

The SignON project: a Sign Language Translation Framework

Dimitar Shterionov¹, Vincent Vandeghinste², Horacio Saggion³, Josep Blat³, Mathieu De Coster⁴, Joni Dambre⁴, Henk van den Heuvel⁵, Irene Murtagh⁶, Lorraine Leeson⁷, Ineke Schuurman⁸

¹Tilburg University, ²Instituut voor de Nederlandse Taal, ³Universitat Pompeu Fabra, ⁴Ghent University, ⁵Radboud University, ⁶TU Dublin, ⁷Trinity College Dublin, ⁸KU Leuven

Any communication barrier is detrimental to society. In order to reduce such barriers in the communication between the deaf and hard-of-hearing (D/HoH) community and the hearing community, the SignON project researches machine translation to translate between sign and non-sign languages. SignON is a Horizon 2020 project funded by the European Commission, which commenced 01.01.2021 and lasts until 31.12.2023.

Within the SignON project, we develop a free and open-source framework for translation between sign language video input, verbal audio input and text input and sign language avatar output, verbal audio output or text output. Such a framework includes the following components: (1) input recognition components, (2) a common representation and translation component, and (3) output generation components.

- (1) The input side can consist of video containing a message in a sign language, in which case the meaning of the message in this specific sign language (Irish, British, Dutch, Flemish or Spanish Sign Language) needs to be recognized. Another input modality could be speech or text (English, Irish, Dutch or Spanish).
- (2) We will use a common representation for mapping of video, audio and text into a unified space that will be used for translating into the target modality and language. This representation will serve as the input for the output generation component.
- (3) The output component is concerned with delivering the output message to the user. In the simplest case the output is plain text; but it could also be speech, in which case a commercial text-to-speech (TTS) system will be used, or it could be that the requested output should be signed in one of the specified sign languages. In that case, the message will first be *translated* into a computational, formal representation of that specific sign language (Sign_A), which will then be converted into a series of behavioral markup language (BML) commands to steer the animation and rendering of a virtual signer (aka avatar).

SignON will incorporate machine learning capabilities that will allow (i) learning new sign, written and spoken languages; (ii) style-, domain- and user-adaptation and (iii) automatic error correction, based on user feedback.

The SignON framework will be distributed on the cloud where the computationally intensive tasks will be executed. A light-weight mobile app will interface with the SignON framework to allow communication between signers and non-signers through common mobile devices. During the development of the SignON application, collaboration with end user focus groups

(consisting of deaf, hard of hearing and hearing people) and an iterative approach to development will ensure that the application and the service meet the expectations of the end users.