

Sentiment and Hate Speech Detection for African Languages : Ethiopia as a Use-case

• • •

Seid Muhie Yimam
House of Computing and Data Science (HCDS)
Universität Hamburg, Germany

AfricaNLP 2023 Workshop
(Collocated with ICLR 2023, 5th May 2023)

Disclaimer: Slides adapted from sources such as
EthioNLP, AfriSenti, AfriHate, ...

outline

- Low-resource-ness

- Pre-processing
- Tasks
- Challenges
- Wayout



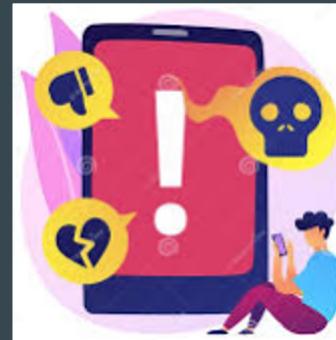
- Sentiment Analysis

- Annotation
- Challenges
- Wayout



- Hate speech detection

- Annotation
- Challenges
- Wayout



Low-resource languages

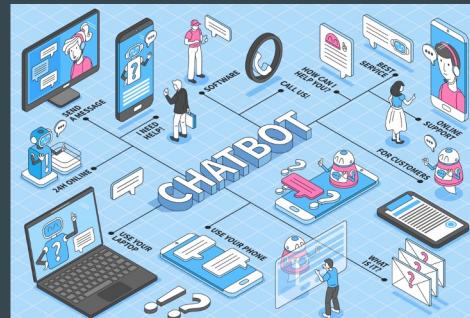
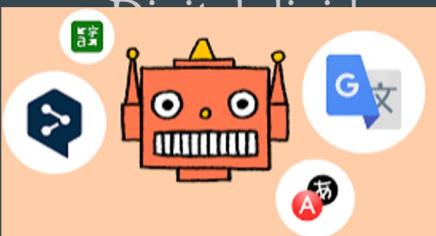
- Technology changes the way people access and share information
 - NLP
 - Conversation and speech technologies
 - Machine translation
 - E-commerce
 - ...



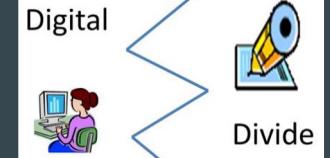
https://uploads-ssl.webflow.com/5f8adf96ff635f2728f2e3e4/622f5ab1c267053a030b6e67_NLP%20Tools_Main.png



<https://developer-blogs.nvidia.com/wp-content/uploads/2022/07/ai-for-dev-blog-riva-asr-v006-1600x900-1.jpg>



<https://algoscale.com/wp-content/uploads/2021/10/2007.i121.028.isometric-chatbot-flowchart-scaled.jpg>



Research focuses

Kalika Bali, Monojit Choudhury, Sunayana Sitaram, Vivek Seshadri (2019) ELLORA: Enabling Low Resource Languages with Technology

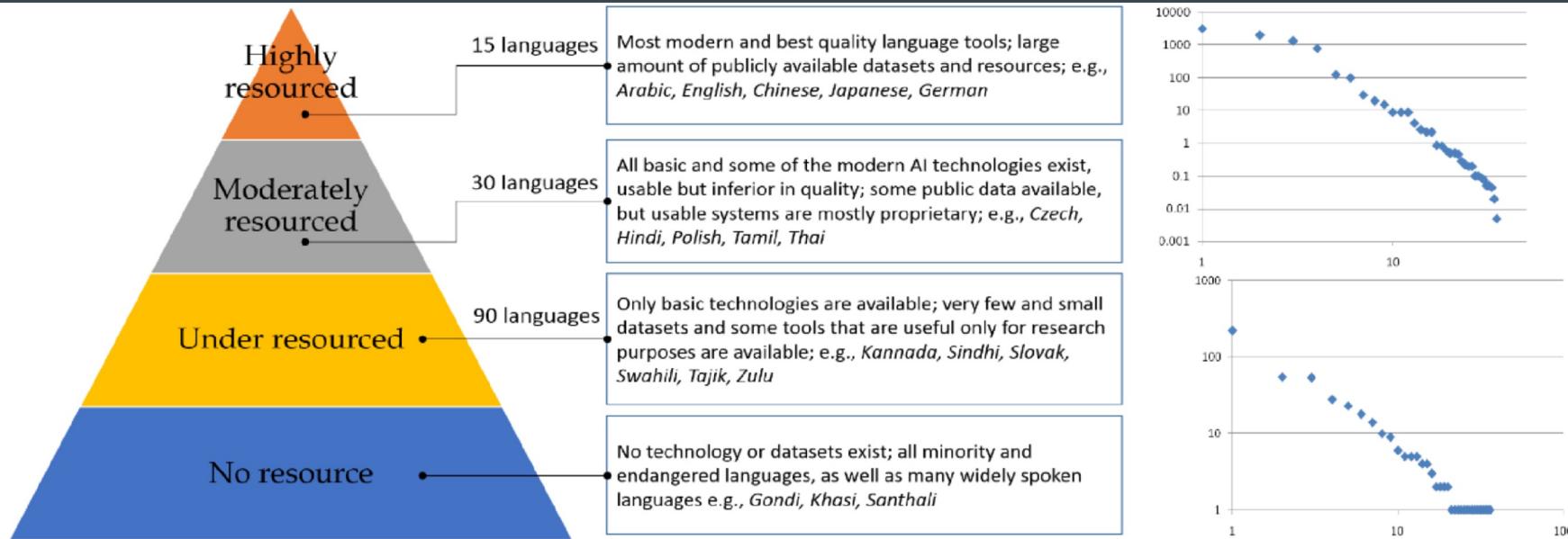
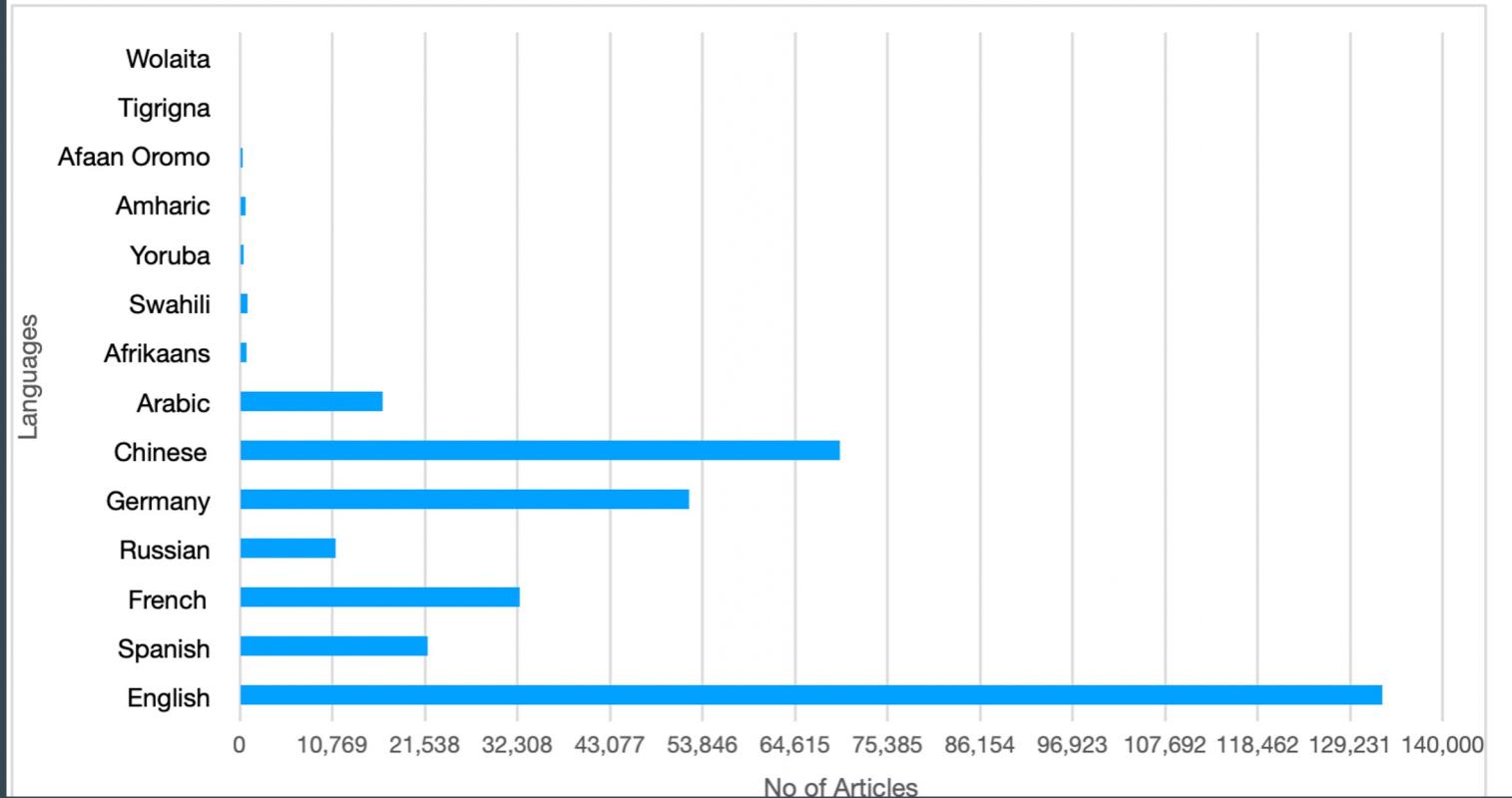


Figure 1: Classification of languages according to the availability of language technology, tools and resources (left) based on the power-law distribution of the resources across the languages of the world (right).

Research focus in Africa

- Most African countries allocate less than **1%** of their budget for Research
- According to the Ethiopian Technology and Innovation Institute report of 2017, Ethiopia allocates **0.27%** of its budget for research



Tonja et al. (2023): Natural Language Processing in Ethiopian Languages: Current State, Challenges, and Opportunities

Part-of-speech	37500
"Part-of-speech"	25000
Amharic Part-of-speech	293
"Amharic Part-of-speech"	10
Tigrinya Part-of-speech	114
"Tigrinya Part-of-speech"	1
Oromo Part-of-speech	119
"Oromo Part-of-speech"	0
2019	
speech recognition	27300
"speech recognition"	11700
Amharic speech recognition	221
"Amharic speech recognition"	9
Tigrinya speech recognition	127
"Tigrinya speech recognition"	6
Oromo speech recognition	90
"Oromo speech recognition"	0

ACL
Anthology
Phrase search

Phrase	Count
Part-of-speech	54,100
"Part-of-speech"	33,500
Amharic Part-of-speech	397
"Amharic Part-of-speech"	19
Tigrinya Part-of-speech	132
"Tigrinya Part-of-speech"	
Oromo Part-of-speech	137
"Oromo Part-of-speech"	0
speech recognition	2023
"speech recognition"	35,100
Amharic speech recognition	15,600
"Amharic speech recognition"	313
Tigrinya speech recognition	59
"Tigrinya speech recognition"	116
Oromo speech recognition	7
"Oromo speech recognition"	127

Big Tech for low-resource langs!

- chatGPT same question in English and Amharic
- The answer to the Amharic question is totally rubbish, meaningless!



List all Ethiopian leaders in order



1. Menelik II - Emperor from 1889-1913
2. Lij Iyasu - Emperor from 1913-1916
3. Zewditu - Empress from 1916-1930
4. Haile Selassie I - Emperor from 1930-1974
5. Mengistu Haile Mariam - President from 1974-1987 and Chairman of the Derg from 1977-1991
6. Tesfaye Gebre Kidan - Chairman of the Military Administrative Council from 1987-1991
7. Meles Zenawi - Prime Minister from 1995-2012
8. Hailemariam Desalegn - Prime Minister from 2012-2018
9. Abiy Ahmed - Prime Minister from 2018-present



የኢትዮጵያን መረጃዎች በቅድመ ተከተል ዘርዝር



እባ መረጃዎች, የንቀ ንግሥት አርአደጋ ገበረ እግዢ አብይ, የሚች አብዳሪስ, ስምዬን አማራካ, ፈያለንድ ለሰም, የቃድ ዓይነት አብዳሪስ አልማካ, የሚች ገዢነት መንግሥት መስፈት, የውሃ ገንዘብ አስተዳደር አህመድ, የውሃ ገዢነት መረጃዎች የኢትዮጵያን ንግሥት የአብይ አብይ የሚከተሉ መከከለኛ ንግሥት ያለው::

Recent initiatives - EthioNLP

- Established in 2018 (COLING 2018, Santa Fe, USA)
- More than **30 members** as of today
- It was not active for the last 4 years, getting more active now
- Twitter - <https://twitter.com/EthioNLP>
- Facebook - <https://www.facebook.com/groups/1275577692604176/about/>
- Slack - <https://ethionlp.slack.com/home>
- Telegram - https://t.me/+f_5gMa4KhtU2NWUy



Recent initiatives - GanaNLP



- <https://ghananlp.org/>
- Processing (NLP) of Ghanaian Languages & it's Applications to Local Problems

Our Projects

Here are projects contributed to by the community

Khaya Translator Web App

ABENA

NLP Ghana

Khaya TRANSLATE

Khaya Translator App - Android

Khaya TRANSLATE

Khaya Translator App - iOS

Recent initiatives - HausaNLP

- **Papers**
- **Datasets**
- **Models**
- **Repositories**

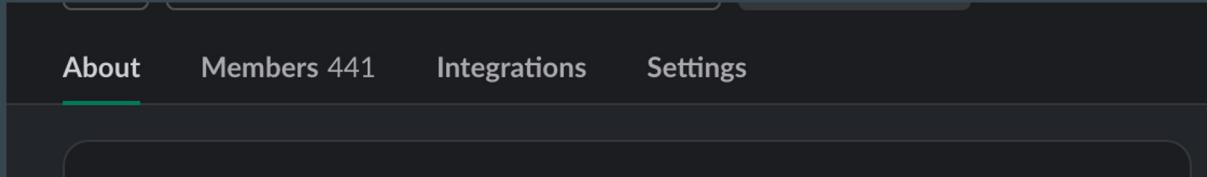


- <https://github.com/hausanlp/Awesome-HausaNLP>
- Collaborate with EthioNLP for AfriHate and AfriSenti Projects

Recent initiatives - Maskhane

A grassroots NLP community for Africa, by Africans

- <https://www.masakhane.io/>



Values

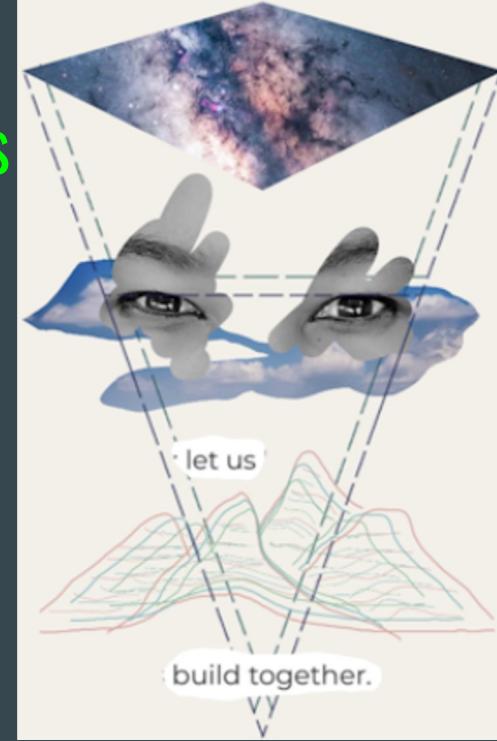
Umuntu Ngumuntu Ngabantu

African-centrality Ownership Openness

Multidisciplinarity Everyone has valuable knowledge

Kindness Responsibility Data sovereignty

Reproducibility Sustainability



Semantic Models for Amharic

- Purposes
 - Benchmark Datasets
 - Open sources (models, codes, tools, data)

Announcements

🎉 The Amharic RoBERTa model is uploaded in Huggingface [Amharic RoBERTa Model](#) 🎉

🎉 The Amharic FLAIR embedding model is integrated into the FLAIR library as [am-forward](#) 🎉 The model will be accessible on the next FLAIR release. [Details](#)

🎉 The Amharic Segmenter, Toknizer, and Translitrator is released and can be installed as [pip install amseg](#) 🎉

🎉 The Flair based Amharic NER classifier model is now released [am-flair-ner](#) 🎉

🎉 The Flair based Amharic Sentiment classifier model is now released [am-flair-sent](#) 🎉

🎉 The Flair based Amharic POS tagger is now released [am-flair-pos](#) 🎉

Different semantic models and applications for Amharic



<https://github.com/uhh-lt/ethiopicmodels>



Semantic Models for Amharic (Yimam et al. 2021)

- Corpus
 - At the [Mendeley Dataset Repository](#)
- Datasets
 - Sentiment analysis
 - NER
 - POS tagging
 - Question classification
- Models
 - Language models
 - AmRoBERTa at Huggingface
 - AmFLAIR - at FLAIR repository
 - Word2Vec
 - fastText
- Segmenter/tokenizer

The screenshot shows a hosted inference API interface for the `uhhlt/am-roberta` model. The input text is: "የኢትዮጵያ የሰንጠና አቅርቦት ለስተቶች አጭርቃል ተከራክሮւ በአንድ በአንድ በአንድ በአንድ". The masked token is <mask>. Below the input, there is a "Compute" button and a note about computation time: "Computation time on Intel Xeon 3rd Gen Scalable cpu: 0.043 s". The results are listed in a table:

አማርኛ	Confidence
መ-ሳምን	0.952
መ-ሳምን	0.025
መ-ሳምን	0.003
መ-ሳምን	0.003
መ-ሳምን	0.003

At the bottom, there is a blue button with the text "pip install amseg" and a small icon.

Why **STILL** low-resource, see MT as an example for **Amharic**

2003 application of corpus-based techniques to amharic texts

2006 guarani: a case study in resource development for quick ramp-up mt

2017 amharic-english speech translation in tourism domain

2018 parallel corpora for bi-lingual english-ethiopian languages statistical machine translation

2018 parallel corpora for bi-directional statistical machine translation for seven ethiopian language pairs

2019 english-ethiopian languages statistical machine translation

2019 language modelling with nmt query translation for amharic-arabic cross-language information retrieval

2022 geezswitch: language identification in typologically related low-resourced east african languages

2022 extended parallel corpus for amharic-english machine translation

Application of corpus-based techniques to Amharic texts

Sisay Fissaha and Johann Haller

Institute for Applied Information Sciences – University of Saarland

Martin-Luther-Str.14, D-66111, Saarbrücken, Germany

Tel +49-681-3895126, Fax +49-681-3895140

{sisay, hans}@iai.uni-sb.de

<http://www.iai.uni-sb.de>

No mention of “**low-resource**”

2003

Abstract

A number of corpus-based techniques have been used in the development of natural language processing application. One area in which these techniques have extensively been applied is lexical development. The current work is being undertaken in the context of a **machine translation** project in which lexical development activities constitute a significant portion of the overall task. In the first part, we applied corpus-based techniques to the extraction of collocations from Amharic text corpus. Analysis of the output reveals important collocations that can usefully be incorporated in the lexicon. This is especially true for the extraction of idiomatic expressions. The patterns of idiom formation which are observed in a small manually collected data enabled extraction of large set of idioms which otherwise may be difficult or impossible to recognize. Furthermore, preliminary results of other corpus-based techniques, that is, clustering and classification, that are currently being under investigation are presented. The results show that clustering performed no better than the frequency base line whereas classification showed a clear performance improvement over the frequency base line. This in turn suggests the need to carry out further experiments using large sets of data and more contextual information.

In this paper, it is mentioned 4X “**low-resource**”

Extended Parallel Corpus for Amharic-English Machine Translation

Andargachew Mekonnen Gezmu, Andreas Nürnberg, Tesfaye Bayu Bati

Abstract

2022

This paper describes the acquisition, preprocessing, segmentation, and alignment of an Amharic-English parallel corpus. It will be helpful for machine translation of a **low-resource** language, Amharic. We freely released the corpus for research purposes. Furthermore, we developed baseline statistical and neural machine translation systems; we trained statistical and neural machine translation models using the corpus. In the experiments, we also used a large monolingual corpus for the language model of statistical machine translation and back-translation of neural machine translation. In the automatic evaluation, neural machine translation models outperform statistical machine translation models by approximately six to seven Bilingual Evaluation Understudy (BLEU) points. Besides, among the neural machine translation models, the subword models outperform the word-based models by three to four BLEU points. Moreover, two other relevant automatic evaluation metrics, Translation Edit Rate on Character Level and Better Evaluation as Ranking, reflect corresponding differences among the trained models.

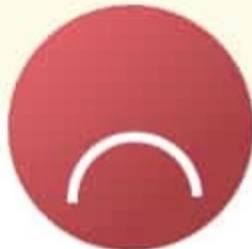
Why we are have more “low-resource” terms over time

- “Low-resource” - becomes **buzzword**
 - Funding
 - Research gap, an opportunity for students
- English and other languages are getting more attention
- The works are less impactful
 - Unpublished
 - Not used in industry

Publish and Perish



Sentiment Analysis



Negative

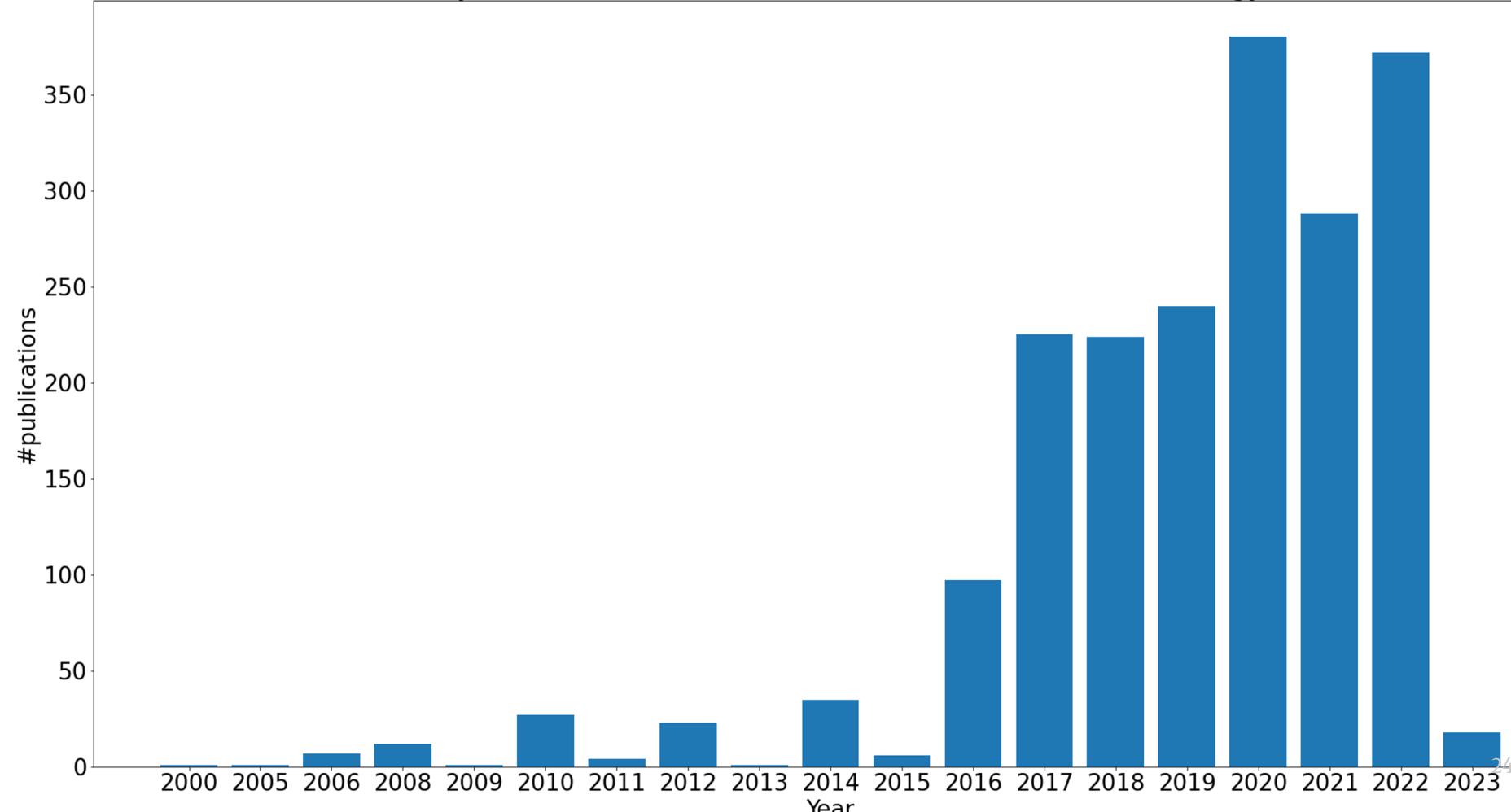


Neutral



Positive

Analysis of Sentiment Publications Over Time in ACL Anthology



Why sentiment analysis is important

- No exception: understand users opinion towards a target
- But, why focus on low-resource languages
 - Difficult to get suggestions/recommendations from multiples sources - **low-resource**
 - Opinions are culturally different - communities have their own language to understand a text
 - Understand opinions for local events, **disaster**, conflict,

ASAB - Amharic Sentiment Analysis (Yimam et al. 2020)

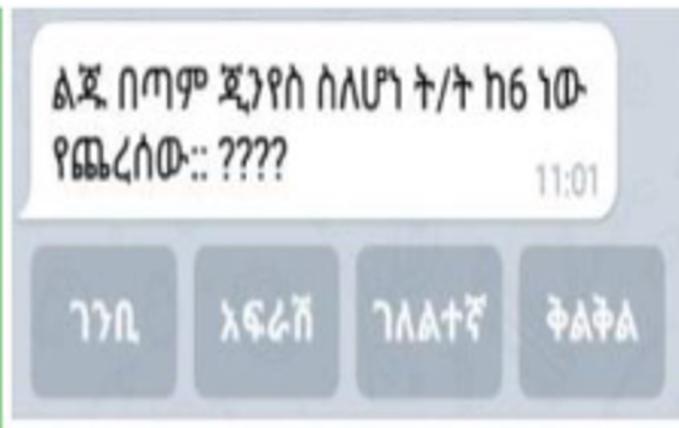
- Sentiment analysis dataset for Amharic
 - Using AmTweet dataset
 - Annotation tools, models, and datasets

User ID	First Name	Last Name	Gender
12345678901234567890	John	Doe	Male
12345678901234567891	Jane	Doe	Female
12345678901234567892	Mike	Smith	Male
12345678901234567893	Alice	Johnson	Female
12345678901234567894	Bob	Williams	Male
12345678901234567895	Carol	Parker	Female
12345678901234567896	David	Miller	Male
12345678901234567897	Eve	Anderson	Female
12345678901234567898	Frank	Wilson	Male
12345678901234567899	Gina	Howard	Female
12345678901234567890	Hank	Carter	Male
12345678901234567891	Iris	Taylor	Female
12345678901234567892	Jessie	Wong	Female
12345678901234567893	Karen	Chen	Female
12345678901234567894	Liam	Nguyen	Male
12345678901234567895	Mia	Kim	Female
12345678901234567896	Noah	Lee	Male
12345678901234567897	Olivia	Ho	Female
12345678901234567898	Penelope	Yoon	Female
12345678901234567899	Quentin	Kim	Male
12345678901234567890	Riley	Nguyen	Female
12345678901234567891	Samantha	Ho	Female
12345678901234567892	Taylor	Yoon	Female
12345678901234567893	Uma	Chen	Female
12345678901234567894	Vivian	Nguyen	Female
12345678901234567895	Wade	Ho	Male
12345678901234567896	Xiaoming	Yuan	Male
12345678901234567897	Yara	Chen	Female
12345678901234567898	Zoe	Ho	Female
12345678901234567899	Zuri	Yuan	Female

(a) Excel-sheet for annotation

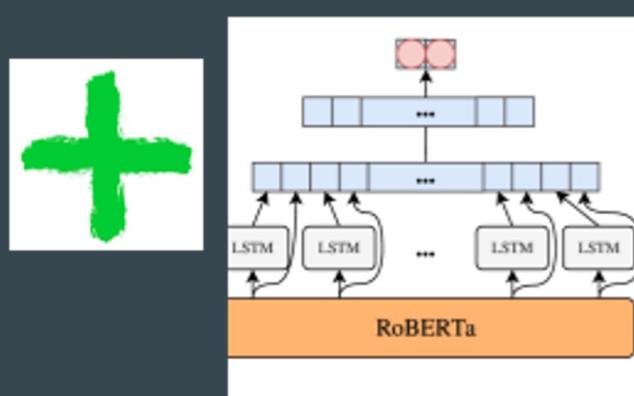
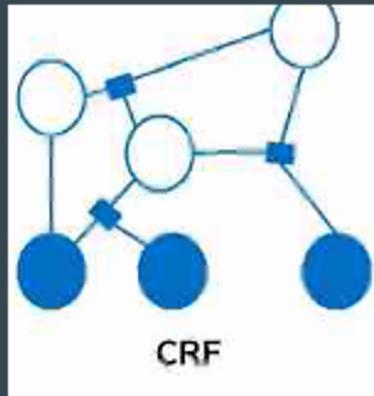
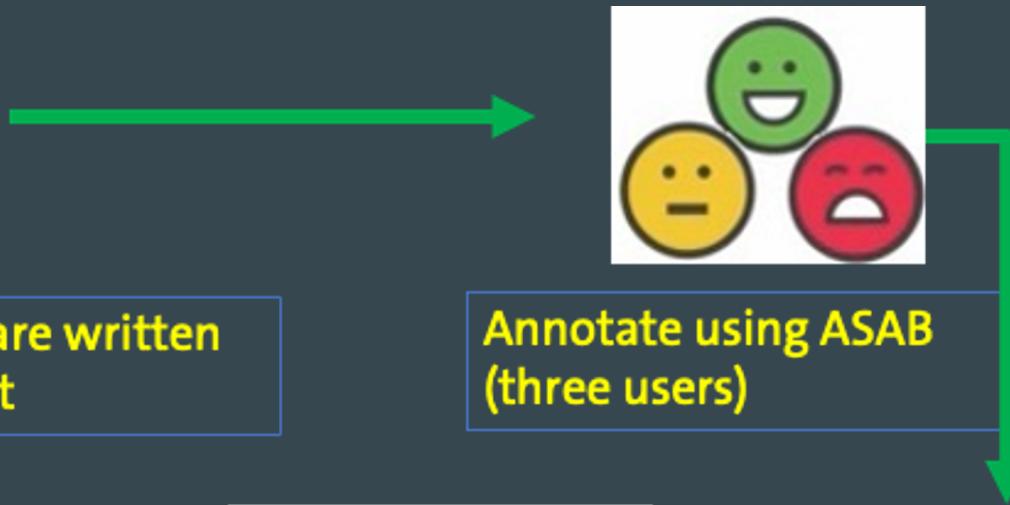


(b) Web annotator interface



(c) ASAB interface

ASAB approach



Building
supervised and
deep learning
ML models

ASAB tool - <https://github.com/uhh-lt/ASAB>

- ASAB support **mobile card vouchers** rewards for annotators.
- Reward given when a user **annotates 50 tweets**.
- ASAB integrates a **controlling control questions** for every 6 tweets.
- Users with 3 consecutive mistakes will receive a **warning** message.
- Users **blocked** after the fourth wrong attempt.

ASAB ML models

- Baseline methods:
 - Stratified, Uniform, and Most frequent.
- Supervised approaches:
 - SVM, KNN, Logistic regression, Nearest centroid
 - Features: TF-IDF with the CountVectorizer and TFIDFTransformer methods from scikit-learn.
- Deep learning approaches:
 - Models based on **FLAIR** deep learning text classifier.
 - Features: Word2Vec, network embeddings, contextual embeddings (**RoBERTa** and **FLAIR** embeddings)

Outcome

- 9.4k tweets annotated (143,848 words and 45,525 types), each tweet three annotators.
- A total of 92 Telegram users visited ASAB.
- 58% of users completed at least 50 tweets and got rewarded.
- 4 users blocked for consecutive mistakes.

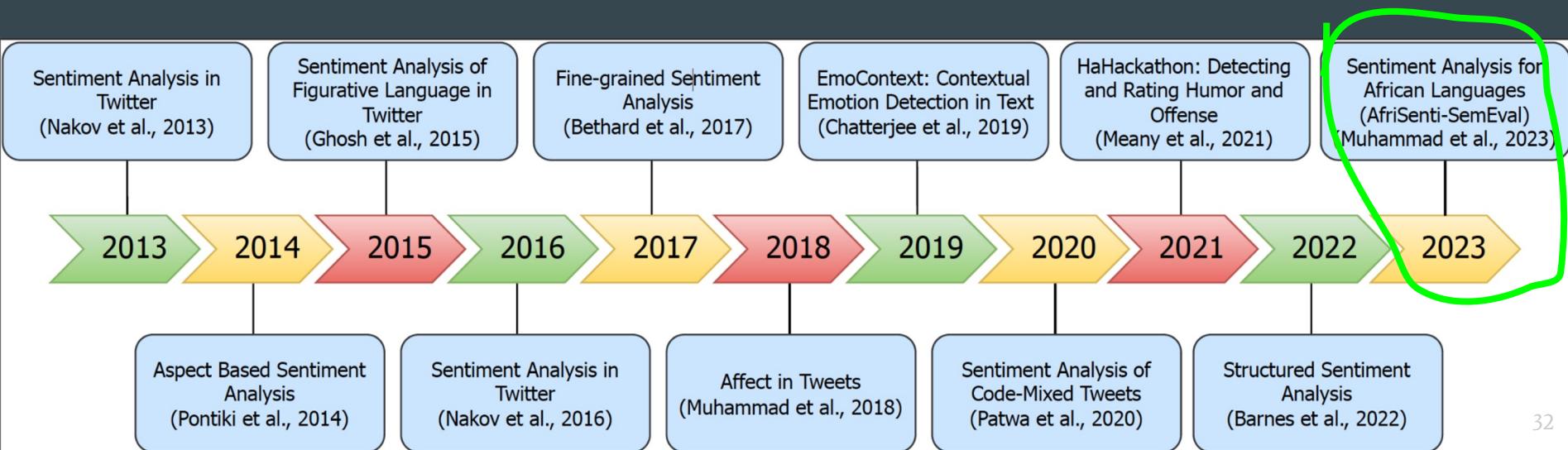


Analysis

- We randomly select tweets where the model prediction and the user annotations differ.
- Possible source of errors:
 - Users press the wrong button by mistake.
 - Some users might not understand the tweet.
 - Slow internet connection, some users reported that there was a delay between the first and the second tweet.
 - Sarcasm, figurative speech, mixed scripts, incomplete phrases and sentences, and spelling and grammar errors cause most of the model errors.

ASAB dataset - extension

- Used for AfriSenti-SemEval Shared Task 12 - 2023
- Data is used for the Amharic Semantic model project (Yimam et al. 2021)
- ASAB tool is being extended for general-purpose text annotation



ASAB model - example usage

Model is currently hosted at the **LT Group** data server

```
import wget
import flair
from flair.data import Sentence
am_sent_model = wget.download("http://ltdata1.informatik.uni-hamburg.de/amharic/taskmodels/sent/final-model.pt")

39% [.....] 197582848 / 503849408

# create example sentence
sentence = Sentence('የሰው ነው ምርመራ ለአትናቁዎችን አማራካውያን ስለአገልግሎት በፊጥ የሚኖሩበት ይሆናል!')

# predict class and print
from flair.models import TextClassifier
classifier = TextClassifier.load(am_sent_model)
classifier.predict(sentence)
print(sentence.labels)

['Sentence[10]: "የሰው ነው ምርመራ ለአትናቁዎችን አማራካውያን ስለአገልግሎት በፊጥ የሚኖሩበት ይሆናል!"' / 'POSITIVE' (0.8838)]
```

Hate Speech



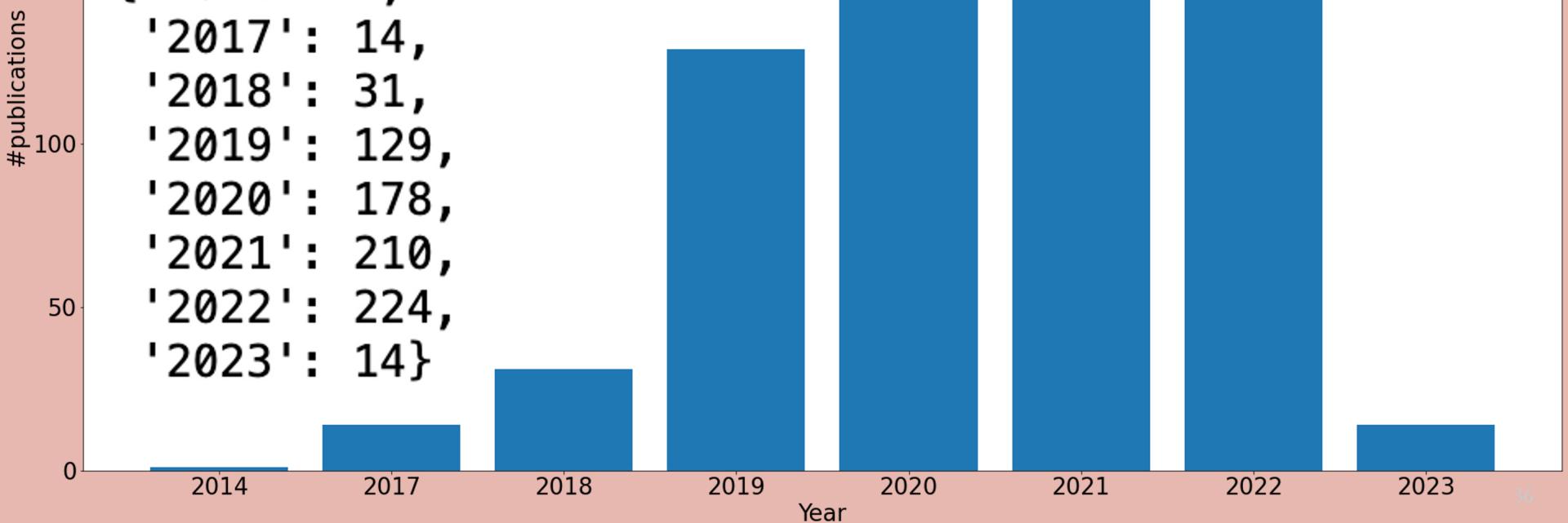
Addressing hate speech on social media: Contemporary challenges

- Freedom of speech?
- “Six part threshold test”
to justify restrictions on
freedom of expression
 - considering the socio
political context,
 - status of the speaker,
 - intent to incite
antagonism,
 - speech content,
 - extent of dissemination
 - likelihood of harm.

Analysis of Hate Speech Publications Over Time in ACL Anthology

```
for paper in papers:  
    if " hate " in paper['abstract'] or " hate " in paper['title'] or \  
    " offensive " in paper['abstract'] or " offensive " in paper['title'] or \  
    " abusive " in paper['abstract'] or " abusive " in paper['title'] or \  
    " toxic " in paper['abstract'] or " toxic " in paper['title'] :
```

```
{'2014': 1,  
'2017': 14,  
'2018': 31,  
'2019': 129,  
'2020': 178,  
'2021': 210,  
'2022': 224,  
'2023': 14}
```



Is hate speech a new event?

Ask ChatGPT! :-)



No, hate speech is not a new event. Hate speech has existed for centuries and has been used to target and discriminate against individuals or groups based on their race, religion, ethnicity, gender, sexual orientation, and other characteristics. The term "hate speech" itself may be relatively new, but the concept and practice of using language to express hatred or prejudice towards others is not new. With the rise of social media and other digital platforms, however, hate speech has become more visible and widespread in recent years.



<https://sloanreview.mit.edu/wp-content/uploads/2022/03/GEN-Bird-Visibility-1290x860-1.jpg>

Why **hate speech** detection models for **low-resource** languages?

- **Social media** and mobile usage increases
 - Less awareness of media usage
 - Social media becomes a **fertile ground** for hate speech
 - Escalate to **offline unrest** (Nkemelu et al. 2023)
- Utilize knowledge of experts of the **community** along models
- Application developers and **social media moderators**
 - Use models to detect hate speech before reaching larger audience
- Plan **counter-hate speech** - peace build up - responsible AI
- But
 - **Small** and **unbalanced** dataset
 - Unpublished resources/models

Hate speech in Ethiopia - the 5J

- Use the **Toloka Yandex** crowdsourcing
- **Crowdsourcing** is getting more popular for data annotation due to its lower cost, higher speed, and diversity of opinions



5Js - Unpacking Ethiopia's Controversial Five Consecutive Junes: A Period of Turmoil and Change (Ayele et al. 2022)

The 5
consecutive
&
controversial
Ethiopian
Junes: 5Js

- **June 2018**
Bomb attack at a rally



- **June 2019**
Assassination of Officials



- **June 2020**
Assassination of Hachalu H.



- **June 2021**
National Election 2021

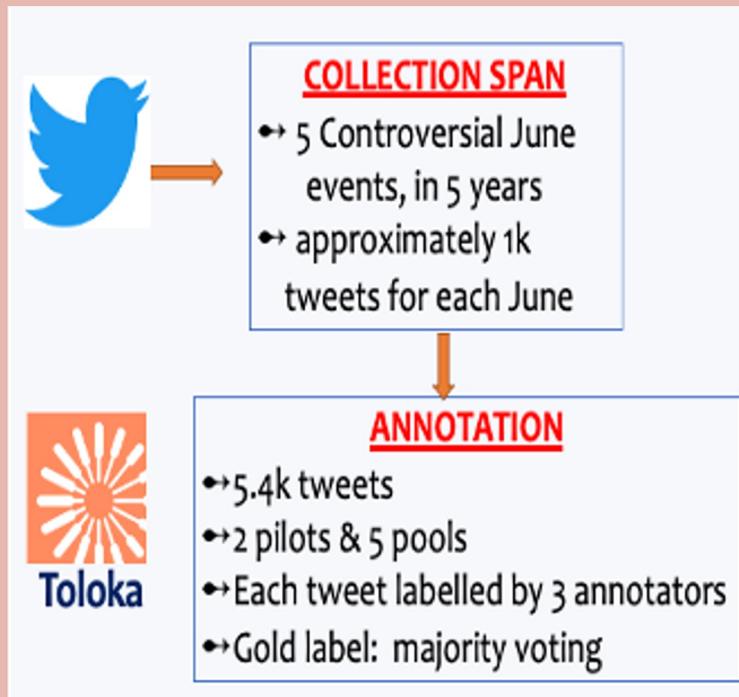


- **June 2022**
Massacre in Kelem Wolega



Data collection and annotation

- Toloka setups:
 - 20 training tweets
 - 50 control tweets
 - Smart mixing:
 - a task has 15 tweets
 - The one is a control question



Fleiss Kappa
Agreement

-
- Pilot1: 0.15,
 - Pilot2: 0.25 and
 - Main Task: 0.34

Sample Toloka User Interface for presented for Performers

Annotation errors

- Possible source of variations among human annotators might be due to:

- Negligent or malicious annotators working only for financial rewards.



- Tweets containing idiomatic and poetic expression are difficult to understand
 - The context in which some tweets are written is not known

Error analysis

#	Tweet	Anno1	Anno2	Anno3	Gold
1	@USER አንተ ይደብ ቅርቡ መስጠትና ማረጋገጫ:: (@USER You idiot. educate your cattle called Ke...)	normal	normal	offensive	normal
2	ይህ ከዚምያ ከኢትዮጵያ ከልማኑ ስላም የለም:: (If the mu... does not disappear from Oromia and Ethiopia, there will be no peace.)	normal	normal	normal	normal
3	አማራንትን መርጠጥቃች ማድረግ ይችም!! (Stop genocide of ethnic Amhara's!!)	hate	hate	hate	hate
4	@USER ተጠቃሚነት ከልሳሽ መቻቻው ይቀጥላል:: (@USER Without accountability, the massacre will continue.)	hate	hate	hate	hate
5	የተበታቸው እንደሆነ አዋጅ ነፃሰ ሆኖ መመሪያ:: (The disp... our comes as a whirlwind.)	normal	normal	unsure	normal
6	@USER አንተ ቅልድ: አሁንም ፊርማ አውላውን (@USER you are joking; while fearing the donkey, you deal with what the donkey carries)	hate	hate	hate	hate

Hate

Hate

Normal

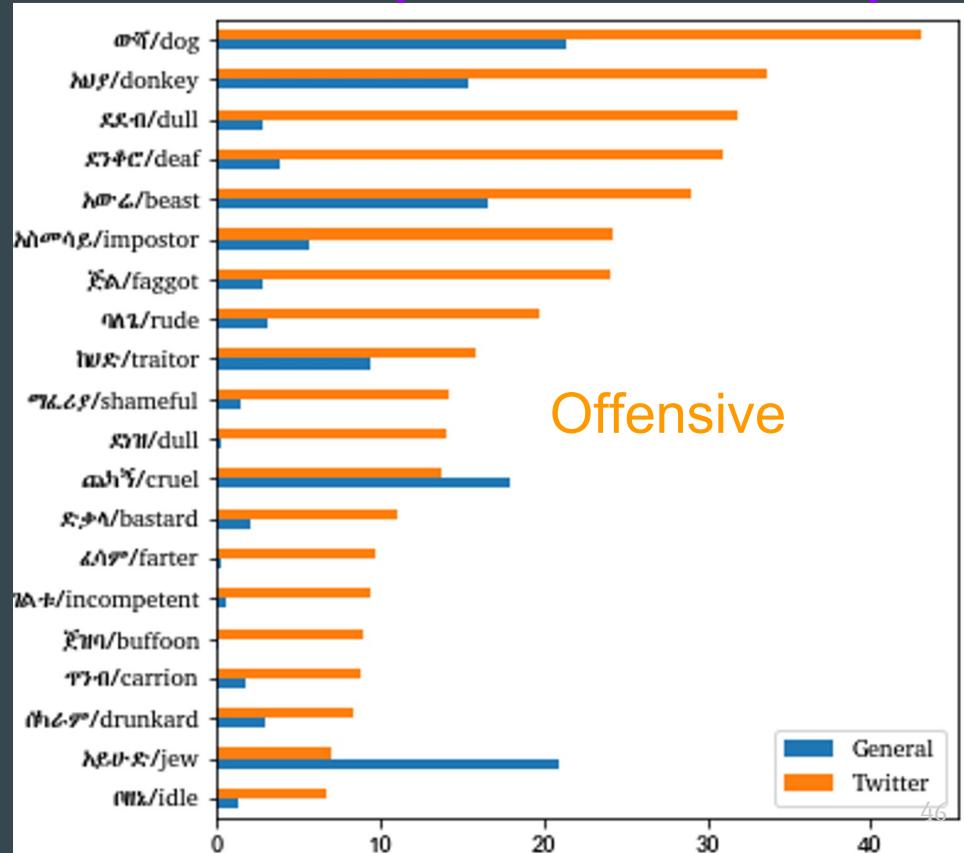
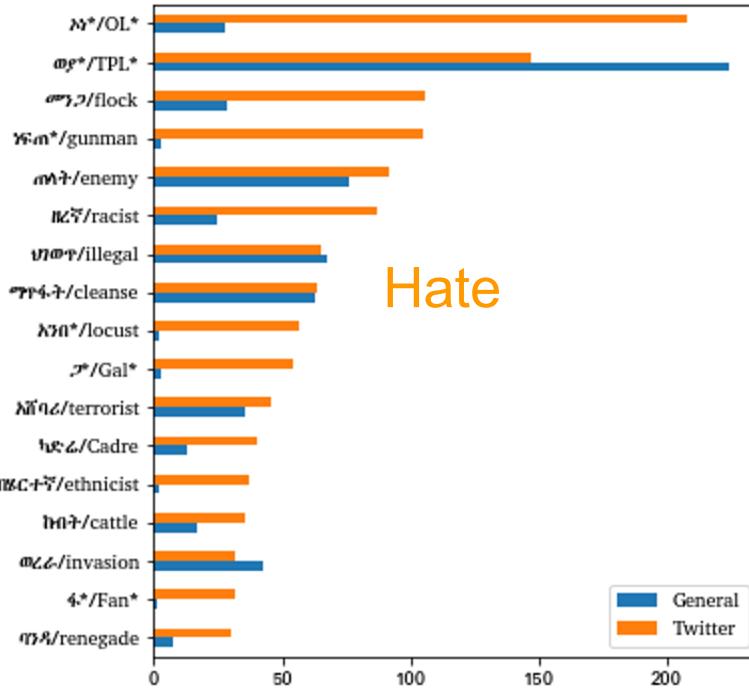
Normal

Sarcasm

Idiom

Comparison of keywords in Twitter and general corpus

(Yimam et al. 2019)



Challenges in hate speech annotation

- **Data selection**: Lexicon? Party names? Ethnics names? Tricky!!
- **Costy**: no difference from English and similar high-resource languages
- **Sensitive**: Annotators can be annoyed (religion/ethnicity)?
- **Native speaker**: You need speakers who speak the language (annotation, guideline)
- **Awareness**: Teaching annotators the implication of the annotation, why do they care?
- **Infrastructure**: Most have mobiles, web-based tools will not help. Where to publish the data (GitHub??)

Lacuna Funding 2022

AfriHate Datasets

Nigeria

Hausa, Igbo, Pidgin, Yoruba

Ghana

Twi, Pidgin

South Africa

Afrikaans, isiZulu, Isixhosa

Ethiopia

Amharic, Tigrinya, Oromo, Somali

Kenya

Swahili

Somalia

Somali

Algeria

Algerian Arabic

Sudan

Sudanese Arabic

Morocco

Darija

Mozambique

Portuguese

Rwanda

Kinyarwanda



Project Leading Universities

Bayero University
Kano, Nigeria



Bahir Dar University,
Ethiopia



Project Partner Organizations



Take home message

- Most languages, for example Amharic, they are **not anymore low-resource** for some tasks, they are **less-organized**.

"Amharic Machine translation"

All Videos Images

About 1,340 results (0.55 sec)

Bahir Dar University Institutional Repository System



BDU IR Home → Search

Search

Search: All of IR

language processing Amharic

Add filters

Showing 10 out of a total of 1304 results. (0.026 seconds)

1 2 3 4 ... 151 Next Page

Communities or Collections matching your query

Ethiopian Languages and Literature - Amharic

Items matching your query



AUTOMATIC IDIOM RECOGNITION MODEL FOR AMHARIC
ANDUAMILAK, ABEBE FENTA (2021-07)

Language Processing research has been influenced by the existence of idiom. It is known that idiom affects NLP researches such as machine translation, sentiment analysis, information retrieval, question answering and next word prediction.

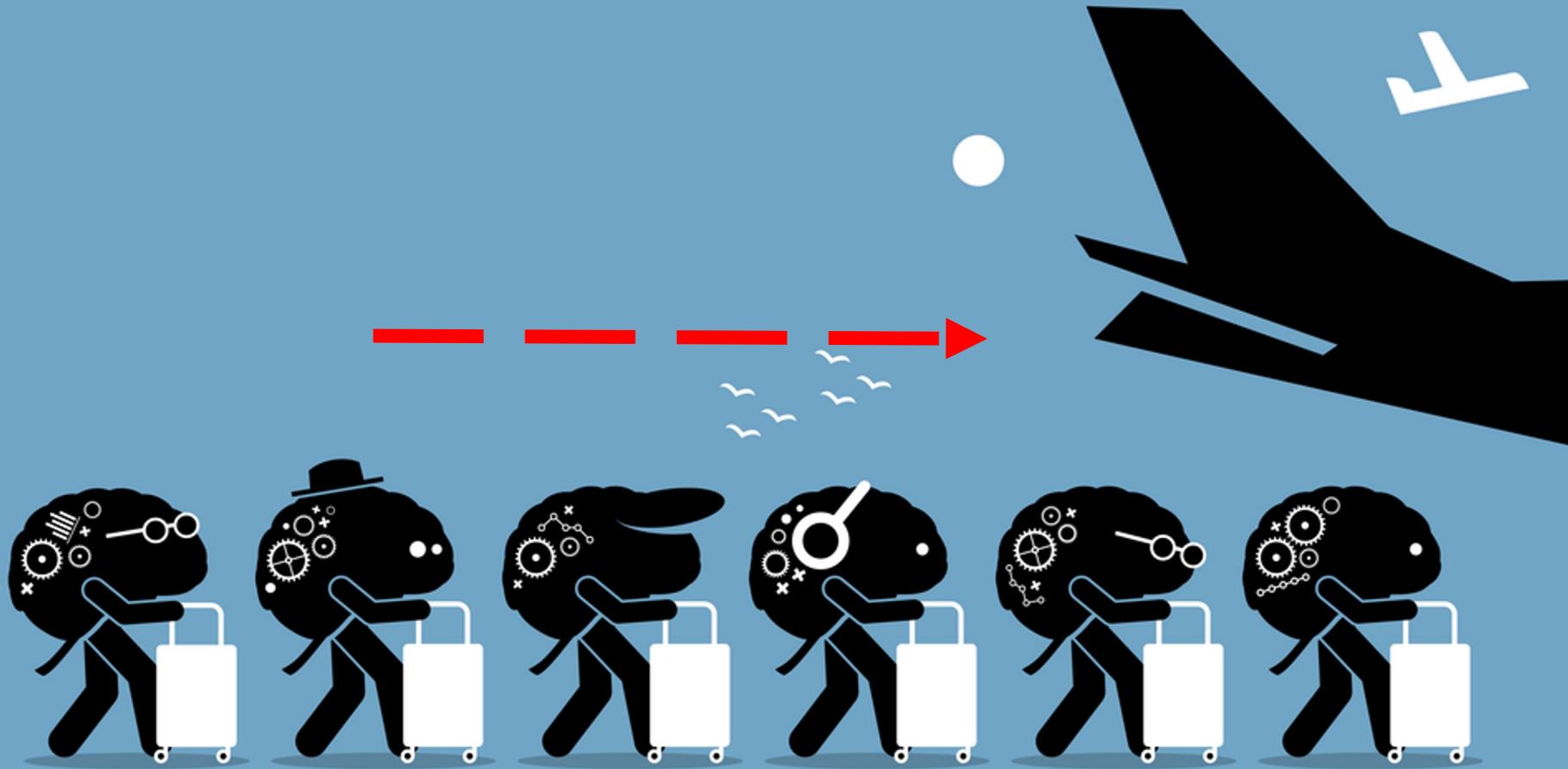


IDIOMATIC EXPRESSION IDENTIFICATION FROM AMHARIC USING DEEP LEARNING
TIRUEDLE, ASTERAYE TSIGE (2022-07)

algorithms SVM and KNN. The experimental result shows that the proposed model performs better than SVM, KNN, CNN, and LSTM. Keywords: Amharic, Deep Learning

Take home message

- Most languages, for example Amharic, they are **not anymore low-resource** for some tasks, they are **less-organized**.
- Lets **use, improve**, promote, critique our works,..
- Create collaboration (with positive spirit) among local researchers
- **Mentoring**, mentoring, mentoring,...
- Funding strategies, Own funding, Member contribution,...
- Reverse brain-drain to brain->train.





Some announcements

- ICAST 2023 conference - deadline 21 May 2023
- <https://icast-conf.eai-conferences.org/2023/>

EAI ICAST 2023 WILL BE HELD AS AN ON-SITE CONFERENCE IN BAHIR DAR, ETHIOPIA

EAI ICAST 2023 will be held as an on-site conference and if needed, Accepted Authors who are unable to attend the event in person will be given the option to present remotely.

The Submission is open until 21 May 2023!



EAI ICAST 2023 - 11th EAI International Conference on Advancements of Science and Technology

August 25-27, 2023
Bahir Dar, Ethiopia

Call for papers

INDEXING - SUBMITTED FOR INCLUSION IN:

Web of Science, Compendex, Scopus, DBLP, EU Digital Library, and more

PUBLICATION

EAI Endorsed Transactions on Energy Web (Open Access) – indexed in Scopus

Join/support EthioNLP

Ethiopian Languages NLP



Why ETHIONLP?

- ✓ Ethiopia is a multilingual and multicultural country.
- ✓ Advance NLP, data science and in general AI research for Ethiopian languages
- ✓ Establish well-organized and research-oriented community

Tasks

- NLP corpus collection
- Pre-trained models
- NLP applications
- Organize workshops
- Assist M.Sc. & PhD students
- Projects & Research fund
- and many more



CONTACTS

info@ethionlp.com
 <https://www.ethionlp.com>

@EthioNLP



RESOURCES

<https://github.com/EthioNLP>



Question/discussion/contact me?



Seid Muhie Yimam

House of Computing and Data Science

Universität Hamburg

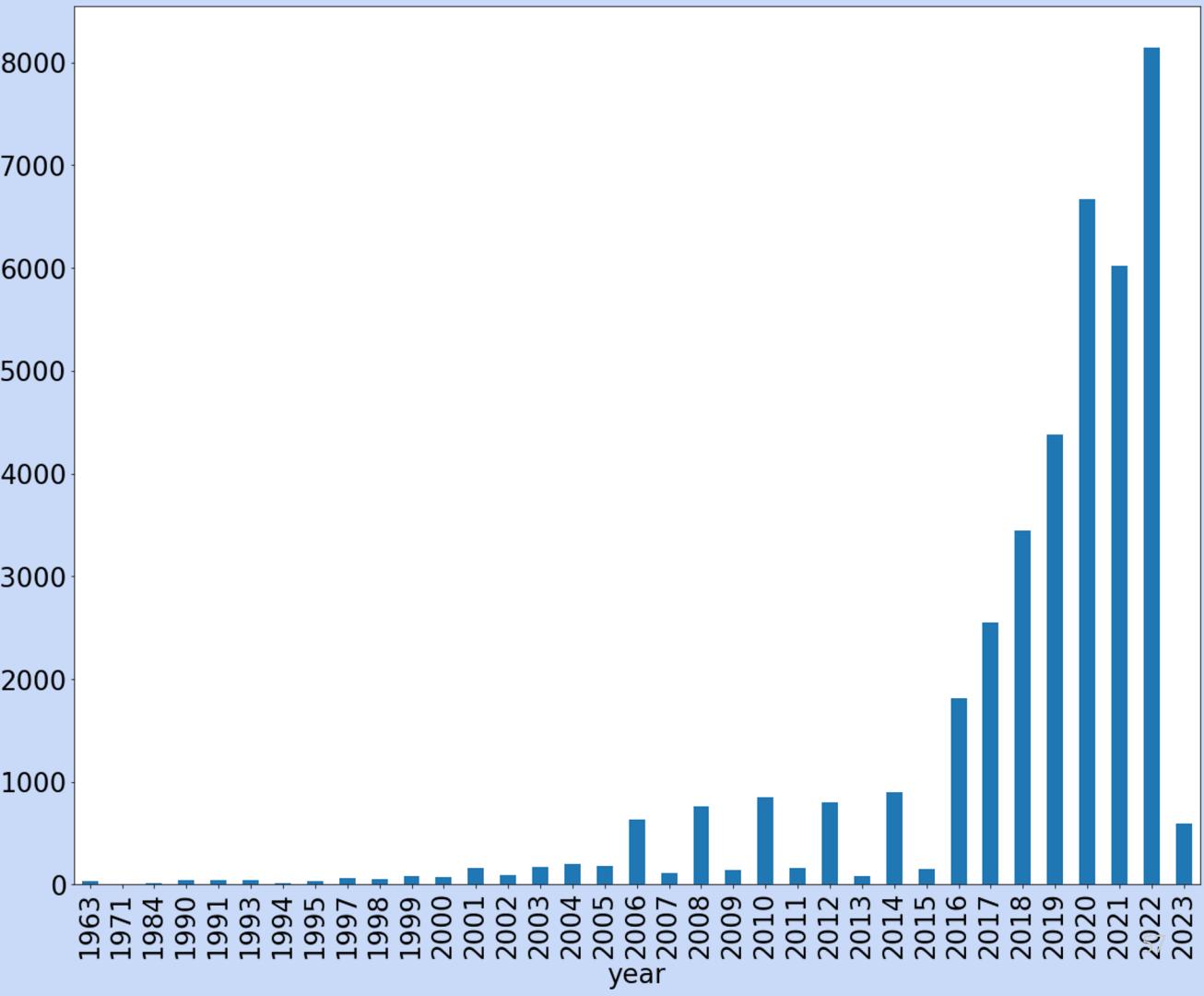


seid.muhie.yimam@uni-hamburg.de



@seyyaw

ACL Anthology papers per year



Amharic tweets (AmTweet)- current status

year	count
2014	85240
2015	346016
2016	433022
2017	498085
2018	695533
2019	1032463

- Collect tweets everyday
- Tweets written in Amharic script (**Ethiopic, Fidäl, Ge'ez**)
- A total of **17,602,943 tweets** by April 16, 2023

IPA	æ	u:	i:	a:	e:	ə	o:	wa	jæ
h	v	v̄	y	y	ȳ	v	v̄		
l	ň	ň̄	ň.	ň.	ň̄	ň	ň̄	ň̄	ň̄

