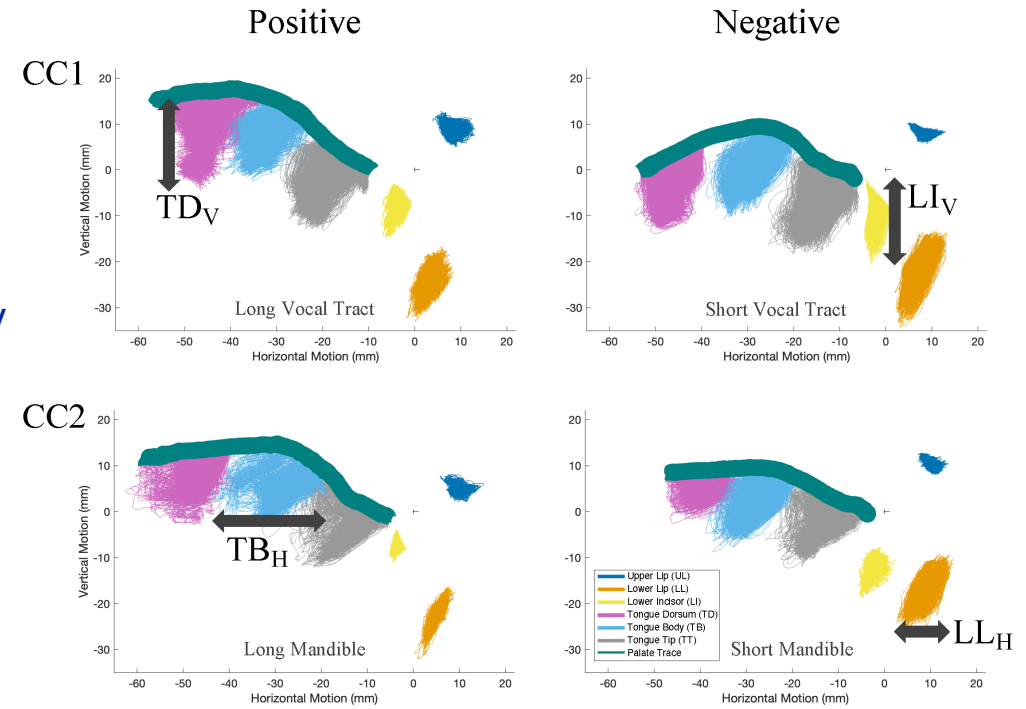


### A few ideas:

**Kinetic Task Analysis:** Explore differences in diadochokinetic tasks, such as Alternating Motion Rates (AMR) and Sequential Motion Rates (SMR). Use data from Electromagnetic Articulography (EMA) to understand better why SMR are quicker.

**Articulatory Synthesis and Biomechanical Modeling:** Create 3D models of articulatory movement using EMA data. Develop simulations (e.g., a dynamic tongue model) using the modeling toolkit/platform ArtiSynth.

**Biological and Environmental Effects on Language:** Investigate how biological (anatomical) variation and climatic conditions influence human sound systems. Assess the extent to which these factors contribute to the diversity of language.



Contact:

✉ [daniel.friedrichs@uzh.ch](mailto:daniel.friedrichs@uzh.ch) , [bambooforest@gmail.com](mailto:bambooforest@gmail.com)



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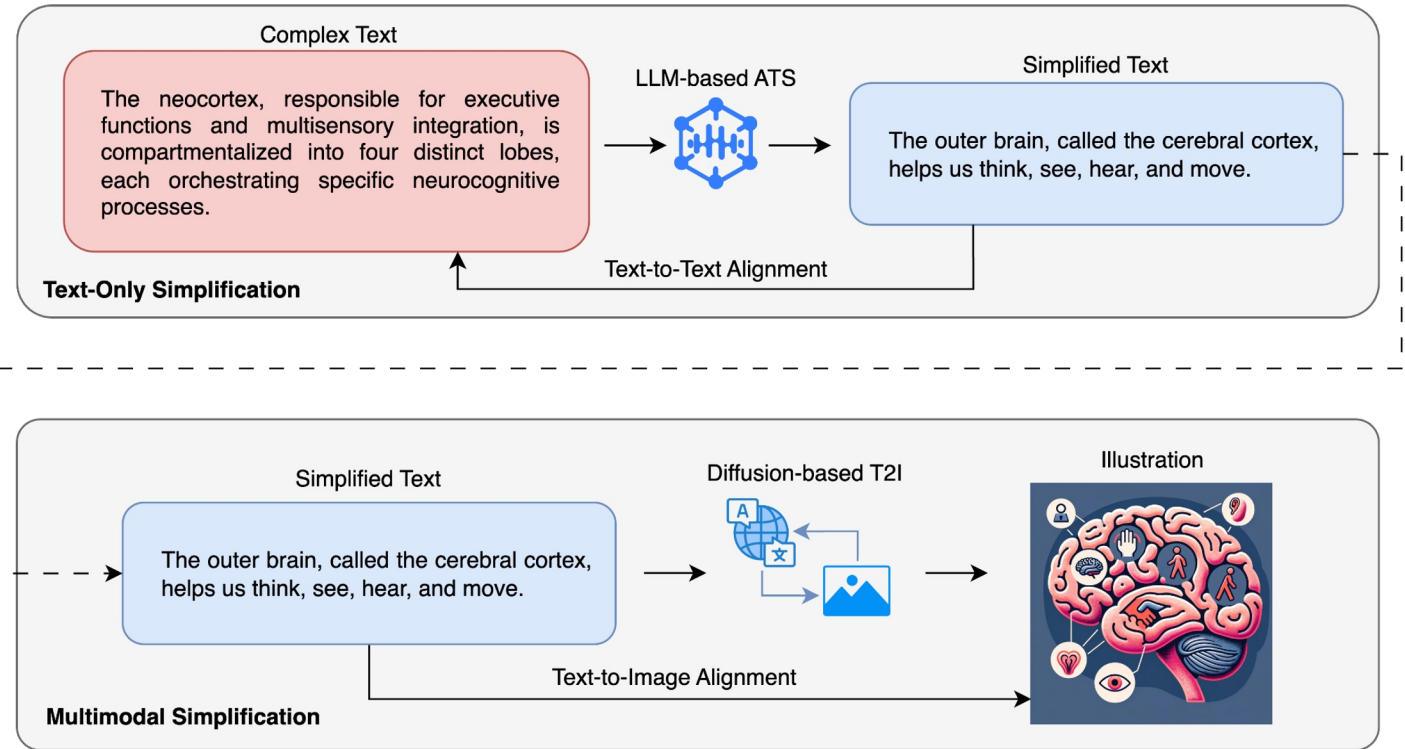
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**Sarah Ebling**

# Increasing Information Accessibility through Image-to-text Alignments with LLMs and Diffusion Models

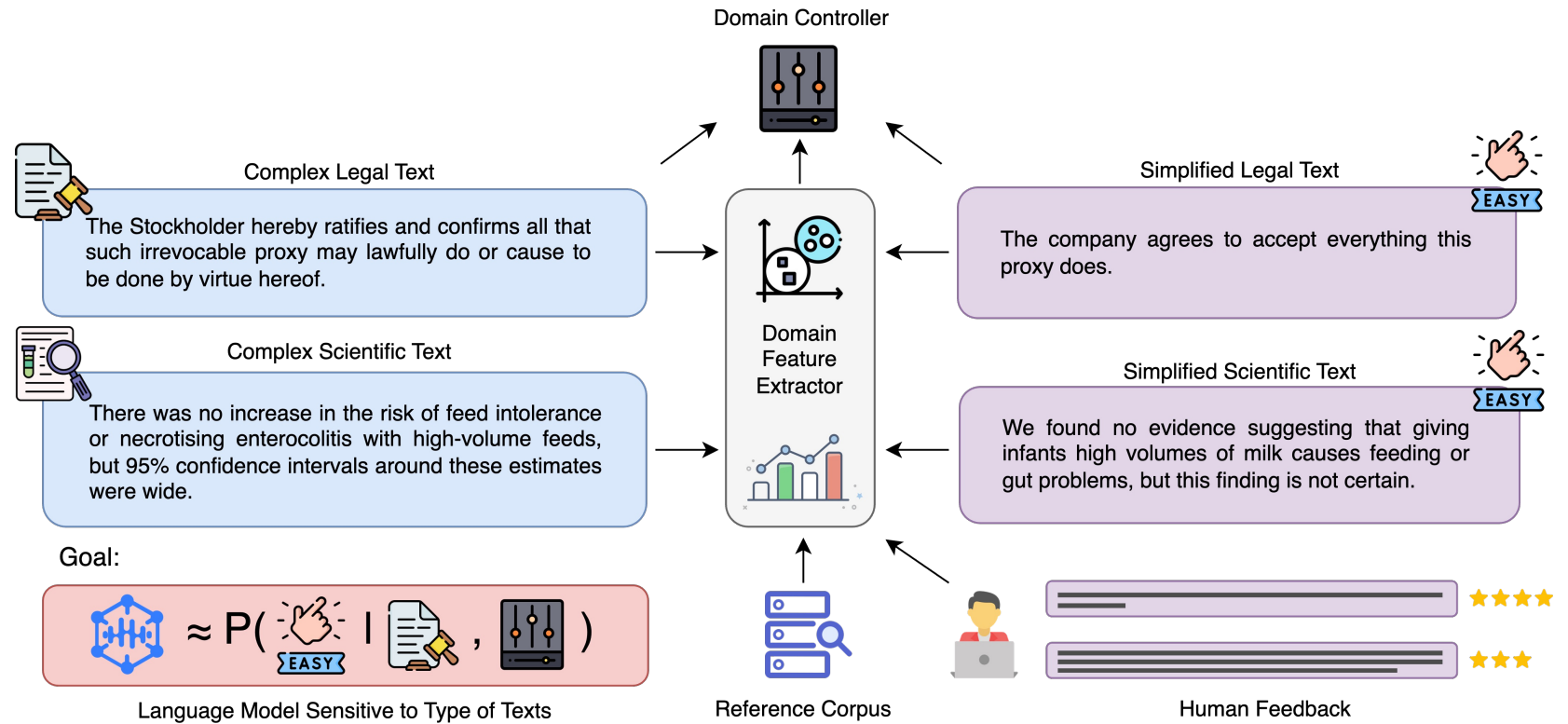
- Explore the integration of Large Language Models (LLMs) and diffusion models to transform complex, difficult-to-read text into more accessible visual formats.
- Improve the information accessibility for individuals with cognitive disabilities, a group of people often overlooked in technological advancements.
- Leverage the capabilities of generative models to achieve multimodal image-to-text alignments, enhancing the understandability of simplified texts.





# Text Type-Sensitive Controllable Text Simplification

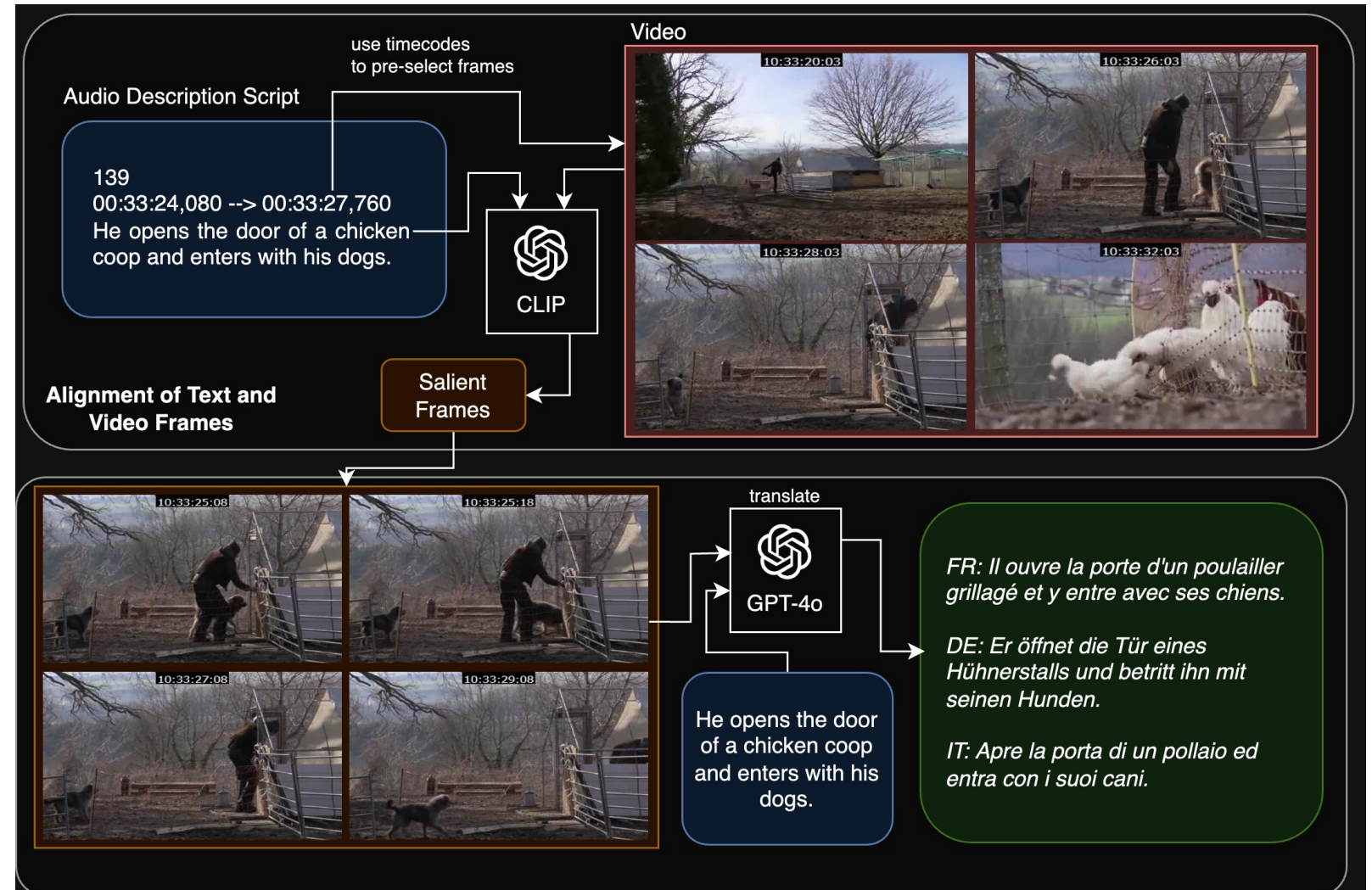
- Develop a controllable text simplification model tailored to diverse text types such as legal and scientific text.
- Create a model that not only simplifies text across multiple types but also preserves the distinctive textual features and complexities of each type.
- Refine the effectiveness and applicability of text simplification techniques, making them more versatile and domain-sensitive.



# Multimodal Alignment for Audio Descriptions

- Develop a method for aligning video frames with their corresponding (textual) audio descriptions (ADs)
- Possible strategy: use CLIP to project text and video frames into joint representation space and perform nearest neighbor search.
- Test the effectiveness of the alignment approach on multimodal translation.

contact: [fischerl@cl.uzh.ch](mailto:fischerl@cl.uzh.ch)



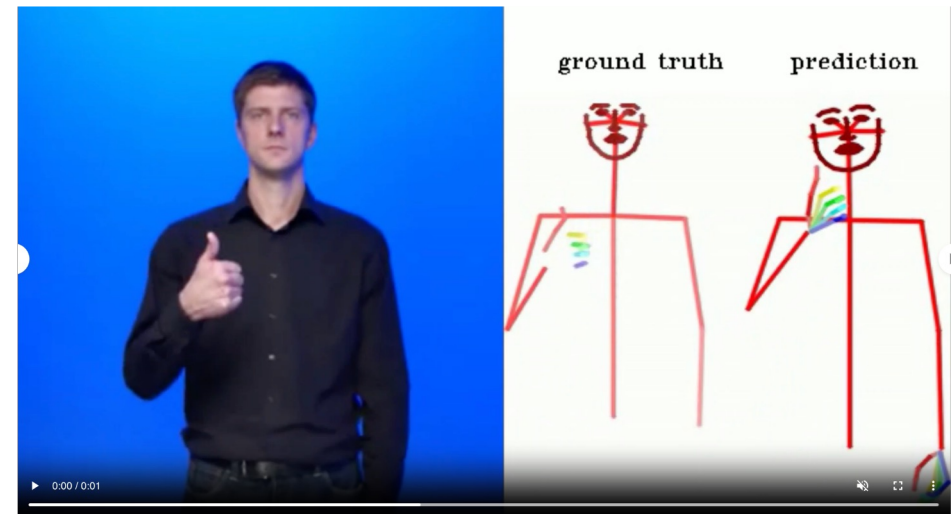
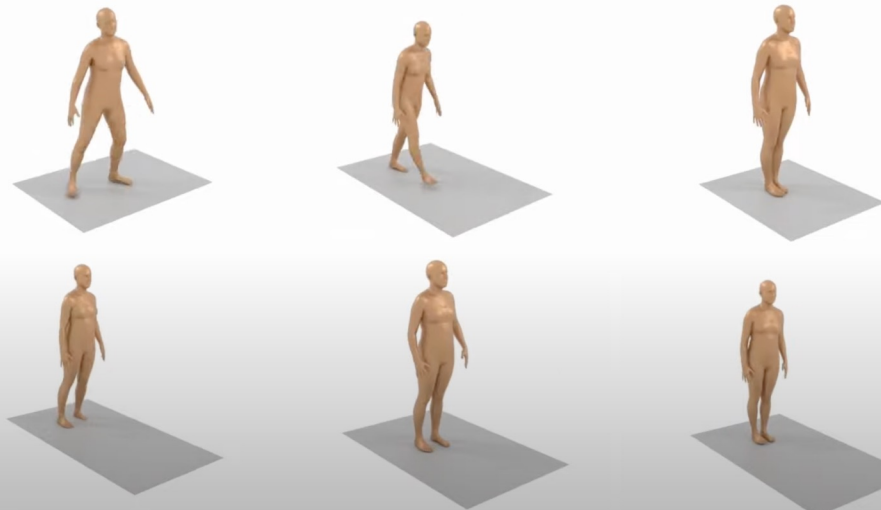
# Sign Language Motion Diffusion using SignWriting & HamNoSys

Motion diffusion models have been [shown to work well](#) for sign language animation from a phonetic representation. This project requires to pre-train a diffusion model on a large, un-annotated sign language dataset, then finetune it to allow for control from SignWriting/HamNoSys (and possibly text). An extension would be to consider how to seamlessly transition between multiple signs.

## Human Motion – a Many-to-many Problem

### Diversity

“A person kicks”

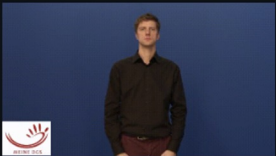
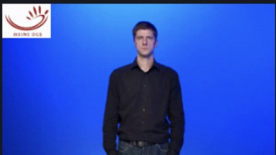
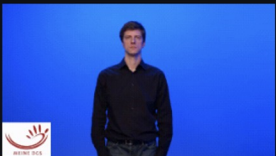



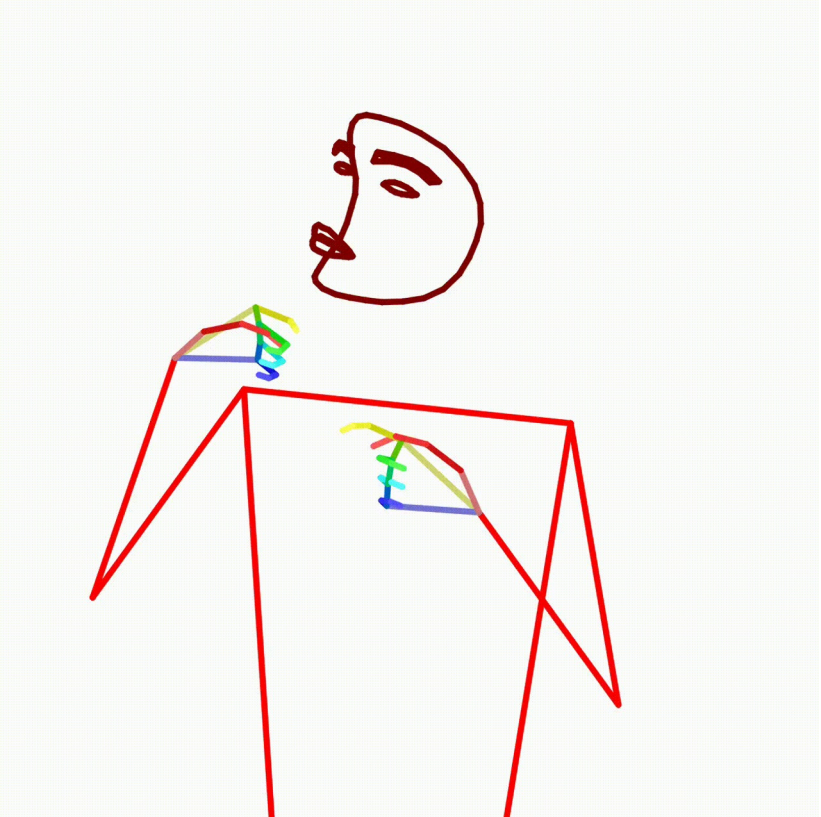


# Sign Language Post-editing

contact: amit.moryossef@uzh.ch

As sign language machine translation starts becoming more viable, there's a growing need for post-editing tools, allowing to edit the translation. This project will focus on the backend of such a tool. For more details, see <https://github.com/sign-language-processing/fluent-pose-synthesis>

Gloss	HamNoSys	Video
DIFFERENT1^	" d r o x [ + > Δ o ]	
IMAGINATION1A^	ʒ r e n ) ( e +	
LIKE3B*	[ d i r e r d i r e ] 1 \ \ 0 ( ʒ \ \ ) ʒ x +	
EASY1	[ 0 \ ʒ r e r 0 ʒ o ] \ ʒ x +	



# Sign Language Synthetic Translation with SSML

When generating synthetic sign language translations using dictionaries, we use spoken language text as input. Similar to speech synthesis, this representation is often not enough, and more control is needed. This project will involve solving [several small issues](#) in a larger framework, and introducing [Speech Synthesis Markup Language \(SSML\)](#) support.

```
<speak>
  Here are <say-as interpret-as="characters">SSML</say-as> samples.
  I can pause <break time="3s"/>.
  I can play a sound
  <audio src="https://www.example.com/MY_MP3_FILE.mp3">didn't get your MP3 audio file</audio>.
  I can speak in cardinals. Your number is <say-as interpret-as="cardinal">10</say-as>.
  Or I can speak in ordinals. You are <say-as interpret-as="ordinal">10</say-as> in line.
  Or I can even speak in digits. The digits for ten are <say-as interpret-as="characters">10</say-as>.
  I can also substitute phrases, like the <sub alias="World Wide Web Consortium">W3C</sub>.
  Finally, I can speak a paragraph with two sentences.
  <p><s>This is sentence one.</s><s>This is sentence two.</s></p>
</speak>
```



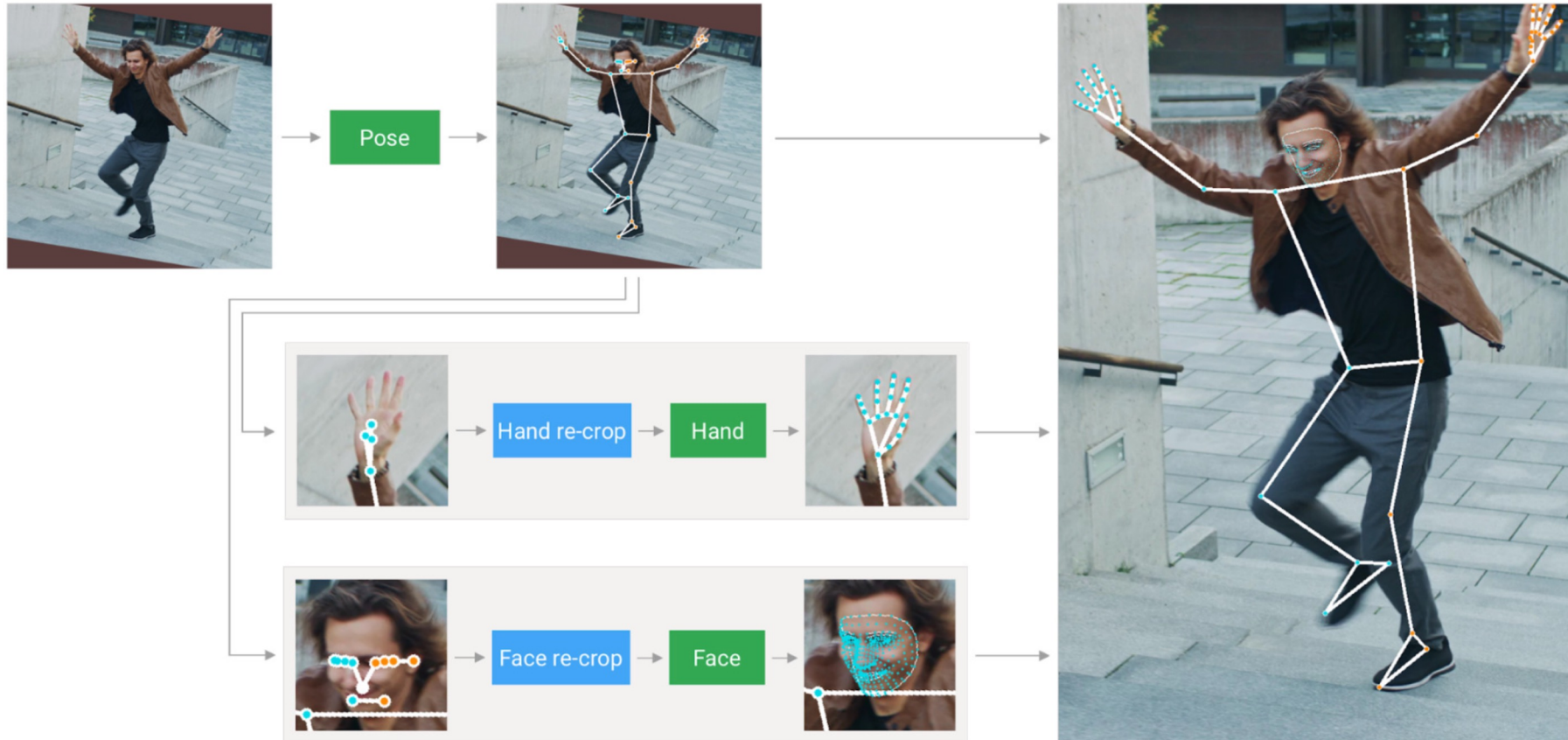
# Sign Language in a Mixed-reality Setting

This project has prerequisites. It involves mapping sign language translation from poses to a 3D model, and placing the model in the space around the signer. It will integrate with an existing application (<https://github.com/sign/translate>) to support the Apple Vision Pro.



# Fixing Pose Estimation for Sign Language

This project aims to fix bugs and adjust the MediaPipe framework for better sign language use.





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**Sina Ahmadi**



# Gamification for dialect data collection

## Background

- NLP for low-resourced languages, dialects and varieties
- Data Paucity: Limited availability of dialectal data.

## Project Aims

- Gamify data collection and annotation
- Engage users to provide text in their native dialect.
- Encourage users to correct potentially incorrect suggestions.
- Allow users to add more content.

## Requirements

- Creativity: Students can be innovative in designing the game.
- Familiar with web development, handling database and gathering feedback



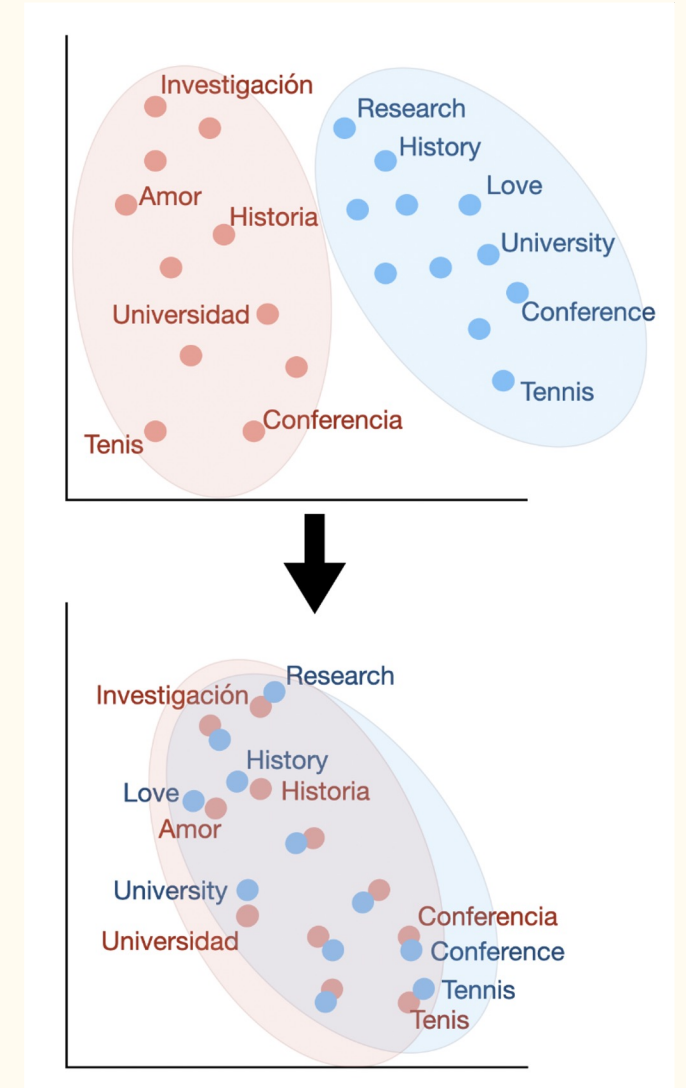
# BLI and Morphosyntactic Tagging for dialects

## Background

- NLP for low-resourced languages, dialects and varieties
- Dictionaries are essential resources in many applications
- Dialects lack such resources

## Project Aim

- Focus on bilingual lexicon induction (BLI) for **dialects**
- **Joint prediction of translations and morphosyntactic tags**
- Analyze the performance of the existing methods for dialects
- Propose new approaches with minimal/no supervision





# Diacritization of world languages

## Background

- Diacritization: The task of adding diacritics to graphemes in a given script.
- High-Resourced Languages: Have tools and resources for diacritization.
- Global Gap: No universal benchmark, resource, or tool for diacritization across all world languages.

## Project Aims

- Establish standards for evaluating diacritization tools.
- Gather data and resources for various scripts.
- Build adaptable tools for diacritization across multiple languages.

Latvian:

(a) Vins tiecas klut par arābu pasaules austrumu daļas neoficiālo līderi...

(b) *Viņš tiecās kļūt par arābu pasaules austrumu daļas neoficiālo līderi...*

‘He aspired to become the unofficial leader of the eastern part of the Arabic world...’

Vietnamese:

(a) Amphetamin được sử dụng để điều trị rối loạn tăng động giảm chú ý...

(b) *Amphetamin được sử dụng để điều trị rối loạn tăng động giảm chú ý...*

‘Amphetamine is used to treat attention deficit hyperactivity disorder...’

## Machine Translation for Loanwords: Annotators Wanted!

I am sure you have been corrected by someone for using a foreign word in a sentence instead of a native one? Words like “ghosting”, “simp”, “computer” etc. Many languages try to replace such words by native words or coin new ones for them. We wonder how **language purism** affects machine translation and language models. That’s why we need you to replace loanwords with native ones in one of the following languages:

Famous→Nameknown  
Dictionary→Wordbook  
Brilliant→Bright  
Fascinating→Bewitching  
Ability→Skill  
Native→Inborn

- Greek, Hungarian, Icelandic, Romanian, Turkish, Persian, Armenian, Hindi / Urdu
- Do you speak any other language? We are interested in including it!

### Details:

- **Duration:** 15 hours per language
- **Compensation:** 30 Francs per hour

### Who Can Participate:

- Native speakers or individuals fluent in any of the target languages.
- Those with a keen interest in language and translation.
- No prior annotation experience required; we will provide guidelines and support.

### Why Participate:

- Contribute to advancing machine translation technology.
- Gain experience in annotation and NLP while being paid

**How to Join:** If you are interested in participating, please reach out to us at [sina.ahmadi@uzh.ch](mailto:sina.ahmadi@uzh.ch). We look forward to collaborating with you to create a valuable linguistic resource.



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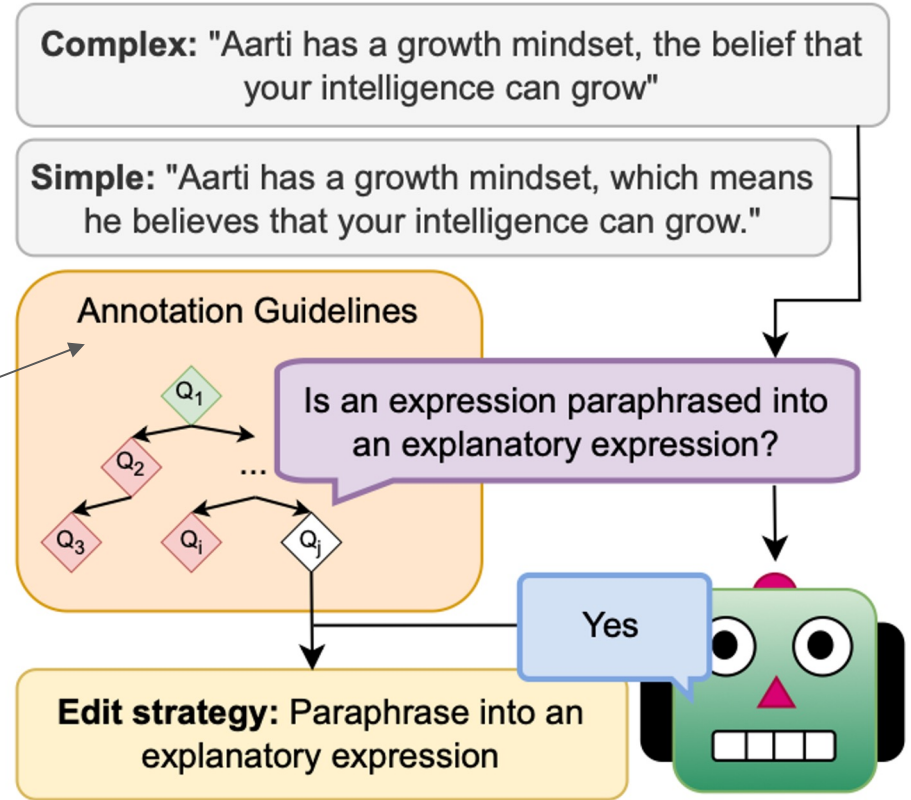
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**Tannon Kew**

# Automating Analytical Evaluation for Text Simplification with LLMs

[Yamaguchi et al. \(2023\)](#)





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**Srikanth Madikeri**



# Programming projects in speech & language technology

1. Automatic Speech Recognition: convert speech to text
  - 1.1. **Inverse text normalization for speech recognition**
    - 1.1.1. E.g. Let us meet at twelve o clock → Let us meet at *12'o clock*
    - 1.1.2. Work on a limited resource language
  - 1.2. **Prompted Whisper for downstream tasks**
    - 1.2.1. To what extent does prompting work with Whisper? How can we use it for other tasks (e.g. intent recognition)
  - 1.3. **Evaluate Streaming ASR solutions**
    - 1.3.1. Open-source “loss-less” streaming solutions seem to be practically non-existent
    - 1.3.2. Evaluate what is available at the moment, what exactly can be achieved with open-source
  - 1.4. **Integrate ML toolkits with Icefall:** Programming project
  - 1.5. Other possibilities: build a ASR for a low-resource language, understand internal language model
2. Other topics of interest:
  - 2.1. **Speaker recognition:** identify who is speaking in an audio
  - 2.2. **Speaker diarization:** identify who is speaking where in a multi-speaker audio (e.g. meetings)
  - 2.3. **Language identification:** identify the language of speech in the audio



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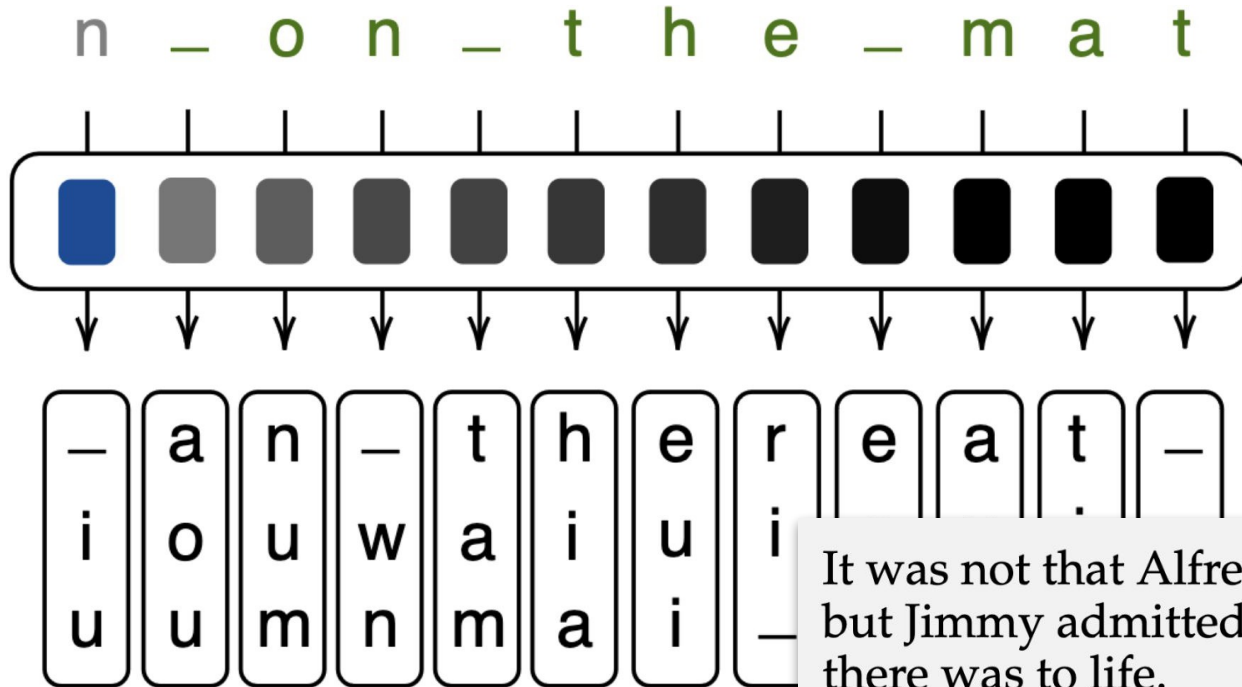
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**Jannis Vamvas**

# Byte-Level Text Generation

Jannis Vamvas  
[vamvas@cl.uzh.ch](mailto:vamvas@cl.uzh.ch)



It was not that Alfred really considered his friend an ideal husband, but Jimmy admitted that it looked differently. And, too, it was all there was to life.

And on went Alfred, through long years of honest comradeship and unblushing promises and bubbling kindness. In his heart he had long since forgotten Jimmy and his friendship, since he realized the superiority of Jimmy's ideal, if of any one's.

It was to be expected that Prince William would fall a victim. Perhaps he was a modified betting man, and then had thrown over Nature and his

# Massively Multi-Source Machine Translation

Jannis Vamvas  
[vamvas@cl.uzh.ch](mailto:vamvas@cl.uzh.ch)

**The quick brown fox jumps over the lazy dog.**

*Der schnelle braune Fuchs springt  
über den faulen Hund.*

The swift auburn fox leaps across the sluggish canine.  
The fast tawny vulpine bounds past the sleepy pooch.  
The rapid chestnut vixen vaults over the idle hound.  
The brisk russet critter springs across the drowsy mutt.  
The nimble sable reynard hops over the lethargic mongrel.

???

# Programming Project:

## Adding the Prism Translation Model to Hugging Face Transformers

Jannis Vamvas  
[vamvas@cl.uzh.ch](mailto:vamvas@cl.uzh.ch)

# huggingface/ transformers



 Transformers: State-of-the-art Machine Learning for Pytorch, TensorFlow, and JAX.

 3k  
Contributors

 168k  
Used by

 126k  
Stars

 25k  
Forks





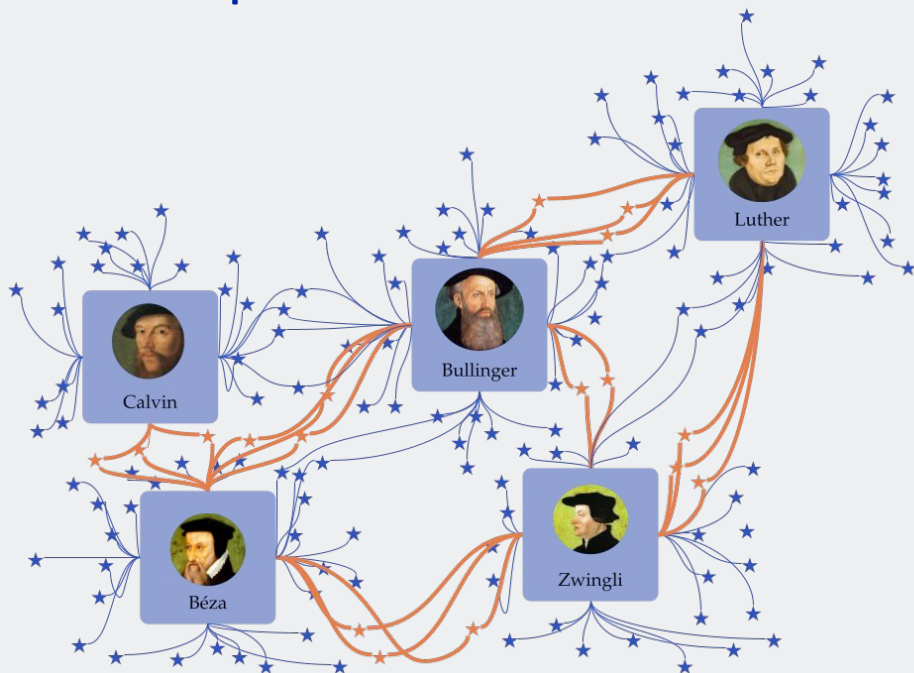
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**Phillip Ströbel**

# The Spread of Ideas during the Reformation in 16th Century Correspondence



- Given a correspondence network
  - identify “ideas”
  - find out how they spread through the network over time
- Techniques used:
  - “traditional” approaches (lexical semantic indexing, word embeddings, topic modeling)
  - Large language models
  - Network analysis
- **Contact:** Phillip B. Ströbel, [phillip.stroebel@uzh.ch](mailto:phillip.stroebel@uzh.ch)

# Text Tiling, Tile Assignment and Evaluation

- Paragraph and Sentence Alignment of German Summaries to Letters in Latin and Early New High German via Machine Translation
  - on the Bullinger letter corpus
- Method:
  - NMT or LLM-based MT from Latin or ENH-German  German
  - Paragraph Alignment of the manual German summaries to the MT output (via length, anchor words and digits)
  - Alternative: LLM-based paragraph alignment
- Supervisors: Martin Volk and Phillip B. Ströbel

## Regest

Myconius erhielt am 17. Juli zwei Briefe von Bullinger [nicht erhalten]; der zuletzt geschriebene wurde morgens von [Ulrich] Hugwald überbracht, der zuerst geschriebene abends von [John] Burcher. Die [handschriftlichen] Aufzeichnungen [des Vortrags, den die Gesandtschaft] von Papst [Paul III.] [auf der Badener Tagsatzung hielt, haben Myconius sehr geärgert. Auch der an die eidgenössischen Bischöfe und Äbte gerichtete Brief des Papstes bezeugt dessen Skrupellosigkeit!

- Es heißt, dass der Rückruf der [eidgenössischen] Söldner [aus deutschen Diensten] beschlossen wurde. Wenn diese nur nicht gehorchen würden, zumal sie einen guten Grund haben! Sollten die Städte [des Schmalkaldischen Bundes] mit den Eidgenossen gerechnet haben, werden sie enträuscht sein. Vielleicht aber halten sie sowieso nichts von den Eidgenossen, genauso wie die Kaiserlichen. Diese spotten nämlich über die in die Picardie gezogenen und dort verstorbenen Schweizer: Letztere hätten viele Kühe zu Witwen gemacht! Beim Trinken scherzen die [Deutschen], auf wieviele Schweizer sie es brächen. In der Region Freiburg [i. Br.] ist es besonders schlimm. Dabei ahmen sie ihren Fürsten [Kaiser Karl V.] nach. Sollte dieser [über die Schmalkaldener] siegen, kann man sich vorstellen, was für Folgen der Hass gegen die Eidgenossen für Letztere hätte. Selbst der Kaiser könnte nichts dagegen unternehmen, aber das will er natürlich auch nicht.

- Myconius bat Heinrich Lüthi brieflich mit seinen Amtskollegen und der Gemeinde [Winterthur], für die Eintracht unter den Eidgenossen zu beten. Ohne sie ist es um die [Eidgenossenschaft] geschehen!

## Transkription Übersetzen Sprachen markieren

S. Accipi tuas omnes<sup>1</sup> 17. iulii. posterius scriptas mane ab Hugwaldo<sup>2</sup>, vesperi scriptas prius a Burchero<sup>3</sup>. Summarium pape<sup>4</sup> crudeliter me divexavit. Audent homines desperatissimi nomen domini, dei nostri, quem obpugnant, in os sumere. Valeant ac pereant! Epistola ad episcopos et abbates,<sup>5</sup> quos<sup>6</sup> ecclesiam nominat Helveticam, ut est secuta et imperiosa (tanquam non sit scrupulus in corde bestie, qui ipsum vel tantillum maceret, et credo ego facillime conscientiam lepra mortuam esse)<sup>4</sup>, non ergo mirum eum sic scribere, sic agere.

De revocandis militibus audio decretum esse<sup>7</sup>. Utinam dominus immittat animos, ut nemo obtemperet! Causam habent bonam, honestam, divinam, contra quam mandantibus non est, meo videre, obsecrandum. Si quid spei concepissent de nobis civitates<sup>8</sup>, revocatio casura esset non felicitur, nisi forte sint, qui si animos gerunt contra Helvetiam, ut omnes gerunt cęsariani.

Illudunt nos, contemnunt, execrantur, verbis et cantionibus turpissimis contaminant. Aiunt: „Die Schweizer sind in Picardei zogen. Si hand vil großer küusgogen<sup>9</sup>. Demnach sind sy da imen<sup>10</sup> gestorben. Ist menge kü zur wittwen worden.“ Inter pocula more suo et hodie faciunt: „Ich bring dir uff einen, zwen, dry Schweizer. Wie wilt dem ersten thün? Wie dem andren? Wie dem dritten?“ etc. Summa: Contumeliarum eiusmodi non est finis. Circa Friburgum<sup>11</sup> hæc sunt frequentissima, et illorum principi<sup>12</sup> nostri gerunt morem! Si victoria ad istum inclinarit (quod dominus avertat), quid putamus ex tam immani contra nos sequaturum odio? Nec ipse, si vellet, prohibebit - sed non volet animus insolens, impius ac ambitiosus. Scripsi ad M. Heinrichum Lüti<sup>13</sup> obiter, ut fratres et ecclesiam hortetur ad preces pro concordia Helvetiorum in hac causa. Illam enim si obtinuerimus a domino, non est, ut timeam. Si non, vereor actum esse de nobis.



# Illustrating a 16th Century Correspondence Corpus

- Based on the summaries of the letters:
  - Illustrate the letter content with an image generation model
  - Evaluate the output
  - Make it “learn” about the 16th century to produce more faithful images
- **Contact:** Phillip B. Ströbel, [phillip.stroebel@uzh.ch](mailto:phillip.stroebel@uzh.ch)

## Regest 📄

[1] Es stimmt, Bullinger hat lange geschwiegen. Doch Myconius möge ihm dies nicht übelnehmen. Denn angesichts so vieler unterschiedlicher Gerüchte aus Briefen von sonst vertrauenswürdigen Personen schreibt man lieber gar nichts! [2] Es heißt, Kaiser Karl V. werde den Krieg von Deutschland in die Eidgenossenschaft verlagern. Das scheint plausibel! Käme es nicht dazu, dann wohl nur deshalb, weil ihm eine passende Gelegenheit dazu gefehlt haben wird, was wiederum als eine von Gott verliehene zusätzliche Gelegenheit, Buße zu tun, zu deuten wäre. Angeblich schmiedet der Kaiser auch Pläne zur Belagerung und Unterwerfung von Konstanz. Nun aber ist in „Belgien“ [richtig: Norddeutschland] etwas völlig Unerwartetes passiert, wesswegen der Kaiser seine Pläne ändern könnte. [3] In „Belgien“ [Norddeutschland] wurde nämlich die „belgische“ [niederländische] Legion des Kaisers besiegt! Zunächst vernichteten die Hansestädte in der Nähe von Bremen das Heer von Herzog Erich von Braunschweig-Calenberg, dem Neffen [richtig: Cousin] des gefangenen Herzogs Heinrich von Braunschweig-Wolfenbüttel. Nach dem Zusammenschluss der Streikräfte der sächsischen Städte mit dem Rest des kurfürstlichen Heeres und den Truppen der Hansestädte bezwang dieses vereinigte Heer das restliche kaiserliche Heer, welches unter der Führung von Martin von Rossem bis jetzt Bremen belagert hatte, und schlug es in die Flucht. Der sächsische Oberst Wilhelm von Thumshirn fing die 1500 Kavalleristen und 16 Fähnlein Fußsoldaten ab, die der Kaiser den Belagern von Bremen schickte, und tötete sie fast alle. Als der Kaiser davon erfuhr, gab er die Belagerung Magdeburgs auf (die er nach seinem Abgang aus Wittenberg unternommen hatte) und zog nach Halle, weil alle Truppenteile der [Protestanten] nach Magdeburg streben. Vielleicht werden diese nun den von seinem Bruder König Ferdinand (der nach Böhmen eilen musste) allein gelassenen Kaiser bis nach Halle verfolgen. All dies gilt als verbürgt. [4] Ganz Neapel soll in Waffen stehen und sich gegen Pedro Álvarez de Toledo, den Vizekönig des Kaisers, auflehnen, weil er dort die spanische Inquisition einführen wollte. [5] Also ist die Sache [der Protestanten] noch keineswegs verloren, denn Gott schickt unverhoffte Hilfe! Nun muss man alle zu Buße und Glauben ermahnen. Serzen die Gottesen ihr sündiges Leben fuer, dann erwarer sie Gottes Srafel! Aber





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**Thank you!**

**PS There are more...**



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**Axel G. Ekström**

# Limitations on chimpanzee speech?

Supervisor: Axel G. Ekström

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## Background

Vocal tract configurations corresponding to a range of speech sounds are well known from phonetics.

The primate vocal tract possesses different degrees of freedom, meaning some sounds would have to be produced differently, or would be unavailable.

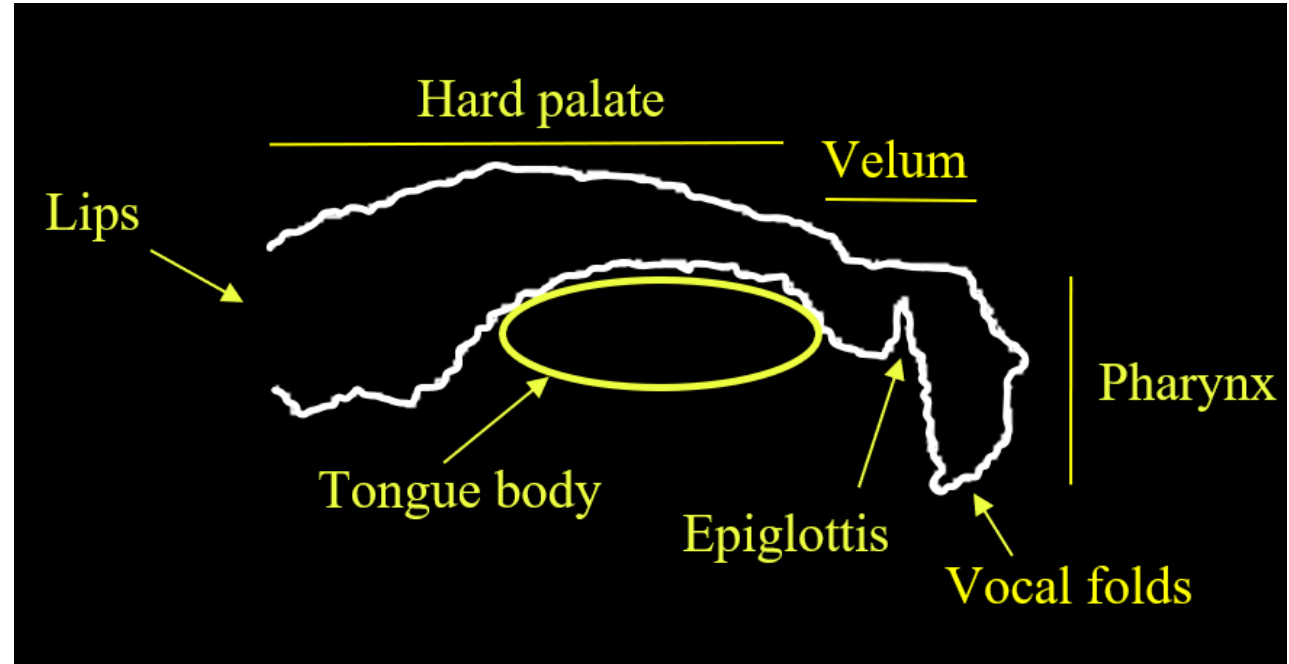
## Project description

Explore an articulatory model designed after a chimpanzee VT, with human configurations as goals.

Exact goals are flexible (focus on fricatives, coarticulation, etc.)

Implications for the evolution of the human vocal tract.

Chimpanzee vocal tract



## Requirements:

- Experience with Python/MATLAB
- Articulatory phonetics



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**Sandra Schwab & Jean-Philippe Goldman (UniGE)**

## Automatic prominence detection in L2

### Framework

- Computer-assisted pronunciation teaching (**CAPT**)
- Focus on L2 **stress contrasts**: e.g. import vs. import
- **Automatic prominence detection in speech signal**

### Two goals

- **Train** system to develop **L1 German/Italian stress detector**
- **Assess and adapt the L1 system to L2 German/Italian** to be implemented in **Miaparle** ([miaparle.unige.ch](http://miaparle.unige.ch))

**Requirement:** Strong background in **Machine Learning**

**Co-supervision:** Sandra Schwab (UZH) & Jean-Philippe Goldman (UniGe)