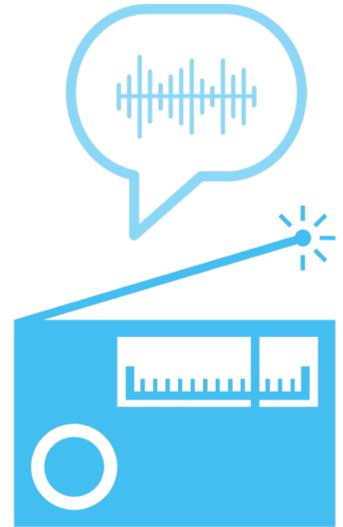
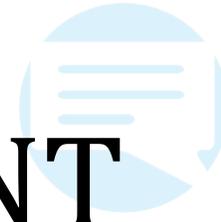


ANALYSING RADIO CONTENT



In rural areas, where almost 90% of the population lives, radio serves as a vital platform for public discussion, information sharing and news. The United Nations' initiative Pulse Lab Kampala, along with the University of Edinburgh and Stellenbosch and with support of the Embassy of Sweden in Uganda, is developing a prototype that makes it possible to conduct analysis of public discussions on radio. The tool under development is unique and a worldwide innovation. For the first time automatic speech-to-text technology is developed for African languages (Ugandan English, Luganda and Acholi) from radio in combination with data mining. For the first time also people's voices from public radio broadcasts are accessible to advance the Global Goals.

OBJECTIVES

1. **DEVELOP** a tool that can convert what people say on the radio into text. In order to do so a number of technical preparations need to be made. This challenging process has never been done before for local African languages.
2. **ANALYSE** radio content for predetermined topics of interest such as 'malaria', 'flood' or 'domestic violence' that are automatically found by the tool. And test if this tool can be used as an early warning tool to signal issues ongoing at local level.

HOW IS THIS DONE



Someone calls in to a radio talk show or the presenters discuss a topic of importance to them.



This broadcasted speech is detected through small hardware deployed across the country.



What people say on public discussions is transformed into text. The topics of interest related to the Global Goals are automatically found by the tool.



Trending topics are visualised in a web interface, providing real-time insight into the needs and perceptions of the community.

PROJECT TIMELINE

Phase I March 2015 - March 2016

METHODOLOGY

- 1. DATA COLLECTION:** Receiving publically broadcasted radio is done by using computer based radio scanners that can record multiple radio channels at once. These radio scanners consist of USB sticks for receiving radio signals and are connected to a computer or a small low-cost Raspberry Pi computer. These recordings are split up into small audio clips that are uploaded to secure cloud server for analysis.
 - 2. TURNING TEXT INTO SPEECH:** Before being able to analyse the radio content a number of technical preparations need to be made in order to train the software to recognise and convert recorded radio speech in Ugandan English, Luganda and Acholi into text.
Firstly, at least 10 or more hours of speech need to be collected for human transcription, to provide in-context examples of how all of the keywords are spoken on the radio. This also includes names of places in Uganda or staple foods etc.
Secondly, the transcribed words must be entered in a pronunciation dictionary showing the commonest sequences of sounds people make as they say each word. If there no existing pronunciation dictionary available, one needs to be created by listing all of the words in the desired languages and how they are constructed from the phonemes their speakers use. The pronunciation dictionary is used together with the transcribed recordings to build acoustic models of all the sounds people utter as they talk about the subjects of interest.
Thirdly, a language model needs to be built, which is an estimate of how likely each word is to be spoken. A likelihood that is strongly influenced by the preceding and following words, e.g. “torrential” and “rains”. The more available, the better the estimates can be.
 - 3. ANALYTICS:** Pulse Lab Kampala aims to derive two types of analysis results with the tool:
Qualitative; where we provide the ability to listen to people’s opinions.
Quantitative; where for example we look at trends over time (e.g. spikes in the number of mentions of a topic may be an early warning signal), or monitor the extend of local floods.
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EXPERTS AT THE LAB

Developing the prototype requires a skilled group of people with the right technical expertise. Pulse Lab Kampala currently consists of the following experts:

- Transcribers
 - Speech recognition researchers, in collaboration with Stellenbosch University.
 - Speech technology software developers
 - Data engineers
 - Data scientists
 - Development practitioners
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