A Framework for Rapid Development of Limited-Domain Speech-to-Sign Phrasal Translators

RAYNER, Emmanuel, et al.

Abstract
We present a web platform which permits rapid development of limited-domain speech-to-sign translators; the work leverages a line of research on limited-domain speech applications that has been pursued at Geneva University, extending it to sign language output. The type of application supported typically uses a vocabulary of a few hundred to a couple of thousand words/signs, and grammatical coverage of a few dozen to a few hundred syntactic patterns.

Reference

Available at:
http://archive-ouverte.unige.ch/unige:79988

Disclaimer: layout of this document may differ from the published version.
A Framework for Rapid Development of Limited-Domain Speech-to-Sign Phrasal Translators

Manny Rayner, Pierrette Bouillon, Sarah Ebling, Irene Strasly, Nikolaos Tsourakis
University of Geneva, FTI / TIM, Geneva, Switzerland
University of Zurich, Institute of Computational Linguistics, Zurich, Switzerland
(Emmanuel.Rayner, Pierrette.Bouillon, Irene.Strasly, Nikolaos.Tsourakis)@unige.ch, ebling@cl.uzh.ch

What is this exactly?
How do I get from speech to sign?
Create your own speech-to-sign translation app!

Overview

1. Speech to sign table
   - Input: speech
   - Speech recognition using Nuance platform
   - Translation rule formalism: Synchronous Context Free Grammars (SCFG)
   - Output: glosses and non-manual information

Rule:
Utterance
Target/french départ à $heure:1 sur la $voie:1 $secteur:1
Target/gloss DEPART $heure:1 $voie:1 $secteur:1
Target/head Neutral Neutral Neutral Neutral
Target/gaze Neutral Neutral Neutral Neutral
Target/eyebrows Up Purrow Up Up Up
Target/aperture Wide Small Small Kid Wide Wide
Target/mouthing Dép $heure:1 $voie:1 $secteur:1
EndUtterance

Sign table:
Gloss DEPART KEURE DEUX VOIE TROIS SECTEUR D
head Neutral Mod Mod Neutral Neutral Neutral Neutral
gaze Neutral Neutral Neutral Neutral Neutral Neutral Neutral
eyebrows Up Purrow Up Up Up Up Up
aperture Wide Small Small Kid Wide Wide Kid Wide
mouthing Départ keu de voie feecteur deh

Platform: Key features

1. Speech to sign table (cont’d)
   - Input: sign table
   - HamNoSys and SAMPA previously produced from videos of Deaf signers
   - Intermediate step: gloss-to-HamNoSys and mouthing-to-SAMPA conversion

2. Sign table to SiGML
   - Output: form information in SiGML
   - SiGML is sent to avatar

Example:
<sigml>
  <manegetural_sigh glases="item_0" />
  <sigh_manual>
    <chandontiograph sghapes="figur2" />
    <chandontiograph sghapes="figur2" />
    ... <sigh_nomaunal>
      <facealgaap sghape="facial_expr_par">
        <eyebrow movemant="124" />
        <eyebrow movemant="76" />
        ...
      </facealgaap>
  </sigh_manual>
</sigml>

Translation process: Two stages
1. Speech-to-table translation
2. Sign-table-to-SiGML translation

Example:
Départ à deux heures sur la voie trois secteur D (‘Departure at 2 o’clock on platform three sector D’)

3. Animation
   - Signed language generation: JASigning
   - JASigning: fully synthesized signing (as opposed to hand-crafted animations or animations created from motion-captured data)

1. Get an account
   - Email us and ask for an account Emmanuel.Rayner@unige.ch
   - Say a few words about who you are and your plans
   - (We are currently in alpha testing…)

2. Write the rules
   - Read the documentation
   - (Example app is available on the web)
   - Write translation rules
   - Write HamNoSys definitions
   - Write mouthing definitions

3. Upload files over FTP
   - You need to install FileZilla first
   - Upload your files using drag-and-drop

4. Compile the app
   - Press the Compile button
   - Compiler gives feedback
   - Fix errors if necessary and upload again

5. Test the app
   - When your app compiles, press the Test button
   - Makes your app available for testing
   - Fix problems and repeat cycle

6. Release the app
   - Satisfied? Press the Release button
   - Makes your app public
   - Other people can now access it

...