Quality of life. Smart working environment. User centric design

WA involves combining technology with empathy to create wellbeing experiences for people to make sense and adapt to a world that is constantly changing

ABOUT THE PROJECT   WA TOOL

Welcome to the August 2020 WorkingAge Newsletter!

We hope you enjoyed our first edition of the **WorkingAge** Newsletter. We are back with the second edition of the **WorkingAge** Newsletter, a running project funded by the European Commission under Horizon 2020 programme, the EU Framework Programme for Research and Innovation. We would like to share the latest project news. We will also take a look at some of the exciting things we have coming up in the next few months.

Want to know more? Keep up to date on all project news **@Workingage_EU** and sign up for the Newsletter so you never miss out.

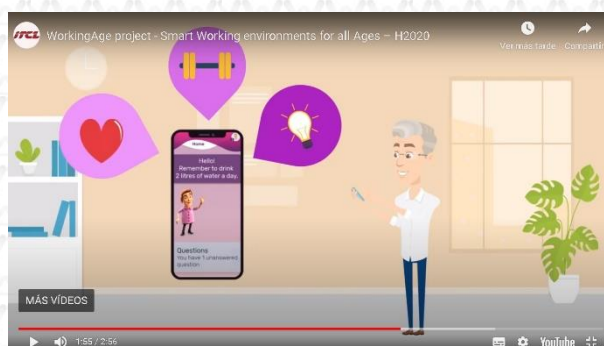Questions? Contact **info@workingage.eu**

Latest project news

Promotional video of the WorkingAge project | July 2020

What is the WorkingAge project? Why? How? Do you know the WAOW Tool?

The **WorkingAge** project is a research project aiming to improve older people's well-being at work.

Discover the **WorkingAge** promotional video where you can learn all about it!

Learn more

The WorkingAge of Well-being (WAOW) Tool

The **WorkingAge Of Well-being (WAOW) Tool** aims at improving the health and well-being of people at work by supervising their working conditions and providing different types of advice through personalised technologies and friendly & intelligent human interfaces.

The **WAOW Tool** uses state-of-the-art sensing, networking and cloud technologies to collect and analyze information on working conditions and make personalized recommendations while ensuring data security and privacy. The **WAOW Tool** is composed of a set of cameras, sensors, and wearables, connected to local and secured in company servers through a dedicated and encrypted wireless infrastructure. The system is connected to a remote location & emergency service and a remote backup server through secure IP tunnels.

The role of the **WAOW Tool** is to carry out all the interactions with the user through a set of human computer interaction (HCI) services. The application has been designed in full alignment with the project's user-centric principles, providing, among others, the following features:

- <u>Customisable notifications:</u> the users will be able to define the type of notifications they will be receiving, as well as their format and frequency.

- <u>Emergency service:</u> this is a prototype service with techniques enabling that alerts can be generated towards the user and/or the 112 service (depending on the severity of the situation and upon the user's consent).

- <u>Gamification:</u> the application will contain gamification-based features to ensure its uptake by the users and also to encourage their regular and consistent feedback and use.

- <u>Design-driven features:</u> the app will also include a series of design-driven features, such as unique user personas and individualised preferences.

- <u>Privacy and security:</u> the overall WAOW architecture ensures that the data provided by the users is treated in a privacy and security compliant manner, in alignment with GDPR.

- <u>Contactless interaction:</u> thanks to the gesture-based interaction platform, the users will be able to interact with the WAOW Tool through gestures.

The **WAOW Tool**, embedded in a mobile application, consists of the following main components:

1. A Decision Support System (DSS) Component: receives high-level data from the ecosystem of sensing devices, aiming to generate rule-based recommendations. In turn, the DSS component comprises of:

   - A DSS API, which enables the rest of the Android App to use the functionalities of the DSS.

   - The main DSS module which, leveraging the ProbLog engine, makes use of the intervention rules and generates the advices.

- A rule updater, which customises the intervention rules.
- A persistency storage, where the DSS saves its state whenever the mobile application is closed by the Android OS.

2. The Location & Emergency Service component: in charge of spotting the geolocation of the user and to convey the emergency alerts (in a format of an 'emergency message') to the PEMEA Emergency Service Emulator on the cloud. Thus, this component consists of:

- A Position Engine: computes the user's location and identifies whether the user is located at a work, home or office environment and forwards this information to the DSS Component.
- An Emergency message generator: creates and forwards the emergency messages, originally triggered by the DSS, to the PEMEA Emergency Service Emulator.

3. A UI component: including all the user interface-related services of the mobile application and mainly the module which visualises the recommendations to the user.

4. A Registration component: meant to be used only for the registration of the users with the WA Tool.

5. An Encryption/Decryption Service: responsible for encrypting any personal data of the user that is acquired via the application before sending it to the cloud, and also to decrypt the encrypted data received.

6. A Bluetooth service component responsible for connecting and receiving information from sensors connected directly to the smartphone: smartband, smart body scale, environmental sensors...
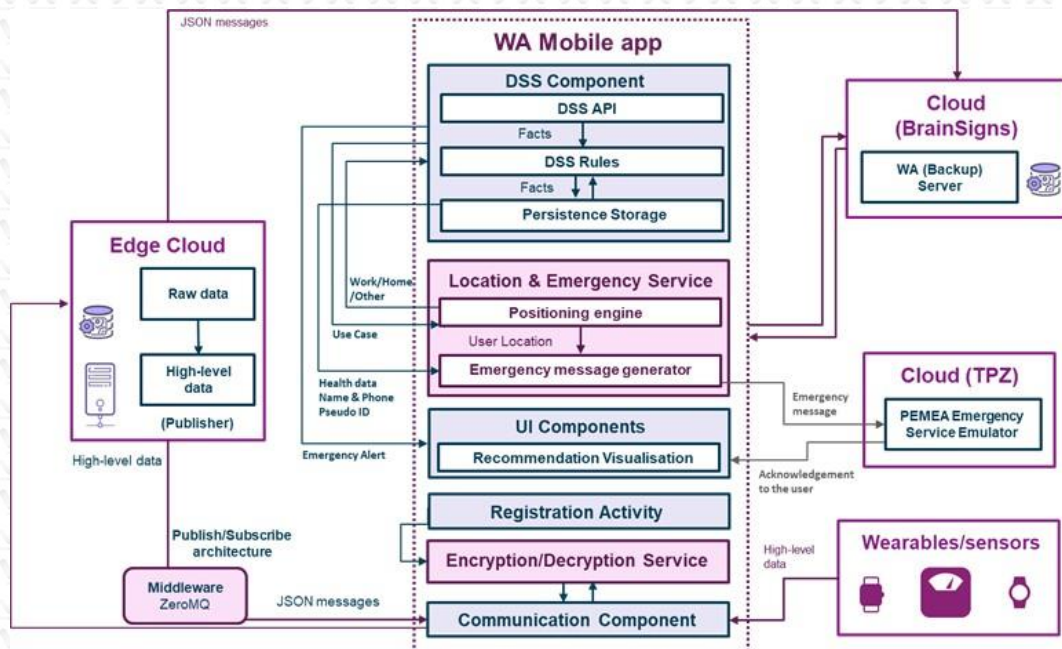
If you want to know more about the progresses of the **WAOW Tool**, follow our social networks and our blog (https://www.workingage.eu/category/blog/), where **WorkingAge** periodically uploads information about the project.

How can technology applied to the work environment be leveraged to respond to the emerging challenges raised by COVID19?

It is an apparent fact that the COVID-19 pandemic has changed the way we currently work, whether we go to our usual workplace or work from home. The COVID-19 epidemic is causing in many workers feelings of isolation aggravated by the measures of lock-down and social distancing, and psychological distress due to having to juggle many roles and responsibilities (e.g., home schooling, caring, teleworking) in a constrained home environment . This necessitates out-of-the-box solutions and much needed revisions to the Occupational Safety and Health (OSH) policies starting from in-company level.

In the current challenging COVID-19 climate, highly charged negative emotions such as fear, anxiety and distress can be overwhelming, and work-related stress can lead to mental exhaustion and burnout. Not being able to effectively cope with these emotions can negatively impact the well-being of the worker, the well-being of the people they care for, their colleagues at work, and their wider communities. Therefore, it is crucial to recognize the signs of distress, and early signs of depression, and take prompt action to manage these effectively and build resilience.

In this new work context caused by the COVID-19 pandemic, technologies such as the **WorkingAge Of Well-being (WAOW) Tool** developed in the framework of the **WorkingAge** project (https://www.workingage.eu) are of outmost relevance. The aim of the **WAOW Tool** is (i) to recognize negative and unhelpful emotions and strain level of the worker by using (wearable) sensors as well as self-reporting, (ii) to monitor environmental variables such as noise and luminance, and (iii) to reduce psychosocial stress based on an intervention model focused on monitoring worker's health as well as issuing appropriate recommendations. Different working conditions (home-office, manufacturing and call-centre) are considered for this project. This **WAOW Tool** is being developed with the final goal of implementing an intervention program with older workers to prolong their work ability and autonomy, and promote well-being throughout all areas of their lives. This is especially useful in effectively responding to the challenges raised by COVID-19.

Are there changes to the actual priorities and needs, considering the pandemic situation?

The COVID-19 pandemic has highlighted the need to reinforce the health and social services systems, make them more resilient and equipped with technological capability and knowledge to more readily face similar situations. In the field of OSH in particular, strengthening the occupational health and safety of workers, but not only physical health, also mental health, which is one of the major aspects neglected by companies.

Most companies have focused on implementing organizational and personal measures to avoid or minimize exposure to the new Coronavirus (SARS-CoV-2). Stress, anxiety and other strong emotions have also been considered important aspects to address by companies, and in some cases tailored plans have been developed and tools have been used to try to improve the mental health of workers.

Is this an opportunity for projects such as WorkingAge to underline the needs to introduce a digital revolution in the workplace?

The COVID-19 outbreak and subsequent lock-down measures have paved the way for the acceleration of digital transformation as companies shift operations to cope with office closure, restricted mobility and supply disruption. Experts caution that this collective response should focus not only on immediate actions, but also on transformative actions to enable sustained resilience.

The crisis caused by COVID-19 has made it clear that, in many organizations, digitization or business continuity were not mature enough. However, the prospect of long-term economic paralysis will lead organizations to prioritize investments in long-term resilience over daily operational needs.

Basic trends, like teleworking, will continue. As for the safety and security requirements that were already key, they will continue to gain importance and have an impact on sustainable development. Companies will further invest in the use of technologies to improve their production processes and improve the occupational health and well-being of their workers (one of their main assets). Therefore, the COVID-19 pandemic will act as a driver of the digital revolution in the workplace across many levels.

The **WorkingAge** pilots will be deployed during the next couple of months within this new context of COVID-19 threat. The Large Scale Pilot activities will be executed in various deployment sites by establishing and consolidating the local IoT ecosystems for aging well. This activity will cover the operation of the Use-Cases under load and constraints conditions targeted to a large amount of heterogeneous devices and systems and large amount of real users. The current work environment characterized by COVID-19 provides a unique opportunity to analyse the goodness-of-fit of the **WAOW Tool** developed by the **WorkingAge** project. We expect to learn valuable lessons in this process and share them with the relevant parties to create more purposeful technologies that are better able to support their workers' well-being.

"The future of Work" Session – WorkingAge goes Public | March, 2020

In line with the motto "digital change, digital work, digital people?" **WorkingAge** successfully participated in the Society for Industrial Engineering's first digital conference of the 66th spring convention (German: Gesellschaft für Arbeitswissenschaft) in March.

The **WorkingAge** project has chaired its own session "Future of Work – Smart Digital Assistance for Tomorrow's Workplace" and entered the international discourse with exciting scientific contributions on this topic.

DIGITALER WANDEL, DIGITALE ARBEIT, DIGITALER MENSCH?
66. Frühjahrskongress der Gesellschaft für Arbeitswissenschaft
16.–18.03.2020

Learn more

Second official meeting of Working Age project in Cambridge | Cambridge, UK | February, 2020

The second official meeting of **WorkingAge** project took place in Cambridge, from February 18th to 20th, 2020.

During these three days of intense meetings, the project partners have tried to make progress in the design of the pilots that will take place in the laboratory, as well as in the structure of the data that are intended to be collected and how to organize them for the **WAOW Tool**, compose by a set of sensors that capture variations of the person and the environment, could provide precise indications on how to maintain or improve their health conditions to future users in their work environment and at home.

[Learn more](#)

Blogs from WorkingAge partners

Breakdown of the E112 service of the WAOW Tool

In this post, we present the breakdown of the E112 service followed in all research and development work within **WorkingAge**.

Following the findings in the state-of-the-art analysis, it is clear that several apps, connected devices and systems look at how they can integrate emergency communications in their feature sets.


These features aim to make emergency calling available within the apps that people regularly use and provide emergency responders with data already collected and available in the apps. The E112 service of the **WAOW Tool** will follow a similar approach and reuse data already collected by the tool from its sensors, in order to enable an improvement to the emergency response needed by the **WorkingAge** user.

[Learn more](#)

The Path to a User-Friendly Tool

Due to the Corona crisis, the in-lab testing was not performed as a face-to-face study but rather as an online survey. This change in testing, however, wasn't all negative. In fact, due to the online survey, we were able to reach a far greater audience than previously anticipated.
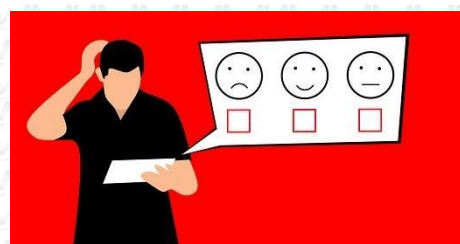
The online survey allowed a total of 65 users from 5 different nations to voice their thoughts on the interface of the **WAOW Tool** as well as state their concerns about the sensors. These user survey answers were detailed and gave insight into what users wanted to get out of the tool, as well as what needs to be taken a closer look at and possibly reworked.

[Learn more](#)

WAOW Tool Architecture

The challenge was to perform fast analysis over a large amount of data and provide quick feedback loop while ensuring best accuracy, security, and privacy of the data. Thus, in possibly constrained and mobile environments. The consortium therefore designed the **WAOW Tool**, an IoT platform that combines innovative sensing, networking and cloud technologies to perform real-time data analysis locally, directly at its source using fixed and embedded sensors & network and distributed edge computing.

[Learn more](#)

The importance of precise localisation information for emergency services

AML is a fantastic innovation allowing crucial time savings during missions where lives are at stake, but still knows some limitations: indeed, the location coordinates may not be always enough to help the rescuers, and notably inside big buildings.

This is why the E112 service of the **WAOW Tool** has been designed by Telespazio France to send extra information, together with the localisation of its user in distress, such as the address, the floor and the room number. It will help the rescuers to find their way very quickly in huge complex of buildings of big companies using the **WAOW Tool**.

[Learn more](#)

Understanding Facial Affect Analysis

A key module of **WAOW Tool** is facial affect analysis. Understanding facial affect is very important as this can potentially reveal information about what people feel and what their intentions are. Facial affect analysis can be performed by recognising the facial expressions of emotion, by predicting the valence and the arousal value of the displayed facial expression and by detecting the activated facial action units.

[Learn more](#)

"Too hot to think? Need more ventilation? Comfort at work"

The **WorkingAge** project partners have designed a proprietary environmental sensor device to assess environmental conditions in the workplace. This device measures illumination, temperature, relative humidity, and CO_2 concentration (a measure for "fresh air") and provides pre-processed information to the WA App via Bluetooth connection. By doing so, the system can perform an assessment on user comfort levels by monitoring programmable thresholds during predefined sampling periods, which provides high level comfort warnings.

[Learn more](#)

## The reasoning core of the WAOW Tool: the Decision Support System

One of the central actors of the **WorkingAge Of Well-being (WAOW) Tool** is the Decision Support System (DSS): such a system is a set of machine learning algorithms that support the worker while dealing with working activities. In particular, the DSS combines the use of models and analytic techniques with traditional data access and retrieval functions to assess the worker's cognitive and emotional states and provide recommendations accordingly.

[Learn more](#)

Security and Privacy

Data about ourselves, whether relating to our habits, our state of fitness, our location, is a part of ourselves that has increasingly become technically easy and inexpensive to record, replicate, and permanently store. While this enables a huge variety of desirable services, such as the ones offered by the **WorkingAge Tool**, it also opens a wide potential for abuse of such personal information.
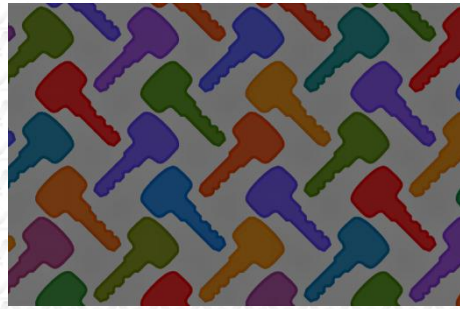
[Learn more](#)

WorkingAge Intervention Model

The **WorkingAge** project is developing an intervention program, based on an e-coach system of interaction with older workers, to prolong their work ability and autonomy, and promote wellbeing throughout all areas of their lives.

For the design of interventions, and other actions and interactions of the system with the user, the **WorkingAge** project maintains a holistic and comprehensive approach to the individual. For this purpose, the scope of the intervention design is not limited to the work environment, but also includes within its area of action the worker's life outside of work.

[Learn more](#)

What do our eyes tell us?

Our eyes can tell us a lot about our mental state. The pupil size in particular has proven to be a useful indicator.

Therefore, the aim of the **WorkingAge** project is to integrate an eye tracker into the **WAOW Tool** that measures mental strain and provides real-time feedback, which will ensure the short-term and long-term well-being of employees.

[Learn more](#)

The WorkingAge Tool will help save workers' life in case of emergency

In addition to a rich set of features helping the **WorkingAge** user in his everyday working life, TELESPAZIO is developing in collaboration with EENA an emergency alert service for the **WOAW Tool**. Based on the health condition detected by the WA sensors, the emergency alert service, also called "E112 service" in **WorkingAge**, can trigger an E112 call when an alert is raised.

[Learn more](#)

WorkingAge's Integration Plan

In the case of **WorkingAge**, all the measurements deriving from the various sensors embedded in the working environment of the user are transferred into a mobile application in the format of 'high-level' data, meaning data that is relatively simple and thus easy to be 'understood' by the application. This application is what we refer to as '**WAOW Tool**' and consists mainly of the following main components: a Decision Support System, a Location & Emergency Service, the User Interface, a Registration component, an Encryption/Decryption Service and a Bluetooth component.

[Learn more](#)

E112 Service: Medical data in emergency calls

A straightforward way that emergency services could resolve the caller location issue to some extent was to implement an emergency app. Emergency APPs usually provide a "speed dial" button to 112, while the caller location is sent from the handset to the emergency call centre. The improved location accuracy of the handset enabled emergency services to locate callers more quickly and accurately, and citizens to receive better emergency service.

[Learn more](#)

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Ethics for In-lab Facial Affect Data Gathering

Creating artificially intelligent (AI) systems heavily relies on human data. It is therefore crucial that the computer scientists, as the main architects of these systems, have very careful considerations of ethics and how to responsibly design and implement AI systems that will be used in the public sector.

Learn more

From voice to emotion recognition: how WorkingAge Tool will work

The **WorkingAge of Well-being (WAOW) Tool** will integrate a module for speech analysis aiming at voice emotion recognition, useful to understand if the worker is happy, stressed, sad, angry or simply neutral.
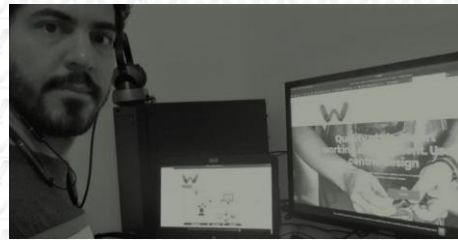
Learn more

2D Body pose estimation at workplaces for ergonomic assessment

In order to assess the posture of workers at their workplace, ITCL are estimating their posture by means of computer vision system, which allow to estimate the position of the main joints of the body.

The computer vision system is based on Convolutional Neural Networks which require a huge number of examples in the training stage. For this reason, a Pose Generator Tool based on a virtual environment has been developed to generate a huge dataset of images with the ground truth information.

Learn more

Approaching the In-Lab tests!

The **WorkingAge** research project is going to face its very first session of experiments. Despite the serious Covid-19 health emergency in Europe, all the technical partners developing sensors for the **WAOW Tool** are starting to test their solutions: the objective is find the trade-off between accuracy of the measurements and the invasiveness reduction of the equipment.

Learn more

WorkingAge's User Interaction Platform

Apart from utilising state-of-the-art Human Computer Interaction (HCI) technologies to create a safe and pleasant working environment, **WorkingAge** deploys the same methods to interact with its users in an easy and privacy-respecting manner. Thus, and in order to protect the privacy of WA users and that of their co-workers, EXUS -a proud participant of the WA project- developed a Face Recognition & Gesture-based Interaction platform (EFRGI).

[Learn more]

Emergency alerting in WorkingAge

In addition to a rich set of features, **WorkingAge** is planning to implement an emergency alert service, aiming to trigger a E112 call when an alert is raised. The term E112 refers to a location enhanced 112 call, or in simple words, a 112 call with the emergency responders being able to retrieve the caller location by technical means. In **WorkingAge**, the emergency alert service is referred to as "E112 service".

[Learn more]

WorkingAge partners

WorkingAge consortium is formed by the balanced collaboration of international level entities represented by Universities, small and medium enterprises, research and innovation centres, big enterprises and industries and Associations, twelve expert organisations from across 6 countries.

[LEARN MORE]