## Automatic Sign Language Translation：dos and dreams．

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## A brief intro

LEAD-ME

| COSTACTION | 2020-2024 |
| :---: | :---: |
| LEAD-ME | Leading Platform for European Citizens, Industries, <br> Academia and Policymakers in Media Accessibility |

## EASY荋



2017-2021

intElligent
Automatic
Automatic
SIgn languag
SIgnlanguag
tRanslation

2021-2023
https://www.project-easier.eu/


## EASIER- Background




H2020 Call for Proposal: ICT57
Projects that aims to design, develop, and validate a complete multilingual machine translation system that will act as a framework for barrier-free communication among deaf and hearing individuals and for a variety of specific contexts and languages

## EASIER- Goals

- Translation between sign languages and spoken languages (speech or writing)
- Multiple languages (e.g. DGS, DSGS, LSF, LIS, BSL, GSL, NGT,...)
- Automatic (near-realtime) and semi-automatic (human post-editing)
- Mobile app demonstrating the automatic route
- Goals shared with the SignOn project (both funded within EU ICT-57)


## Lessons learnt from earlier projects

- Producing comprehensible and easy-to-read signing is a must:
- Producing a signed utterance sign after sign simply is not enough!
- Communication is more than content-passing.
- Co-design with final beneficiaries of the innovation!


## EASIER- Approach

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## Main challenges and opportunities

Sign Languages are different from Spoken Languages
－No direct mapping between spoken languages and sign languages e．g．grammar，syntax，sequentiality vs．signing space
－Multidimensionality and multimodality of sign languages
－Annotation
－Data processing
－Data scarcity
－Combination of datasets（broadcast \＆linguistic）
－Combination of language－pairs
－Combination of approaches for translation（statistical vs lexical vs neural）
－Presentation of automatic translation results
－Mobile Interface
－Avatar／Virtual Human
－User acceptance and quality of translation
－Post－editing
－End users always in the loop
－Continuous evaluation

## Challenge 1: Data (quality \& quantity)

Multidimensionality and multimodality of sign languages

- Annotation
- Data processing


## Data scarcity

- Combination of datasets
(broadcast \& linguistic)
- Combination of language-pairs
- Combination of approaches
for translation
(statistical vs lexical vs neural)

Linguistic corpora


High quality
Variety of elicitation tasks
Source: Sign Language
Semi-spontaneous language production
Rich linguistic annotation + translations

Broadcasting data


Large quantity
News domain
Source: spoken language Interpreting under time pressure

Subtitles/Captions

## Challenge 1: Orders of magnitude

| Language | Number of <br> sentence pairs in <br> corpus* | Number of <br> sentence pairs in <br> broadcast data** |
| :--- | ---: | ---: |
| DGS | 64000 | 1130000 |
| BSL | 6000 | 1150000 |
| Std corpus for <br> English-German | 150000000 | 150000000 |

[^0]
## Challenge 2: Translation



- Speech-to-text to Sign
$\rightarrow$ State-of-the-art machine translation
$\rightarrow$ Avatar presenting signed output
- Sign to text (to speech)
$\rightarrow$ Robust data-driven video recognition
$\rightarrow$ State-of-the-art machine translation
$\rightarrow$ Output in text


## Challenge 2: Translation



KINDER FREUEN WARUM FERIEN NÄHER-KOMMEN

Die Kinder freuen sich, weil die Ferien näher kommen.


## Challenge 3: Presentation (Avatar)

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# Challenge 3: Presentation with affect 



## Challenge 4: Interaction

$\leftarrow$ Input Method
Start

## Challenge 5: Post-editing (NERstar)



## Challenge 5: Post-editing (Azee)



## Challenge 6: Sign Neologisms



## Challenge 7: Raise awarness and disseminate



Meet the EASIIER Consortium


## Thanks for your attention!

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[^0]:    * Public DGS Corpus, BSL Corpus
    ** Broadcast data prepared for processing within EASIER

