Developing Speech-to-pictograph Translation Systems to Enhance Communication Accessibility

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PROjecting spoken language into PICTOgraphs

https://propicto.unige.ch

BACKGROUND

Alternative and augmentative communication (AAC) devices, for example communication boards, are an important means of expression for people with disabilities and their relatives. However, usage of these technologies can be cumbersome [1].

AIM

Creation of systems that automatically translate spoken French into pictographs:

- To improve **usability of AAC devices** for caregivers and people with cognitive impairments
- To improve **accessibility of medical care** across the language barrier

PROJECT OVERVIEW

- French-Swiss four-year project launched in early 2021
- Funded by the French National Research Agency and the Swiss National Science Foundation

Collaboration between:

- Department of Translation Technology at the University of Geneva
- Study Group for Machine Translation and Automated Processing of Languages and Speech, affiliated to the Laboratory of Informatics in Grenoble
- Primary Care Division of the Geneva University Hospitals

ARCHITECTURAL OVERVIEW: 2 APPROACHES

1. General domain: Voice2Picto

'le chat a mangé la souris'

('The cat ate the mouse')

Automatic Speech Recognition

Dependency Parsing [2]

Sentence-level Simplification

Expert Grammars

Translation into Pictographs

SPEECH

PICTOGRAPHS

2. Medical communication: pictoDr

'Est-ce que vous avez remarqué lorsque vous enlevez vos chaussettes qu'il y avait la marque de la chaussette ?'

(*'Did you notice, when you take off your socks, that there was a sock mark?')*

'Vous avez la marque des chaussettes ?'

(*'Do you have sock marks?')*

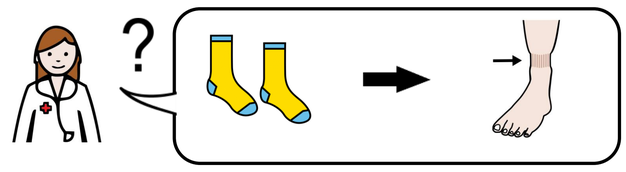
Automatic Speech Recognition

Neural classification to UMLS concepts [3]

UMLS
Unified Medical Language System

Socks	Causes	Skin mark	Question
Manufactured Object	Relation	Finding	Mode

Mapping of concepts to pictographs



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CONTRIBUTIONS

Methods and resources enabling a translation from spoken French into pictographs
The licenses will be as permissive as possible and conform to those of the pictographic sets being used.

Prototypes for different target audiences will be put into production at the end of the project:

- in emergency settings at the Geneva University Hospitals
- in institutions for children and adults with multiple disabilities

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