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ACII 2023
The 11th International Conference on Affective Computing and Intelligent Interaction

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SENTIMENT ANALYSIS FOR SHONA

Cambridge, USA
September 13, 2023

AGENDA

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Related Work	2
ShonaSenti – The Shona Sentiment Analysis Corpus	3
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1

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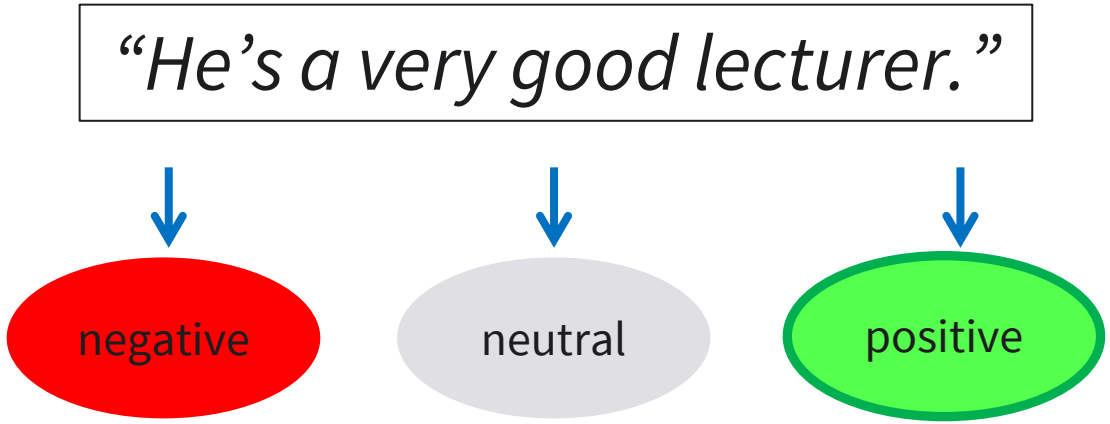
INTRODUCTION

SENTIMENT ANALYSIS

- Detecting & classifying sentiments, e.g.,



- Applications in business, medicine, education, AI for social good
  (Rokade & Kumari, 2019; Zucco et al., 2018; Lalata et al., 2019; Rakhmanov & Schlippe, 2022; Mabokela & Schlippe, 2022)

SHONA

- African language, spoken by 16.6 million people (Ethnologue, 2023)
- Mother tongue of 75% of Zimbabwe's population (African Studies Center, 2023)
- Also spoken in Zambia, Botswana, Mozambique, South Africa, UK (Wikipedia, 2023)

➔ But: No sentiment analysis system

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- Distant supervised methods with emoticons and keywords
  (Mabokela & Schlippe, 2022)

- For automatic sentiment analysis, Transformers usually outperform traditional and lexicon-based approaches
  (Rakhmanov & Schlippe, 2022)

RELATED WORK

- AfroLM: Only Transformer-based pre-trained model to deal with Shona
- (But pre-trained on only 32.8 MB of Shona text) (Dossou et al., 2022)

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➔ **Twitter** for corpus collection

➔ **Distant supervised methods** to accelerate the labeling process

➔ **AfroLM** for monolingual and **English BERT** for cross-lingual systems

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SHONASENTI

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- Essential Twitter API package

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Language	Frequency	Percentage
Shona	15,960	75.9%
English	2,776	13.2%
code-switch	2,184	10.4%
others	15,315	0.5%

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- Goal: Accelerate labeling process in a semi-automated manner

- Analyzed 3 distant supervision approaches:
  - *Distant Supervision with Sentiment Lexicon*
  - *Distant Supervision with Emoticons*
  - *Distant Supervision with Sentiment Lexicon + Emoticons*

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correctly pre-labeled

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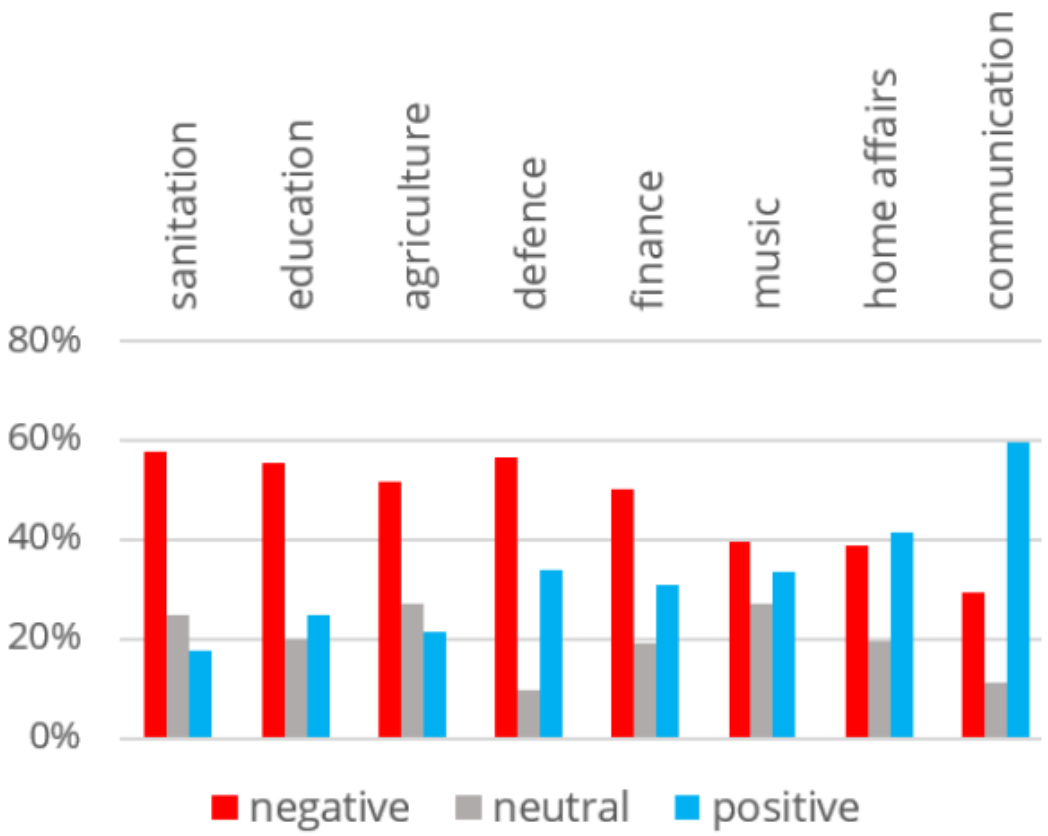
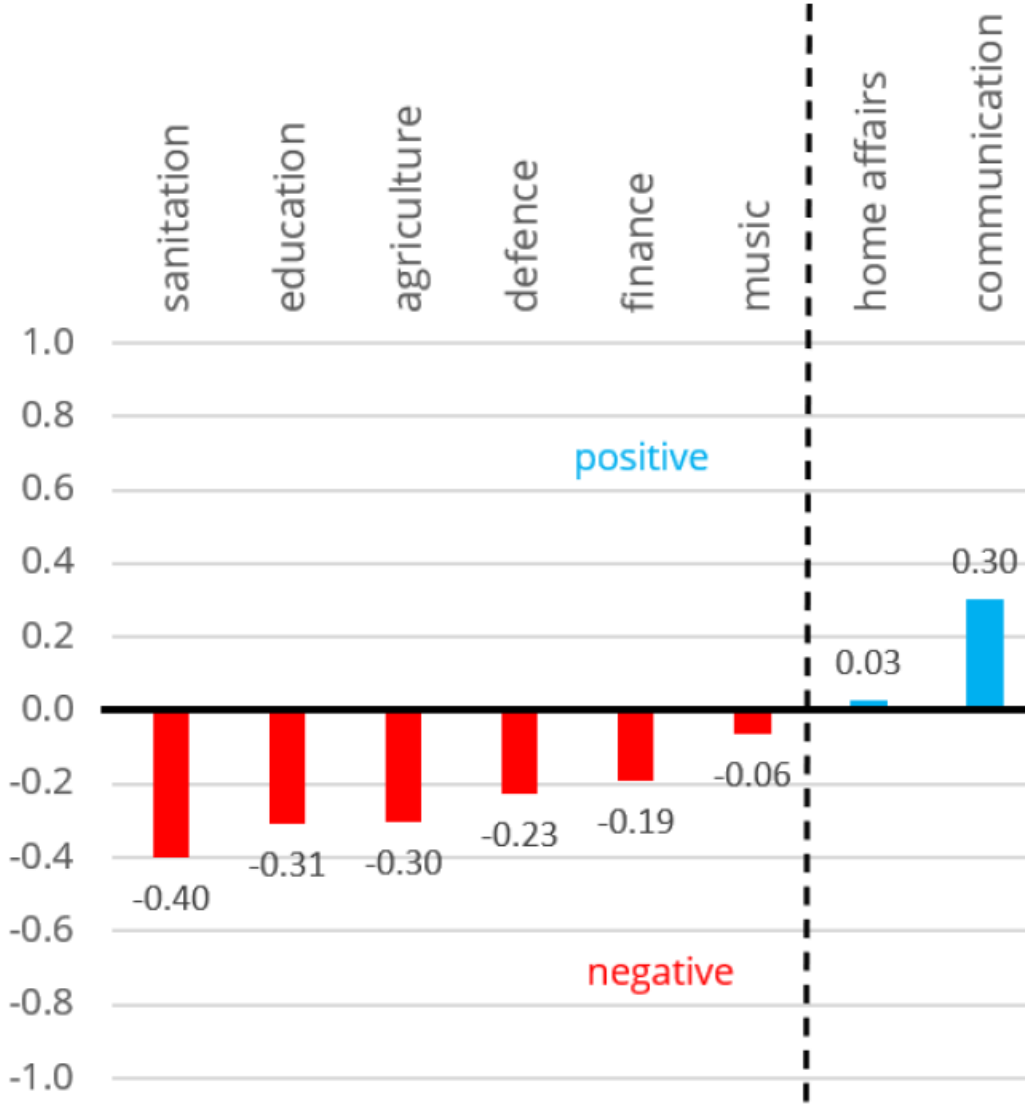
correctly pre-labeled

→ cross-checked, corrected, and added missing labels

TOPICS

$$\frac{\#negative * (-1) + 0 * \#neutral * (+1) * \#positive}{\#allsentiments}$$





SHONASENTI

“I have nothing much to say but he’s a very good lecturer.”

(1) corrected
(2) cross-checked
(3) extended to 5 labels

✓

“I have nothing much to say but he’s a very good lecturer.”

	#sentences	Percentage
Train	12,767	80%
Test	3,193	20%

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SENTIMENT ANALYSIS FOR SHONA

MONO-LINGUAL + CROSS-LINGUAL SENTIMENT ANALYSIS

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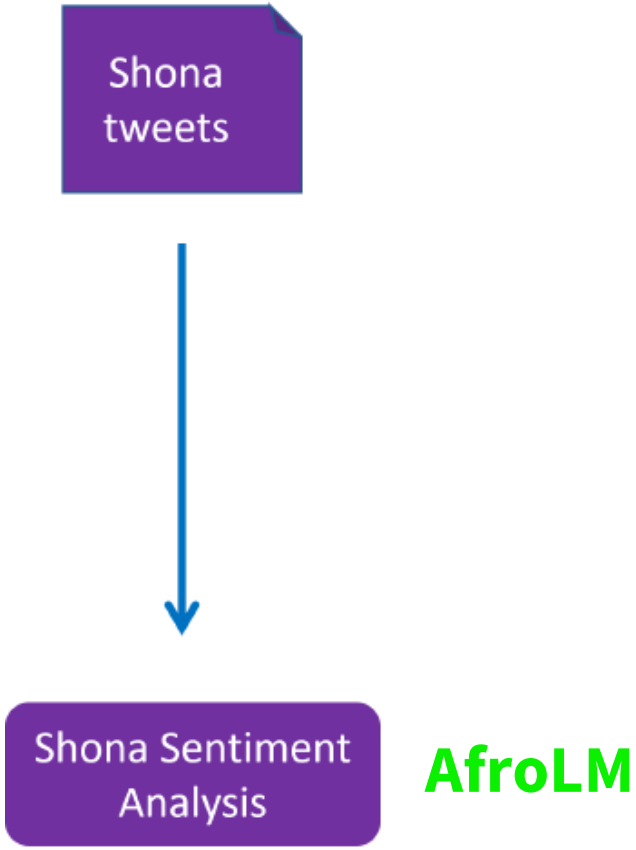
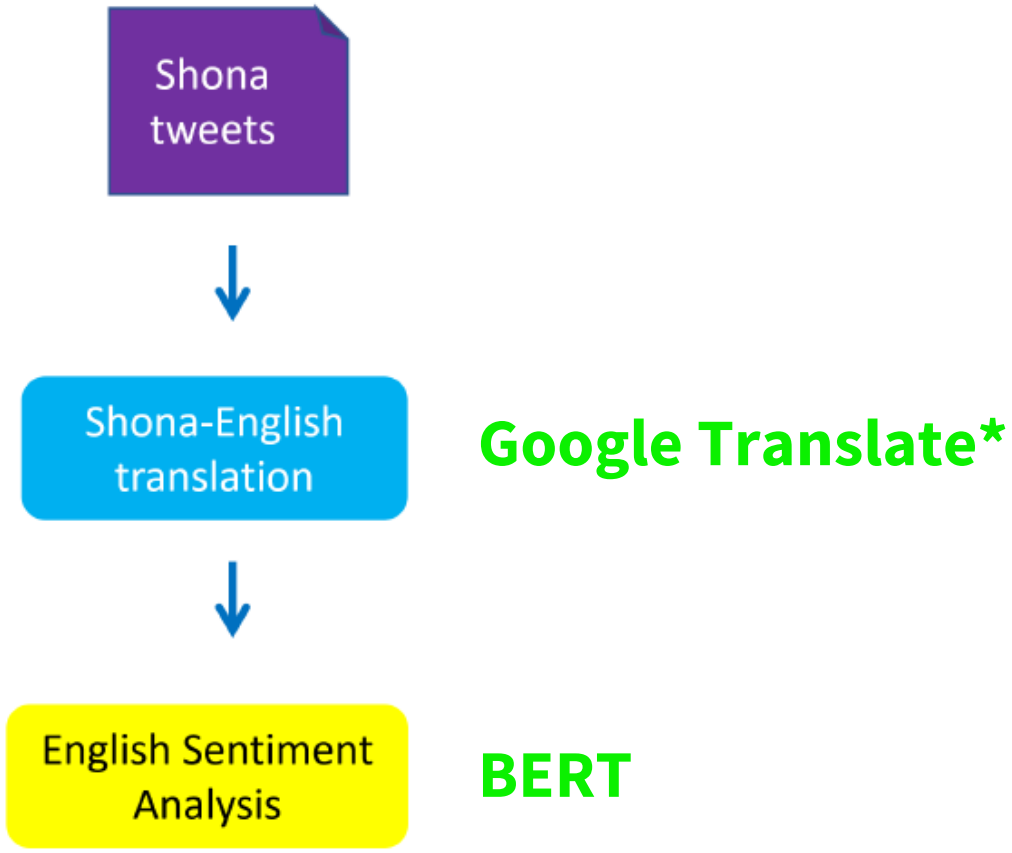
MONO-LINGUAL SENTIMENT ANALYSIS



CROSS-LINGUAL SENTIMENT ANALYSIS



*BLEU = 0.57 on ShonaSenti subset

MONO-LINGUAL + CROSS-LINGUAL SENTIMENT ANALYSIS

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System	Emoticons	Accuracy	F-score
monoLingualNoEmoticons3classes$_{AfroLM}$	no	78.60%	76.39%
monoLingualEmoticons3classes$_{AfroLM}$	yes	80.56%	79.44%
crossLingualNoEmoticons3classes$_{BERT}$	no	77.63%	76.56%
crossLingualEmoticons3classes$_{BERT}$	yes	**83.88%**	**82.34%**
monoLingualNoEmoticons5classes$_{AfroLM}$	no	68.00%	67.00%
monoLingualEmoticons5classes$_{AfroLM}$	yes	**70.38%**	**69.56%**
crossLingualNoEmoticons5classes$_{BERT}$	no	60.02%	59.23%
crossLingualEmoticons5classes$_{BERT}$	yes	61.56%	60.03%

➔ Impact of emoticons in the tweets on system performance

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- Impact of emoticons in the tweets on system performance
- Cross-lingual system better for 3 classes
- Mono-lingual system better for 5 classes
- Performances with 3 classes are higher than with 5 classes

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CONCLUSION AND FUTURE WORK

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Conclusion

- Shona is spoken by 16.6 million people

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- **System combination**
- expand **SAfriSenti** with more African low-resourced languages

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THANK YOU

Tim Schlippe
tim.schlippe@iu.org

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