UP14
Early-stage development of the SignON Application & open Framework - Challenges & Opportunities

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SignON - Sign Language Translation Mobile Application & Open Communications Framework
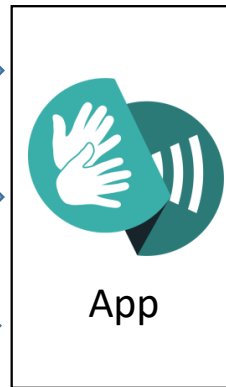
SignON is an EU Horizon 2020 Research & Innovation project, that is developing

- a **smartphone Application** & an **open Framework** to facilitate **translation between different European Sign, Spoken & Text languages.**

- The Framework will incorporate state of the art sign language recognition & presentation, speech processing technologies & multi-modal, cross-language machine translation.

- The Framework, dedicated to the computationally heavy MT tasks & distributed on the cloud powers the Application -- a lightweight app running on a standard mobile device.

- The Application & Framework are being researched, designed & developed through a co-creation user-centric approach with the European deaf & hard of hearing communities.

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SignON Application

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SignON Framework

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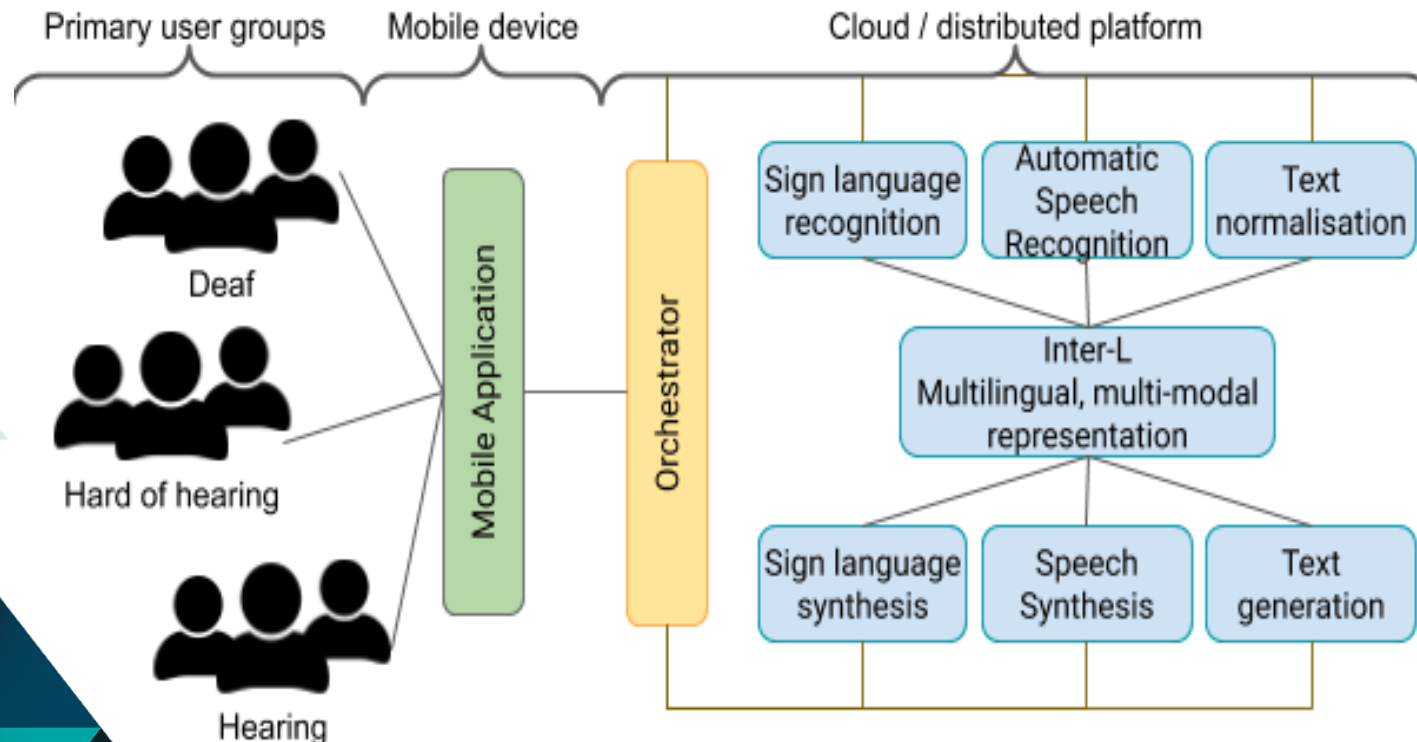
Framework's Machine Translation Components

WORK PACKAGE 3

WORK PACKAGE 4

WORK PACKAGE 5

TRANSFORMATION

ANALYSIS

ENRICHED GLOSSES, Sign_A + RRG SOURCE SL

DEPENDENCIES ROLES

language: ISL
speaker: female
gloss: man woman book give
mood: neutral

language: English
speaker: female
transcript: the man gave the woman a book
mood: neutral
syntax:

semantics: Prop: give
A0: man / A1: woman /
A2: book

InterL Representation

speaker: Dutch

FRAMENET
frame: transfer
donor: wn_10306910 (man)
recipient: wn_10204(woman)
transferors: wn_12346(book)

AMS (Abstract Meaning Repr)
(g / give-01
  :arg0 (m / man)
  :arg1 (w / woman)
  :arg2 (b / book)

InterL Embedding For Sentence
[12.2 -1.5 56.76 ...]

language: Dutch
speaker: female
text: de man gaf het boek aan de vrouw
mood: neutral

TEXT-BASED REP

LANGUAGE DEPENDENT GLOSSES

language: VGT
speaker: female
avatar instructions: man vrouw boek geven
mood: neutral

SYNTHESIS

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Early-stage development of the SignON Application & Framework

- DevOps Approach

- Users' driven Co-Creation Cycle

- Early & many Fast Prototypes

- Iterative Evolution towards the final Service
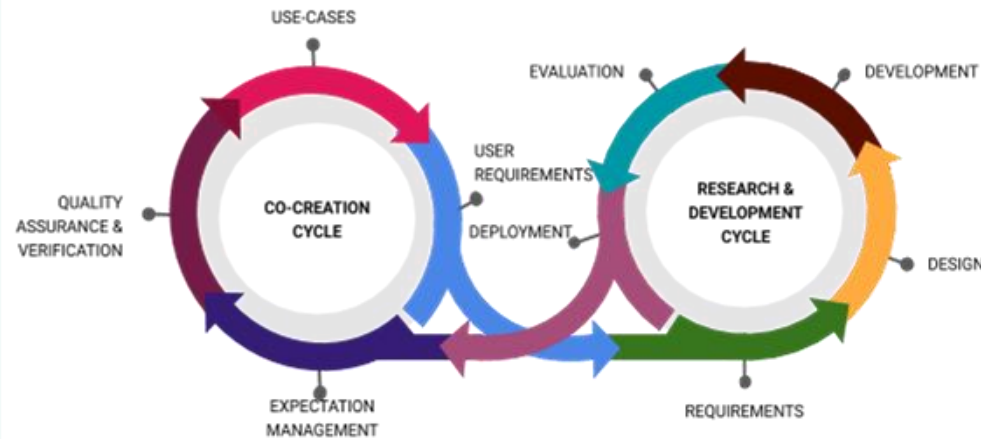
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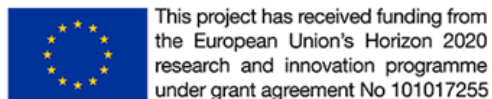
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Agile DevOps approach

- **User-driven Iterative co-creation evolution of the Application** until its final release at the end of the project - to ensure
  - wide uptake,
  - improved sign language detection &
  - multilingual speech processing on mobile devices for everyone
- An **initial fast prototype** to enable **users become actively involved** in the **Co-Creation Cycle** of its functional specification & its **co-development** from **start of project.**

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Nothing about us without us
=> Co-Creation Cycle

- **Expectation management**: SignON service (at its present stage) outline its intended use for defined use-cases & benefits for users.
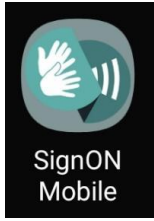
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017255

- **Quality assurance & verification**: Quality of the SignON service tested by the user community. Defined expectations are confirmed/discarded. QoS will re-evaluated & verified.

- **Use-cases**: Quality & functionality of SignON service considered in redefining currently addressed use-cases (if needed) & defining new ones.

- **User-requirements**: Collect evaluation metrics & statistics, reviews, & use case (re)definitions translated into user requirements drives development cycles.

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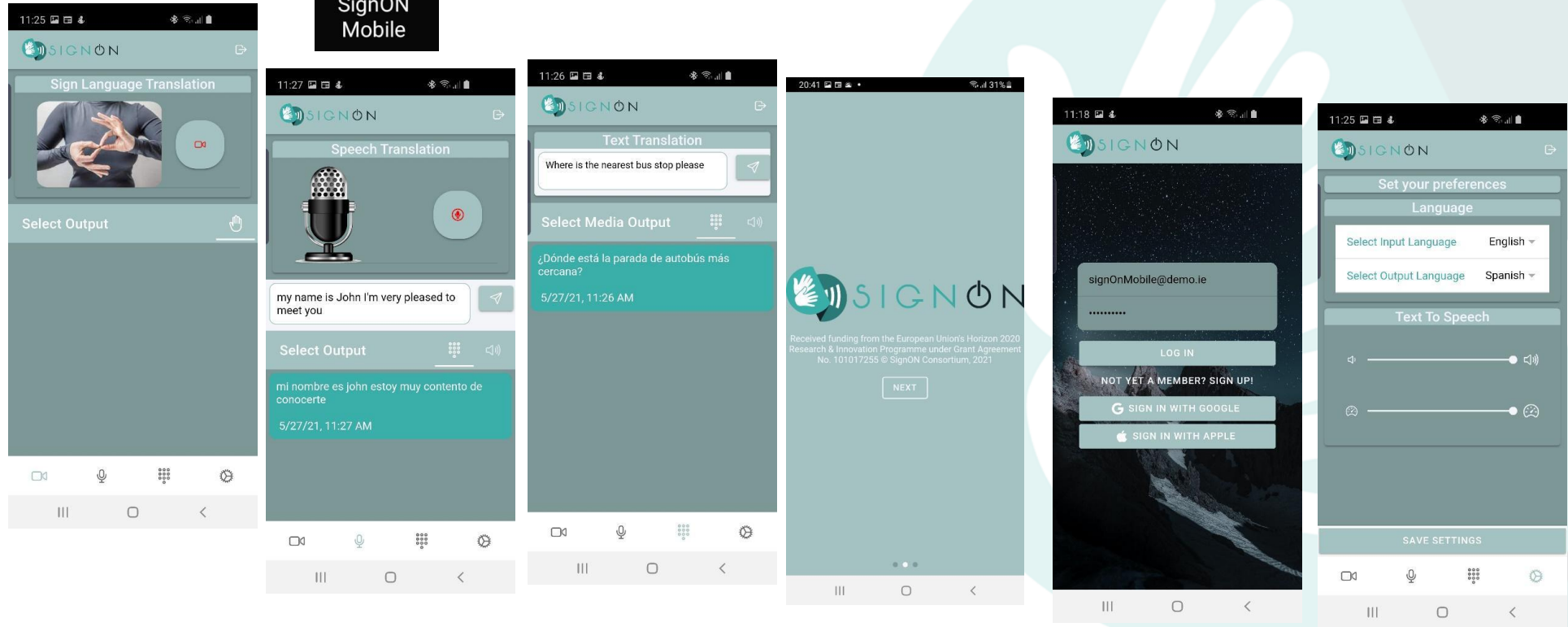
Initial Fast Prototype

- **For Signed, Spoken & Text Languages**
  - SignON Mobile App Input Functions
  - SignON Platform & Framework Services
  - SignON Mobile App Output Functions

- Users start to **see, hold & feel** something tangible
  - to provide realistic inputs on what they need,

- Developers appreciate the realities of the mobile app & Framework platform & cloud requirements.

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Initial Fast Prototype

SignON
Mobile

Published on Google **Play Store** as closed/hidden, for "**Internal Testing**" by Authorised Testers, that the Partners' Users applied to join

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Cognitive Walkthrough Evaluation Methodology

- Users' Use Case Tasks & Functions

- Scored the severity of any problems doing these

- System Usability Scale (SUS).

- User feedback suggestions

SignON Use Case Tasks / SignON Functions.	Functional App	SL input	SL output	Speech input	Speech output	Text input	Text output	Translate Mode	Translate Language
1. Install & run the SignON App on your Android mobile phone.	X								
2. Record a Video of yourself or another person Signing a message (in the Sign Language Translation screen).		X							
3. Display the Video – can you clearly see the Signing?			X						
4. Choose the Speaker's input language & your output language (English, Spanish or Dutch) in Setup screen.									X
5. Record an Audio of yourself or another person speaking a message (in the Speech Translation screen).				X					
6. Play the Audio & read its Text translated to your chosen output language (in the Speech Translation screen) – are they understandable?					X		X	X	X
7. Key in a Text message & translate to another language as text & speech. (in the Text Translation screen).					X	X	X	X	X

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Cognitive Walkthrough Results

- Users' overall severity score for the Walkthrough steps was "Low" & 79% (including 73% of sign language users) indicated they would recommend the App to a colleague
  - Indicating **a usable first prototype** & **good foundation for future** evolution of the App,
- **Users feedback** was over 70 suggestions that will now be addressed in the next iteration of the prototype
- Users' **SUS rating** for the SignON Mobile App was 80 overall
  - **Well above the SUS threshold** of acceptability of 68,
  - Indicating the **SignON App has started on the right track of what users need & want**.
- From the overall process the we **defined the User technical requirements** of the SignON Mobile App & Framework under the following features:
  - A. User's Mobile Device
  - B. System Performance
  - C. User Preferences
  - D. Sign Language Translation
  - E. Speech & Text Translation

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Challenges, Opportunities & Lessons Learned

- **Challenges**
  - ➢ Creating a **genuinely useful SignON**
    Sign, Spoken & Text languages translation & communications Service.

- **Opportunities**
  - ➢ **Users' positive feedback**
    - o They understand this is just the **first step**, but agree it has the **right look & feel**
    - o **Text & speech translations are good** already, but **Sign Language translation functions need to be developed & be as simple**, & available soon.
  - ➢ Cognitive **Walkthrough** process facilitates the **Co-Creation Cycle.**

- **Lessons Learned**
  - ➢ **Co-Creation DevOps** process with a **proactive user community** & **fast prototype A**pp enables an iterative evolution towards an **excellent final Service**
  - ➢ As one user commented -
    "Keep working with end users & everything will be fine".

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Thank you for your attention!

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