UnMute

Speech Interactions Designed With Minoritised Language Speakers

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Motivation

- Speech-based systems are not currently available for the vast majority of languages
- This leaves many communities digitally ‘unheard’
  - Especially for languages that are not commonly written or entirely unwritten [1]
- Existing datasets do not represent the day-to-day languages used (e.g., code-switching) [2]
- This further embeds the digital and linguistic inequality and excludes millions of people worldwide

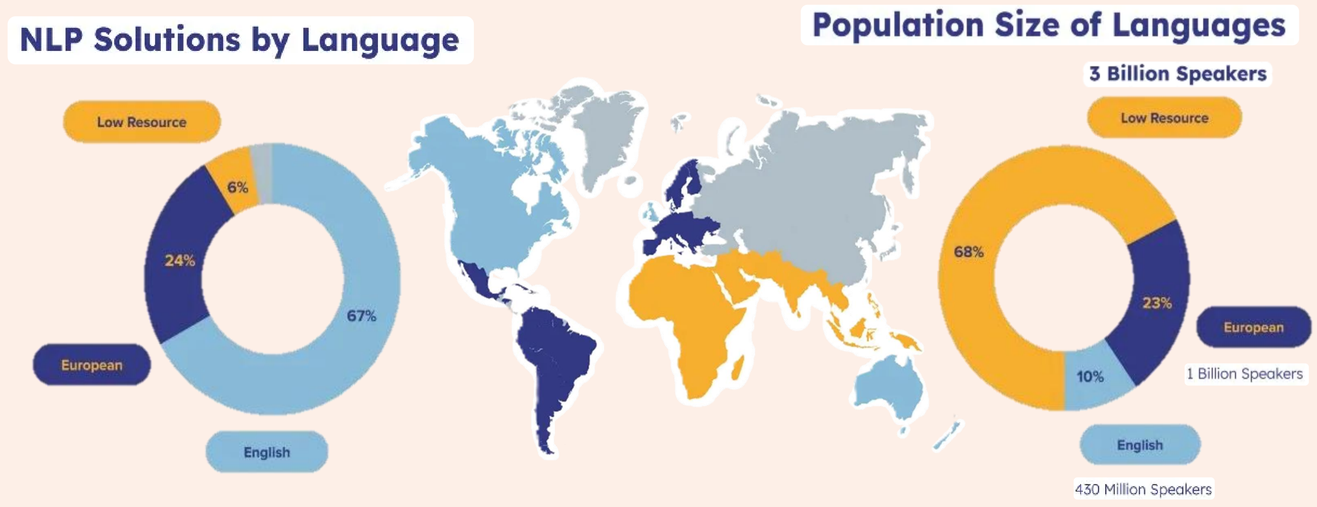


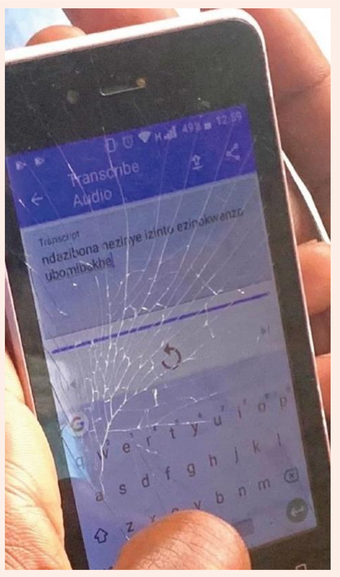
Image Source: https://medium.com/neuralspace/low-resource-language-what-does-it-mean-d067ec85dea5

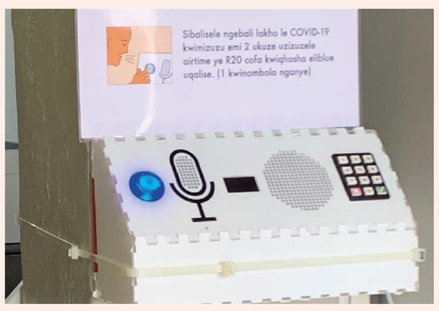
The UnMute Project

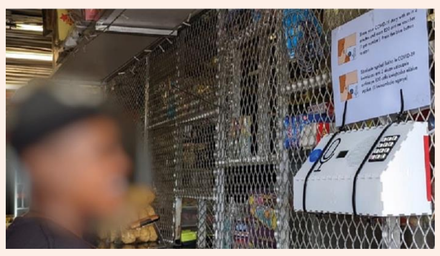
- Interdisciplinary project: HCI, NLP and linguistics researchers
- Aims to empower under-served voices from ‘low-resource’ language communities
- To do this, we co-create spoken-language technologies with communities in South Africa and India
  - Diverse, resource-constrained, and under-heard communities
- These co-created prototypes:
  - Demonstrate the benefits of human-centred methodologies, co-creating datasets and use-cases directly with communities
  - Illustrate how language technologies can broaden digital participation in communities of minoritised language speakers

Community-Based Data Collection and Engagement

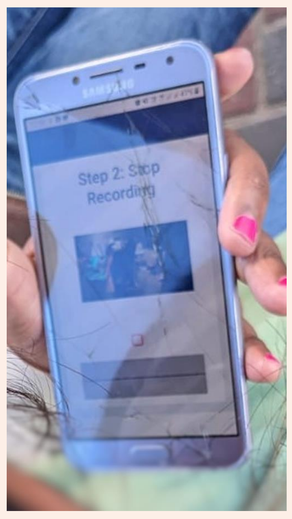
- Voices from Langa (left): a speech probe to engage minoritised language speakers in voice data-collection
- TranscriptTool (middle): an interface to involve community members in the transcription of collected speech data
- SpeechBox (right): a speech probe to gather community responses on their experience of COVID-19 lockdowns
- These probes and prototypes facilitate the collection of speech data from communities in their day-to-day context
  - Rich, every-day language
  - Code-switching
  - Reliable transcriptions

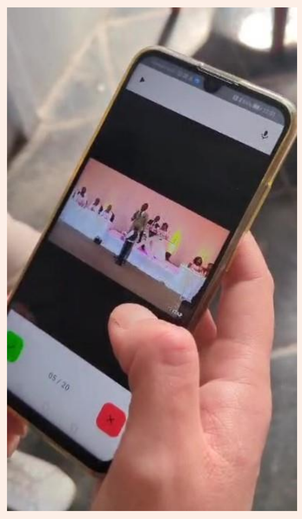






Speech Based Retrieval Application





- Two data collection platforms to gather audio annotations from communities
  - Verbally annotate images and videos
- Ranker trained on phone sounds of high resource languages and fine-tuned on small amounts of low-resource data
- Facilitates media retrieval without requiring written input
- Image retrieval on < 4 hours data
- 74% queries retrieve the correct image in the top 5 results

[1] S. Bird and D. Yibarbuk, “Centering the Speech Community,” in EACL’24, Mar. 2024, pp. 826–839.
[2] T. Reitmaier, E. Wallington, D. Kalarikalayil Raju, O. Klejch, J. Pearson, M. Jones, P. Bell, and S. Robinson, “Opportunities and Challenges of Automatic Speech Recognition Systems for Low-Resource Language Speakers,” in CHI ’22. Apr. 2022, pp. 1–17.

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