Independent access to webpages (reading, understanding, using) is often difficult or impossible for people with cognitive disabilities. The “Easy Reading” framework will improve the cognitive accessibility of original digital documents by providing real time personalisation through annotation (using e.g. symbol, pictures, video), adaptation (using e.g. layout, structure) and translation (using e.g. Easy-to-Read, Plain Language, symbol writing systems). The framework provides these features...
(semi-)automated services using HCI techniques (e.g. pop-ups/ Text-To-Speech (TTS)/captions through mouse-over or eye-tracking) allowing the user to remain and work within the original digital document. This fosters independent access and keeps the user in the inclusive discourse about the original content. Services adapt to each user through a personal profile (sensor based tracking and reasoning of e.g. the level of performance, understanding, preferences, mood, attention, context and the individual learning curve).

The interdisciplinary project team includes users with cognitive disabilities in all phases through the Inclusive Participatory Action Research Method (IPAR) ensuring to address real users’ needs. The “Easy Reading” framework is planned as a cloud based, open source and freely available support infrastructure. It will reach as many people with limited reading and language skills (e.g. people with cognitive disabilities - ~2,5% of the population - older adults, people with a different mother tongue) summing up to 25% in some regions or countries. Additionally, many more people will enjoy exploring new and unfamiliar content using personalisation at the original document.

The “Easy Reading” framework integrates state-of-the-art and future R&D and supports tools for annotation, adaptation and translation of content by providing a sustainable user-centred eco-system for personalisation. It promotes European economic ideals and enables independent applications to leverage the infrastructure and socialize their application for business (profit and non-for profit) in a new EU driven growth market.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far:

- Developed the IPAR/UCD method including an inform consent that allows people with cognitive disabilities to take part in every phase of engineering.
- The Easy Reading framework architecture has designed and implemented and is currently running stable in the cloud.
- Clients (Firefox and Chrome extensions, iOS App, Android browser extension) have been created. Currently the project focuses on improving the desktop clients and then to improve the mobile clients.
- An advisory board has been created that consists of 8 stockholders that have a direct (commercial, scientific) and/or indirect (social/political) interest in the developed system. They provide help on the projects and its development and deployment.
- Different engines for content simplification have been implemented and are deployed in the cloud.
- Framework users interfaces and the presentation of framework results were developed with the end users and are about to be tested in upcoming public user tests.
- Project staff are contributing to the development of the W3C Design Guide for Making Content for People with Cognitive and Learning Disabilities (Design Guide), which was recently published on 16 July 2019 as a W3C Working Draft.

Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)
The Easy Reading project will push the state of the art in the following areas:

- Inclusion of people with cognitive disabilities in research and development: Currently many projects and products for people with cognitive fail as end users are not actively integrated in the development process. Therefore a technique, called IPAR/UCD will be developed, that, supports co-research and inclusion in all phases of research and engineering processes from identifying, exemplifying and measuring the requirements, opinions, and wishes over design and development towards evaluation, application and maintenance.

- HCI supporting cognitive accessibility at the digital original: As diverse as the user group as diverse are the requirements of the user group towards HCI. The project aims to classify and identify different HCI paradigms that can be matched with the user profile, resulting an adaptive user interface that supports the abilities, preferences and individual needs of a user.

- Tracking for personalized cognitive accessibility: Perceiving and operating content with HCI comes along with an amount of mental load for the user. Complex content and user interfaces will force a higher attention level of the user and cognitive disabled persons might get disoriented or even overloaded by the amount of information presented to them. Therefore the project aims to detect the current mental load levels and emotional state of the user with state of the art sensors, so that the framework could automatically react when the user faces problems.

- Content annotation, adaptation and translation for cognitive accessibility: The framework allows to integrate methods and tools for annotating, adapting and translation of web content to improve cognitive accessibility. This methods and tools can be extended by other researchers through the frameworks API, which results in a growing framework functionality.

- Contribution to standards: Research outcomes of the project will be used to contribute to standards and guidelines to make content better understandable in particular by making content ready for personalisation by (semi-)automatic annotation, adaptation and translation.

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