WAXAL: A LARGE-SCALE MULTILINGUAL AFRICAN LANGUAGE SPEECH CORPUS

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ABSTRACT

The advancement of speech technology has predominantly favored high-resource languages, creating a significant digital divide for speakers of most Sub-Saharan African languages. To address this gap, we introduce WAXAL, a large-scale, openly accessible speech dataset for 21 languages representing over 100 million speakers. The collection consists of two main components: an Automated Speech Recognition (ASR) dataset containing approximately 1,250 hours of transcribed, natural speech from a diverse range of speakers, and a Text-to-Speech (TTS) dataset with over 180 hours of high-quality, single-speaker recordings reading phonetically balanced scripts. This paper details our methodology for data collection, annotation, and quality control, which involved partnerships with four African academic and community organizations. We provide a detailed statistical overview of the dataset and discuss its potential limitations and ethical considerations. The WAXAL datasets are released at https://huggingface.co/datasets/google/WaxalNLP under the permissive CC-BY-4.0 license to catalyze research, enable the development of inclusive technologies, and serve as a vital resource for the digital preservation of these languages.

Index Terms— African language, ASR, TTS, Speech, dataset

1. INTRODUCTION

The proliferation of voice-enabled technologies, from virtual assistants to automated transcription services, has transformed human-computer interaction. However, the benefits of these advancements are unevenly distributed, with a stark concentration in a handful of high-resource languages. This has left hundreds of millions of people, particularly in Sub-Saharan Africa, unable to access technologies in their native tongues. The primary bottleneck for developing robust Automatic Speech Recognition (ASR) and Text-to-Speech (TTS) systems is the profound scarcity of large-scale, high-quality, and permissively licensed speech corpora.

Africa, home to 1.3 billion people and over 2,000 distinct languages, represents one of the most linguistically diverse regions on the planet. Despite this richness, Sub-Saharan Africa remains critically underserved by modern speech technology largely due to the scarcity of large-scale speech corpora in many of these languages. This data deficit is exacerbated by the unique linguistic characteristics of the region, such as tonal distinctions, complex morphology, and prevalent code-switching, which pose significant challenges for standard modeling paradigms. Without foundational datasets, it is impossible to train, evaluate, and adapt models to serve the educational, accessibility, and communication needs of these communities. To address this critical need, we present the WAXAL dataset, a new, large-scale resource for 21 Sub-Saharan African languages collected in partnership with four African academic and community partners and supported by Google's technical mentorship. The collection features both ASR and TTS data for languages such as Acholi, Kiswahili, Luganda, Akan, and Ewe; ASR data for Shona, Fula, and Lingala; and TTS data for Hausa, Igbo, and Yoruba, among others. Our primary contributions are:

- A Large-Scale ASR Corpus: We release approximately 1,250 hours of transcribed, image-prompted natural speech from a diverse pool of speakers, suitable for training and

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Fig. 1. Examples of some of the images used as prompts to elicit natural speech for the ASR dataset.

evaluating ASR models.

- A High-Quality TTS Corpus: We provide over 180 hours of studio-quality recordings from members of the community reading phonetically balanced scripts for 10 languages, designed for building high-fidelity TTS systems.
- Rich Metadata and Annotation: The data is accompanied by valuable metadata, including speaker demographics, and was transcribed by local language experts, ensuring high linguistic quality.
- Permissive Licensing: The entire WAXAL collection is made publicly available under a CC-BY-4.0 license to encourage widespread use in both academic and commercial research.

2. RELATED WORKS

In recent years, several significant multilingual datasets have been released, aiming to broaden linguistic diversity. Prominent examples include Common Voice [1], which has crowd-sourced over 19k hours of recordings in 100 languages, and FLEURS [2], covers 102 languages with approximately 12 hours of supervised data each. Other pioneering efforts like BABEL project provided conversational telephone speech for 17 low-resource languages [3], while the CMU Wilderness dataset [4] contains recordings in over 700 languages. For unsupervised and semi-supervised applications, datasets like VoxLingua107 [5] and YODAS [6] offer thousands of hours of unlabeled speech from YouTube. However, a significant portion of these resources is concentrated on high-resource languages, and the ones on low-resource languages such as GigaSpeech 2 [7], still lack substantial representation of African languages, leaving a critical gap.

When focusing specifically on Sub-Saharan African languages, existing public datasets are often limited in scale, scope, or speaker diversity. For ASR, prior work includes datasets derived from radio archives, such as [8] containing

∼10k utterances from 49 speakers . The ALFFA project made valuable contributions by collecting prompted speech for four languages, including Wolof [9]. Similarly, resources for TTS in African languages remain scarce. [10] detailed a methodology for rapidly developing high-quality corpora for four South African languages. More recently, BibleTTS [11] released a significant corpus containing over 80 hours of single-speaker, studio-quality aligned speech for six languages spoken in Sub-Saharan Africa. While these datasets are invaluable, they cover a limited number of languages and speakers.

Our work directly addresses these gaps by introducing a large-scale, unified dataset for 21 Sub-Saharan African languages. With approximately 1,250 hours of multi-speaker, transcribed speech for ASR and over 180 hours of high-quality, single-speaker recordings for TTS, our contribution significantly expands the data available for this linguistically diverse and technologically underserved region.
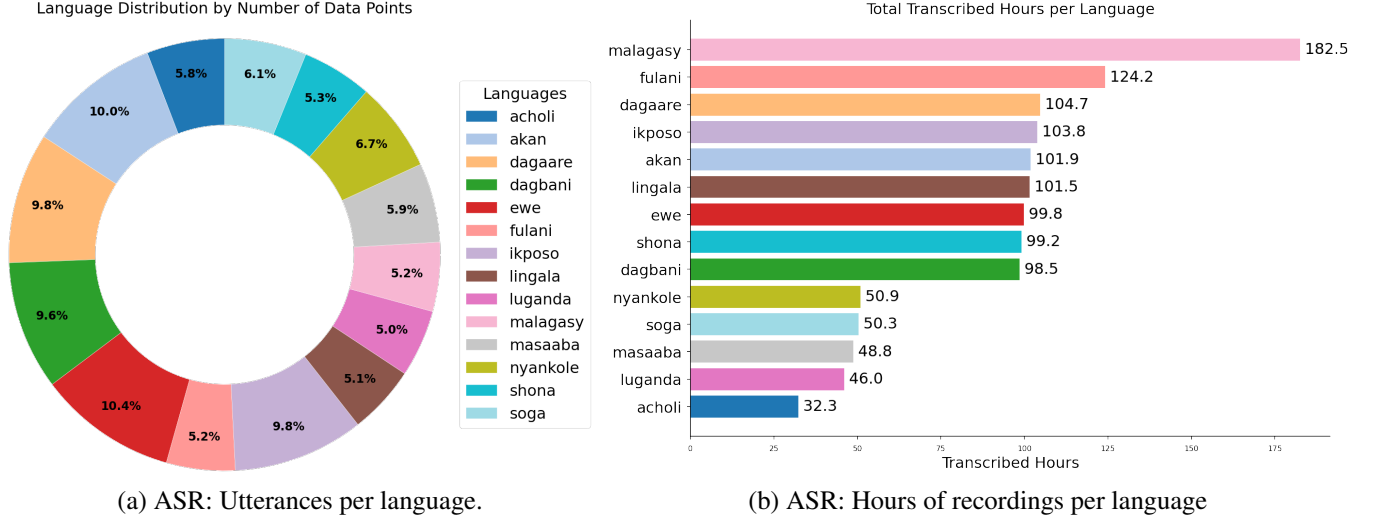
3. DATA COLLECTION METHODOLOGY

The WAXAL dataset was acquired through a multi-year effort (Jan 2021 - Mar 2024) funded by Google with involvement from several key partners in Africa, ensuring local expertise and community involvement: Makerere University, Uganda: Collected ASR data for 5 languages and TTS data for 4 languages. University of Ghana: Collected ASR data for 6 languages and TTS data for 2 languages. Digital Umuganda: Collected ASR data for 4 languages. Media Trust: Collected TTS data for 4 languages.
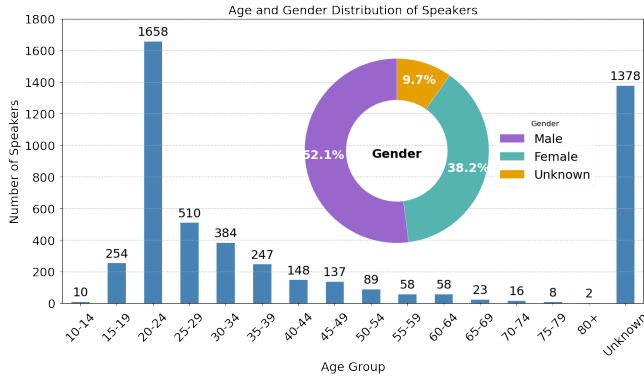
3.1. ASR Data Collection and Annotation

The ASR dataset was designed to capture natural, spontaneous speech. The process involved the following steps:
- Image-Prompted Speech: Participants were shown a diverse set of images covering at least 50 topics and asked to de-

(a) ASR: Utterances per language.

(b) ASR: Hours of recordings per language

Fig. 2. WAXAL-ASR: Distribution of the ASR dataset sliced by language.

Fig. 3. WAXAL-ASR: Dist. of age and gender of speakers.

scribe them in their native language. This elicits more natural and varied speech compared to scripted reading [12].

- Recording: Each recording was captured in the speaker's natural environment and has a minimum duration of 15 seconds. Data collection aimed for gender balance and a wide distribution of speaker ages.
- Transcription: A subset corresponding to 10% of the total collected audio was transcribed by paid, local linguistic experts. Transcriptions were created using the local script where available; otherwise, transliteration to the English alphabet was performed. Each recording was transcribed by a single annotator.
- Quality Control: Transcriptions and audio underwent a quality control process to check for clarity, language accuracy, relevance to the prompt, and appropriate content. Personally identifiable information, if any, was removed during this stage.

The intentionally collected attributes for the ASR dataset in-

clude speaker age, gender, language, and recording environment (e.g., Indoor, Outdoor, Office).

3.2. TTS Data Collection

The TTS dataset was designed for building high-quality, single-speaker synthetic voices.

- Script Development: A phonetically balanced script of approximately 108,500 words was created for each of the 10 target languages.
- Voice Actor Selection: 72 male and female community participants (36 male and 36 female) were contracted.
- Studio Recording: All recordings were conducted in a professional studio-like environment to ensure high audio fidelity and minimal background noise. The goal was to obtain approximately 16 hours of clean, edited audio per voice actor.

The collected attributes for the TTS dataset include speaker ID, gender, and language.
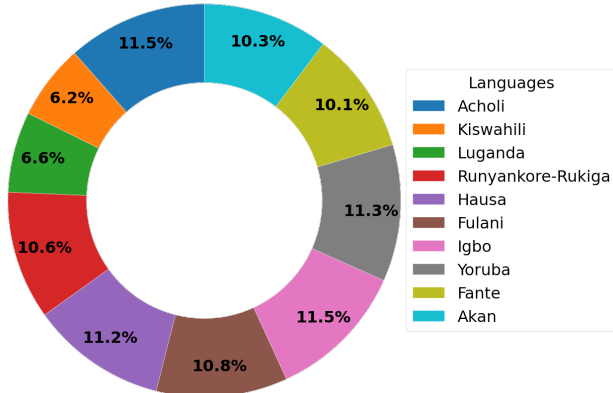
4. DATASET STATISTICS

The WAXAL collection comprises distinct ASR and TTS datasets. The ASR dataset spans 14 languages, and the TTS dataset spans 10 languages. The total size of the released, transcribed ASR data is 1.7 TB, while the TTS data is 99 GB. Table 1 provides an overview.
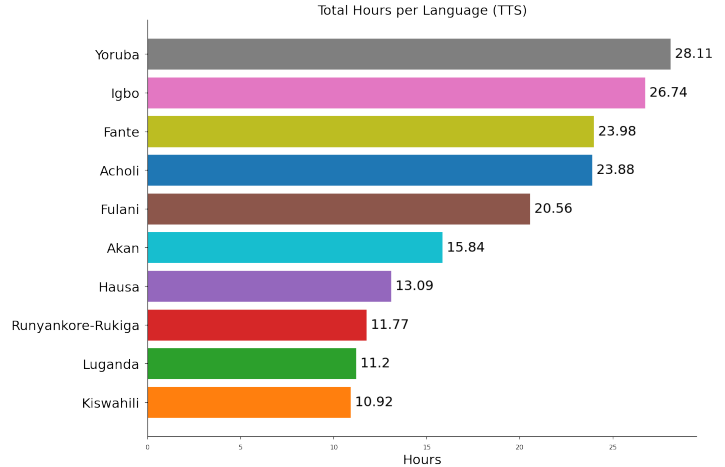
Table 1. Statistics of the WAXAL ASR and TTS datasets.

Dataset	# Languages	Total Hours	# Instances
WAXAL-ASR	14	∼1,250	224,767
WAXAL-TTS	10	∼186	17,660

TTS Language Distribution by Number of Data Points

Languages
- Acholi
- Kiswahili
- Luganda
- Runyankore-Rukiga
- Hausa
- Fulani
- Igbo
- Yoruba
- Fante
- Akan

(a) TTS: Recordings per language.

Total Hours per Language (TTS)

Language	Hours
Yoruba	28.11
Igbo	26.74
Fante	23.98
Acholi	23.88
Fulani	20.56
Akan	15.84
Hausa	13.09
Runyankore-Rukiga	11.77
Luganda	11.2
Kiswahili	10.92

(b) TTS: Hours of recordings per language

Fig. 4. WAXAL-TTS: Distribution of the TTS dataset sliced by language.

5. LIMITATIONS AND ETHICAL CONSIDERATIONS

The release of any large-scale human data requires careful consideration of its limitations and ethical implications.

5.1. Limitations

- Transcription Coverage: The current ASR release contains transcriptions for only 10% of the total audio collected by our partners.
- Dialectal Representation: While efforts were made to recruit diverse speakers, the dataset may not capture the full dialectal and socio-linguistic variation present within each language.
- Unintended Content: As the ASR data is unscripted, there is a small possibility of offensive or inappropriate speech, though this risk is mitigated by our manual quality control process.
- Use-Case Specificity: The ASR dataset, with its diverse pool of speakers and environmental conditions, is not well-suited for training high-quality, single-speaker TTS models.

5.2. Ethical Considerations

- Informed Consent: All participants in the ASR data collection and all voice actors for the TTS dataset provided informed consent for their speech to be recorded and released for research purposes under a permissive license.
- Speaker Privacy: All personally identifiable information was removed from the transcripts and metadata. However, attributes such as ethnicity and race can likely be inferred from a speaker's language and accent.
- Voice Actor Rights: The release of the TTS dataset enables broad community benefit but carries the risk that the voices could be used in ways we did not foresee. We believe the benefits of enabling technology for these languages outweigh the risks.
- Annotator Compensation: All local language experts contracted for transcription were compensated at rates well above the local hourly average for their region.

6. CONCLUSION

The WAXAL dataset represents a significant step toward addressing the resource scarcity that has hindered the development of speech technologies for Sub-Saharan African languages. By providing over 1,400 hours of high-quality, annotated ASR and TTS data across 14 languages, we offer a foundational resource for building and evaluating models, conducting linguistic analysis, and fostering a more inclusive digital ecosystem. We have detailed our collaborative methodology, which prioritized local expertise and ethical data handling. We hope that this resource will empower researchers and developers to create practical, useful technologies that serve the communities these languages represent. The WAXAL datasets are being released publicly to the research community under the permissive CC-BY-4.0 license at https://huggingface.co/datasets/google/WaxalNLP.

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