AI4KSL: Bridging Language Barrier using Artificial Intelligence for Kenyan Sign Language among Deaf Learners

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Overview

This project seeks to develop an assistive Artificial Intelligence technology for Kenyan Sign Language. Goal: to have an assistive AI technology that converts spoken English to Kenyan Sign Language and have visual representation of the signs using virtual signing characters (Avatar) in real time.

OBJECTIVES
- Build dataset for spoken English and video recorded Kenyan Sign Language
- Develop a prototype assistive AI technology from spoken and written text to KSL
- Evaluation of the assistive AI technology

Methodology

**1: Data collection**

<table>
<thead>
<tr>
<th>ENGLISH</th>
<th>KSL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>That is an animal</td>
<td>ANIMAL THAT</td>
<td>ANIMAL: Two claw hand forms in front of the signer, moves in circular movement one after the other. THAT: One index finger in front of the signer with single movement in space away from the signer.</td>
</tr>
</tbody>
</table>

**2: Transcription: phonetic-level representation**

**3: Animation**

Hamburg Notation System (HamNoSys)

HamNoSys to Signing Gesture Mark-up Language (SiGML) to 3D rendering

Target

- 70 sign language teacher trainees (students), 16 teachers of hearing impaired learners and 1000 learners with hearing impairment.
- About 10,000 words and sentences (as per KICD curriculum)
- 30,000 video-clips of Kenyan Sign Language using (by at least 3 persons).

Results

- 4600 words
- 5900 sentences (Glossed)
- about 20,000 video clips
- Ongoing Video segmentation using ELAN [1]
- Ongoing Text transcription using HamNoSys notation [2]

Challenges

- Sign variation
- Glossing variation (focus on meaning)
- Dataset publication - Data Anonymization

References:

1. ELAN https://archive.mpi.nl/tlu/elan