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Deliverable

D8.1 Data Management plan

COADAPT

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Dissemination Level		
PU	Public, fully open	**X**
CO	Confidential, restricted under conditions set out in Model Grant Agreement	☐
CL	Classified	☐

Notices

For information, please contact the project coordinator, Prof Giulio Jacucci, e-mail giulio.jacucci@helsinki.fi

This document is intended to fulfil the contractual obligations of the CO-ADAPT project, which has received funding from the European Union's Horizon 2020 Programme, concerning deliverable D8.1 described in contract 826266.

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Partners

1 HELSINGIN YLIOPISTO (UH)

2 TYÖTERVEYSLAITOS (FIOH)

3 INNOVATION SPRINT (INNO)

4 UNIVERSITÀ DEGLI STUDI DI TRENTO (UNITN)

5 UNIVERSITÀ DEGLI STUDI DI PADOVA (UNIPD)

6 IDEGO SRL (IDEGO)

7 BNP SRL (BNP)

8 AALTO KORKEAKOULUSÄÄTIÖ SR (AALTO)

9 ETSIMO HEALTHCARE OY (ETSH)

10 ELECTROLUX ITALIA SPA (ELUX)

Authors

Sofoklis Kyriazakos INNO

Giulio Jacucci UH

Reviewer

Salvatore Andolina UH

List of Abbreviations

GDPR – General Data Protection Regulation

DMP – Data Management Plan

DPO – Data Protection Officer

DOI – Digital Object Identifier

FPS – Finnish Public Sector

EMG – Electromyography

OCR – Optical Character Recognition

WHFPS – Working hours in the Finnish Public Sector

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Summary

This deliverable describes plans of how data will be managed in the CO-ADAPT project. The focus is on guidelines and practices to ensure ethical handling of data, in particular protect privacy and confidentiality. The sensitive data that is collected is of participant volunteers that have signed an informed consent to allow the project to analyse and reuse the data. The project includes four activities where data of participants is collected: The CO-ADAPT conversational agent application (T2.2, T2.3, T5.4, T6.4), The smart shift scheduling study (T6.1), The proactive recommender (T2.4 , T6.3), adaptive assembly line with cobots (T2.5, T6.2). These four activities can be considered subprojects and operate data collection on participants all four with different technologies and tools but respecting the guidelines proposed on this document.

Since the technologies and tools are still being defined, the document will not contain specific technologies, protocols and formats, as these will specified in the deliverables concerning each of the four activities.

The conclusions are that the plan identifies activities in the project where data is collected and clearly proposes guidelines for the data management. The main guidelines include 1) Obtaining ethical approval from local committees for all data collection activities, 2) Obtaining informed consent from all participants 3) Right to refuse or withdraw for participants, 4) Confidentiality and anonymization of data 5) Use of state of the art security in protecting the data 6) Nominating data protection officers 8) Training project participants on Ethical Handling of data.

1 Introduction

The project will make use of a mixture of data collection methods.

1) **Codesign and qualitative data.** The focus groups and ethnographic observations are qualitative in nature, relying on rich data that can tell us much about people's experiences with current technologies and preferred design aspects of the new system. All data collected through these methods will be kept confidential and will be stored on secured servers. If any of the materials in which participants could be identified are to be used in academic or educational (classroom) settings, the participants need to provide separate consent for this use.
2) **Experiments and field studies/trials**. These whether at work or in personal life, have a more quantitative approach. The project will make use of several behavioural measures (physical activity, heart rate, sleep patterns, work sheet logs, etc).

The types of data collection for experiments and field trials are summarised below.

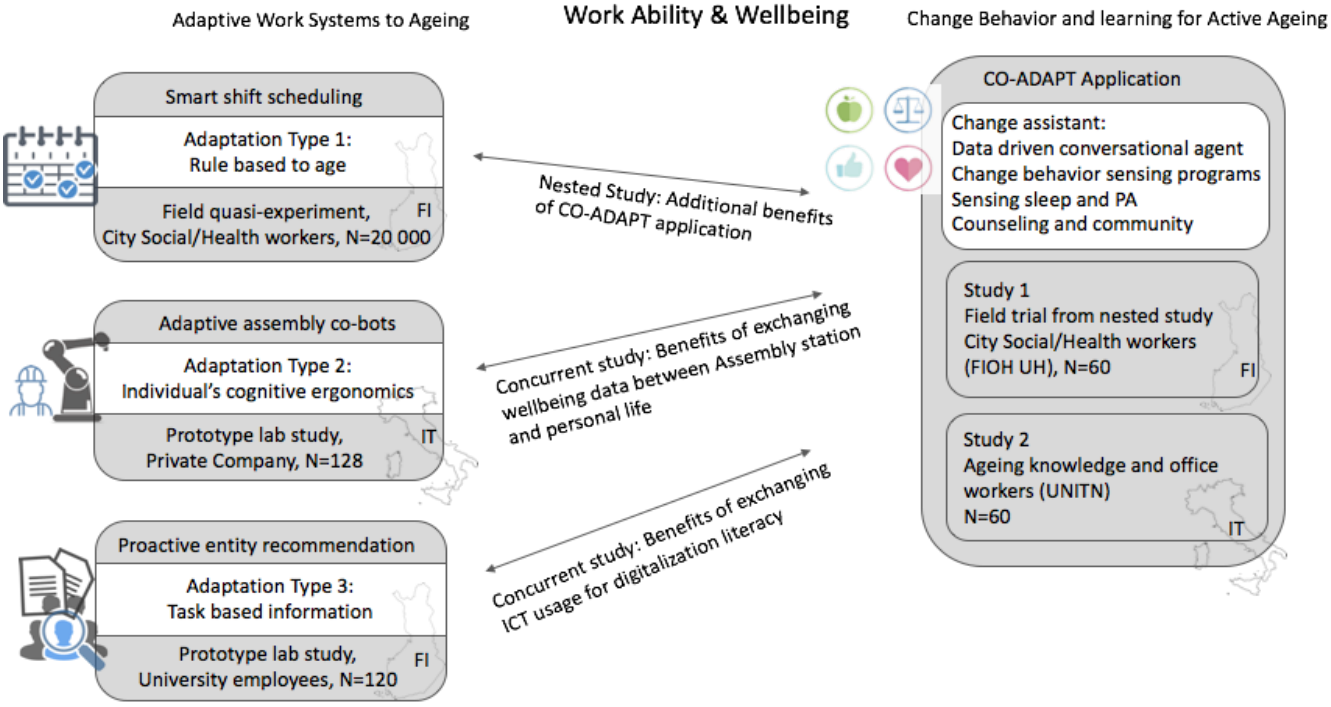

Figure 1 Overview of the 4 data gathering activities in CO-ADAPT

The project includes four activities where data of participants is collected: The CO-ADAPT conversational agent application (T2.2, T2.3, T5.4, T6.4), The smart shift scheduling study (T6.1) , The proactive recommender (T2.4 , T6.3), adaptive assembly line with cobots (T2.5, T6.2). These four activities can be considered subprojects and operate data collection on participants all four with different technologies and tools but respecting the guidelines proposed on this document.

This deliverable first introduces **GDPR section 2** confirming that the project follows the principles of the regulation. **Section 3** introduces the main Data Management

approach in particular regarding ethical handling of data. **Section 4** discusses how the project conforms with the FAIR Data Use principles. Finally, **section 5** reports the nominated Data Protection officers for all partners that handle and collect data.

2 GDPR

As of May 2018, the GDPR regulation applies in the European Union member states, which creates the obligation for all consortium partner to follow the new rules and principles. This section describes how the founding principles of the GDPR will be followed in the CO-ADAPT project.

2.1 Lawfulness, fairness and transparency

Personal data shall be processed lawfully, fairly and in a transparent manner in relation to the data subject.

The CO-ADAPT project describes all handling of personal data in this DMP. All data gathering from individuals will require informed consent of the test subjects, or other individuals who are engaged in the project. Informed consent requests will consist of an information letter and a consent form. This will state the specific causes for the experiment (or other activity), how the data will be handled, safely stored, and shared. The request will also inform individuals of their rights to have data updated or removed, and the project's policies on how these rights are managed.

The project will anonymise the personal data as far as possible, however it is foreseen that this will be possible in all cases. In those cases, further consent will be asked to use the data for open research purposes, including presentation at conferences, publications in journals as well as depositing a data set in an open repository at the end of the project.

The consortium will be as transparent as possible in the collection of personal data. This means when collecting the data information leaflet and consent form will describe the kind of information, the manner in which it will be collected and processed, if, how, and for which purpose it will be disseminated and if and how it will be made open access. Furthermore, the subjects will have the possibility to request what kind of information has been stored about them and they can request up to a reasonable limit to be removed from the results.

2.2 Purpose limitation

Personal data shall be collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes

CO-ADAPT project will not collect any data that is outside the scope of the project. Each researcher will only collect data necessary within their specific work package.

2.3 Data minimisation

> **Personal data shall be adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed**

Only data that is relevant for the project research questions and the required coaching strategies will be collected. Since this data can be highly personal, it will be treated according to all guidelines on special categories of personal data and won't be shared without anonymisation or explicit consent of the patient.

2.4 Accuracy

> ***Personal data shall be accurate and, where necessary, kept up to date.***

All data collected will be checked for consistency.

2.5 Storage limitation

> **Personal data shall be kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed**

All personal data that will no longer be used for research purposes will be deleted as soon as possible. All personal data will be made anonymous as soon as possible. At the end of the project, if the data has been anonymised, the data set will be stored according to the partners practices more information in section 5. If data cannot be made anonymous, it will be pseudonymised as much as possible and stored following local regulations.

2.6 Integrity and confidentiality

> ***Personal data shall be processed in a manner that ensures appropriate security of the personal data, including protection against unauthorised or unlawful processing and against accidental loss, destruction or damage, using appropriate technical or organisational measures***

All personal data will be handled with appropriate security measures. This means:

- Data sets with personal data will be stored servers that complies with all GDPR regulations and is ISO 27001 certified.
- Access to this server will be managed by the project management and will be given only to people who need to access the data. Access can be retracted if necessary.
- All people with access to the personal data files will need to sign a confidentiality agreement.
- These data files cannot be copied, unless stored encrypted on a password protected storage device. In case of theft or loss, these files will be protected by the encryption.

- These copies must be deleted as soon as possible and cannot be shared with anyone outside the consortium or within the consortium without the proper authorization.

In exceptional cases where the dataset is too large, or it cannot be transferred securely, each partner can share their own datasets through channels that comply with the GDPR.

2.7 Accountability

> ***The controller shall be responsible for, and be able to demonstrate compliance with the GDPR.***

At project level, the project management is responsible for the correct data management within the project. For each data set, a responsible person has been appointed at partner level, who will be held accountable for this specific data set. Each researcher will need to make a mention of a dataset with personal information to their Data Protection Officer, in line with the GDPR regulations.

3 Project Policies on Data

3.1 Overview of ethical handling of data in CO-ADAPT

As described in the 1 Introduction In the field trials, monitoring of participants will take place. The task 8.4 Ethical Issue Management will verify and provide to EC ethical approvals obtained by relevant local ethical committees in Italy (UNITN, UNIPD) and Finland (FIOH, UH).

Transmission of personal data over open communication channels will be done in encrypted form only. The people working with the data will have to have a unique password to access the database for security purposes. In all phases of CO-ADAPT, these crucial ethical and legal aspects will be taken into account. As a further measure to ensure compliance with legal and ethical conduct with private data, CO-ADAPT will provide a mandatory training session on data privacy for all CO-ADAPT researchers (see dedicated subsection in this section on Milestone 2) at the project kick-off and three further ones before the start of the last user studies. The consortium is committed to maintain strict rules of privacy and prevent all personal data from being abused or leaked. Under no circumstances, the consortium will provide, give or sell any information on its users to any third party (data will not be used under any circumstances for commercial purposes).

Relatedly, CO-ADAPT will be based on strong analyses of how the design of persuasive interaction paradigms can be created such that the influencing strategies take into account specific ethical constraints by including relevant ethical content and appropriate influencing strategies in the very design of the CO-ADAPT influencing framework (developed in WP1) and thereby in the hardware and software interfaces.

Main guidelines:

Ethical Approval. All studies involving data collection from participants will obtain a ethical approval from local relevant committees and such approvals will be kept on file.

Minimal risk. CO-ADAPT will only use hardware that users interact with (wearable sensors or devices for showing conversational agents) that do not need additional safety certification (i.e., that already have been EC certified for the specific use conditions, or that do not need any certification as a coffee mug).

Informed Consent - Written and verbal informed consent will be obtained from all subjects participating in the lab and field trials. All consent forms will be approved by the local ethical committees.

Confidentiality The confidentiality of data obtained in the study will be safe guarded by anonymization. Encryption and anonymization of data will avoid to identify participants or view the sensitive data. Researchers involved commit themselves not to misuse the data collected during and after the extent of the research. In particular they commit not to use them against participants, nor to sell this information to third parties, and to use the data only in anonymous format unless specifically agreed with you.

Data security and restricted access. The project partners commit to employ state of the art data security and restricted access only to researchers that have signed a confidentiality agreement.

Sharing the Results. We will share with participants from which data come from the results of the overall study with you once the data has been analyzed.

Right to Refuse or Withdraw. Participant has the right to withdraw him-/herself and his/her data from the project at any time. In the case that the participants decide to withdraw from the experiment, all data collected up to that point would be destroyed within the following 24 hours.

Incidental findings. These refer to the medical problems discovered in the course of a research / trial which were not related to the topic of research. As a first step the research subject will be made aware of the approach being taken in the event of incidental findings, which include the right to decide to be informed or not of such findings, as well as the right to request data about such findings would be deleted.

3.2 Co-design and Participatory Design

The CO-ADAPT project will implement active and continuous user participation from a co-design perspective. The involvement of older users in participatory design activities such as focus groups, ethnographic observation and co-design workshops is foreseen. CO-ADAPT will give specific attention to any ethical issues that will arise and will address them in a professional way following very closely established EU regulations and corresponding national laws about user privacy, confidentiality and consent. The main ethical issues to address center on involving older persons in the various methods of the development process of the augmented objects and the virtual e-coaching agent. Following guidelines from research ethics throughout these stages ensures that potentially problematic issues would be identified and assessed. All the work that is done with human participants will therefore be submitted to ethical review boards for approval. This approval will only be given if the proposed research follows ethical codes of conduct that apply to the research population.

Most participants in the co-design and implementation stages of the project will be older users (contact with user groups will be established through several consortium partners; IDEGO, UNIPD, UH, UNITN, FIOH). Participants in all stages of the research will be given informed consent about the research objectives. To this end, an informed consent form will be used on which it is explained what the research is about, what is expected from the research participants, and whether and how they will be compensated for participation. The informed consent forms will be drafted in understandable terms to the older participants. Additionally, there always needs to be the possibility for participants to ask for clarifications regarding the content of the informed consent form. Importantly, in line with codes of ethical conduct, participants can always terminate their participation at any time with no negative consequences whatsoever.

3.3 Task 8.4 Ethical Issues Management (M1-M42)

In the work package Management CO-ADAPT includes a task on Ethical Issues Management. The aim of this task is to monitor ethical issues, where users' personal and potentially sensitive data are collected both explicitly and implicitly, to ensure that the CO-ADAPT activities unfolds in the respect of the EU Regulation 2016/679 (27 April 2016) and of the codes of conduct for professionals doing research with technologies (e.g. IEEE and ACM) and human beings (e.g. American Psychological Association).

The deliverables D9.1-D9.5 define a set of requirements to the ethical conduct that will be monitored by this task. In addition, a yearly presentation will ensure training of project partners on these ethical requirements and common ethical conduct guidelines (MS2).

The Advisory board will be called to comment on the possible ethical issues. provide a set of guidelines at the beginning of project. These suggestions will inform the development of the adaptive systems in CO-ADAPT.

3.4 MS2 Ethical practices and training

A milestone is foreseen to be delivered as a presentation for training all project participants in ethical handling of data.

The training will include an overview of ethics in Co-adapt DoA and on the deliverables 9.1-9.5 guidelines (inf consent, ethical app, DPM etc.). It will also include an overview of established guidelines for example APA codes of conduct for research with humans, with technologies and with personal data.

3.5 Local legislations

All studies will be conducted adhering to all regulatory and ethical national and international requirements. More precisely:

Finland The data protection legislation of Finland and EU, and corresponding regulations and guidelines are followed, as well as instructions by the authorities responsible for each individual registry database used in the FIOH registry study and for the study conducted by UH.

Italy We will comply with GDPR and with art 22 of the old national norm (Decreto legislativo 30 giugno 2003, n. 196) regarding processing health data. Indeed, Italy has not made public its new data protection law, although it seems to have approved it recently ("On the 8th of August 2018, the Italian Board of Ministries announced that they have approved the Italian privacy law integrating the GDPR. The law has not yet been published on the Official Gazette. According to the Government, the decisions and the authorizations issued by the Italian DPA, the Garante per il trattamento dei dati personali, under the regime prior to the GDPR, as well as the existing Ethical Codes, will remain in place "to ensure continuity" until they are updated by the Italian DPA. Source: https://www.lexology.com/library/detail.aspx?g=8e76f584-b6a1-4762-bb1c-86aeac143c4b).

4 FAIR Principle

The CO-ADAPT project, representing a Research Innovation Action within the H2020 framework, has a clear focus on the development of a framework that provides principles for a two-way adaptation in support of ageing citizens. As such, the project's primary objective has never been to generate datasets that are re-usable for whichever purpose. The project's current focus is on the design and implementation of a working software prototype. The final stage of the project includes an evaluation study that may result in a dataset that has potential value outside the project. As the evaluation protocol for that study becomes clear, we will re-visit this document to describe potential FAIR Data Use principles.

4.1 Making data findable, including provisions for metadata

CO-ADAPT will offer open access to results gathered throughout the project. General awareness and wider access to the CO-ADAPT research data will be ensured by including the repository in registries of scientific repositories. DataCite offers access to data via Digital Object Identifier (DOI) and metadata search, while re3data.org and Databib are the most popular registries for digital repositories.

4.2 Making data openly accessible

As the repositories cover the basic principles of CO-ADAPT for publishing research data, the consortium will pursue membership to them, without excluding new initiatives which may arise during the forthcoming years due to the increased interest for open access to research results and the new European policy framework for sharing and freely accessing data collected during publicly funded research activities. As a result, the partners will keep track of those initiatives and will try to deposit the project's generated data sets at repositories which ensure compliance with the relevant proposed standards in order to be easily exchanged. Dryad and figshare can be also used as alternative repositories. In any case, open access to data, following appropriate licensing schemes will be ensured. CO-ADAPT will target "gold" open access for scientific publications and has foreseen budget for this activity. Wherever "gold" is not possible, "green" open access will be pursued. The target is to maximize the impact on scientific excellence through result publication in open access yet highly appreciated journals (see initial list below). It is worth stressing that this list includes targets where CO-ADAPT partners have already published previous results. Furthermore, repositories for enabling "green" open access to all project publications will be used, as well as the OpenAIRE, which provides means to promote and realise the widespread adoption of the Open Access Policy, as set out by the ERC Scientific Council Guidelines for Open Access and the EC Open Access pilot.

In addition, CO-ADAPT will also release a set of core libraries from CO-ADAPT as open source, which will be part of their exploitation strategy towards wide adoption (D3.4, D4.4, D5.5).

4.3 Making data interoperable

Depending on the scientific field where the data set will originate from, additional metadata standards might be used.

4.4 Increase data re-use (through clarifying licenses)

The CO-ADAPT will be implemented based on a variety of background components, including proprietary. Based on these components and the effort to be allocated in the project, CO-ADAPT will produce foreground, also by including open source (royalty free) components.

5 Subprojects specific plans

5.1 Smart shift scheduling FIOH

General description of data

The data consists of quantitative registry and survey data associated to the Finnish Public Sector (FPS) study. The registry data includes information on the daily working hours of the employees (starting and ending times of the work shifts), as well as information on sickness absence (without diagnosis) as obtained from the use of shift scheduling software Titania® in the co-operating organizations in the health and social care sector in Finland. The survey data includes questionnaire information on areas like perceived work ability, sleep, mental health and individual differences.

The obtained registry data of working hours consist of raw data, pre-processed data, data analysis results as well as managerial documents and project deliverables. Raw data are in ascii mode (work hour register), csv form (health registers) and excel form (surveys) and will be stored in SAS-format. The data analysis results of the raw data include data averaged for each 3 and 12 months in relation to the four main dimensions of the working hours: length (e.g. the percentage of long work shifts or work weeks), timing (e.g. the number of night shifts), recovery and work-life interaction.

Data consistency and quality are ensured by centralized processing and storage of the data enabling efficient curation, harmonization and integration of the data, resulting in reliable high-quality research data. The data has and will be linked between registers using the Finnish personal identity codes unique to each resident. The data will be version controlled and backed up, ensuring its efficient storage and re-use.

Ethical and legal compliance

FPS data are owned by the Finnish Institute of Occupational Health (FIOH). FPS consists of the 10-town study (PI Tuula Oksanen), hospital cohort (PI Mika Kivimäki) and Working Hours in the Finnish Public Sector study (WHFPS, PI Mikko Härmä). The FPS study has been approved by The Ethics Committee of the Hospital District of Helsinki and Uusimaa (HUS 1210/2016). We will comply with the protocol by removing personal information (personal identification code) from the data before sharing it with researchers to ensure privacy protection.

FIOH has written contracts with all the FPS and other organizations to agree on the use of obtained data, co-operation and feedback in this project. Results of the CO-ADAPT project will be presented in statistical form so that no individual can be identified indirectly from published reports.

Ethical issues are considered throughout the research data life cycle. The data includes personal and sensitive information, and therefore we will ensure privacy protection and data pseudonymisation. Data quality control ensures that no data are accidentally changed and that the accuracy of data is maintained over their entire life cycle. We take into account the effects of the new Finnish data protection act (based on the EU's

General Data Protection Regulation) on data security, personal data processing and anonymisation.

Documentation and metadata

The datasets in the Finnish Public Sector study (FPS) and Working hours in the Finnish Public Sector (WHFPS) (for the register-based working hours data) are documented as standardized metadata (person file description) on the project websites.

5.2 Proactive entity recommender

Short description: This activity is aimed at developing intelligent recommendations of useful entities (people, documents, topics, etc.) utilising easily accessible interfaces that minimise for example keyboard input (Vuong et al 2017). A user's digital activities are continuously monitored by capturing all content on a user's screen using optical character recognition. This includes all applications and services being used and relies on each individual user's computer usage, such as their Web browsing, emails, instant messaging, and word processing. In addition, microphone and camera are used to capture entities in the real world as well. Unsupervised machine learning and topic modelling is then applied to detect the user's topical activity context to retrieve information. Based on this autonomously learned user model, the system proactively retrieves information entities directly related to what the user is doing as observed on the screen.

Digital activity logs

The digital activity logs will be recorded in a similar way of the operating system event logs, which commonly exist in any operating systems. Logs include the following information.

- Text read by the user: A digital activity monitoring software attempts to capture any information changes on a device's screen (laptop or smartphone) or waits 2 seconds upon any user keystrokes, touch, or mouse behavior (clicks/taps, scrolls, drags, gestures) and commence taking a screenshot. A screenshot will be converted into text using Tesseract 4.0, an open source Optical Character Recognition (OCR) engine. After text conversion, screenshots will be deleted to reserve a device's disk space.
- Operating system logs: time of when the text is read, title of an active document, directory/url of the document, and an active application will be logged in the below format.

Voice activity logs

The voice activity logs will be recorded based on speech recognition technology.

- A software attempts to capture information from a device's microphone. Audio streams will be converted to textual logs.

Detection of entities in the real world

Using computer vision technology entities will be recognised in the real world for example through OCR.

Relevance Assessments

We collect relevance assessments on the entity information that are recommended during the task. The participants rate the entity information (keywords, documents, applications) on a scale from 0 to 3 (0: not relevant, 1: low relevance, 2: medium relevance, 3: high relevance). Participants assess relevance of recommendation in an excel file with 3 fields (word ID, plain text words, relevance score). This file is automatically generated after the participant finishes a task. Plain text words column will be manually removed by participants before handing over the excel file to the experimenter.

Data minimization, security and management

Data minimization: We minimize the amount of data processed to what is absolutely necessary for carrying out the purpose of the research. We avoid storing and archiving personal data, such as plain texts of the digital and voice activity logs.

Data security: We provide a level of security that is appropriate to the risks represented by the processing of personal data (both digital and voice activity logs). Personal data collected are stored on local hard drive during data collection phase. We use encryption to ensure that personal data would be unintelligible even if data breaches occur. We also minimize the risk of any data breaches on users' personal computers by helping them fulfilling basic security measures and by using the secure infrastructure of University of Helsinki during the lab tests.

Data management: All interaction logs during the lab tests and relevance assessment sheets collected and archived for the purpose of the evaluation of the system will be anonymized. Users are identified by 5-digit codes given by themselves. Identifiable information about users in the logs and relevance assessment sheets will be removed before handing over to the researcher in charge. Signed informed consent sheets will never be digitised and kept in a locked room; Anonymized logs and relevance assessment sheets are stored in the secured server located in University of Helsinki.

We expect no risk beyond the risks users encounter in their normal life, but any potential security risks of data breaches mentioned above which can be minimized by advising the users to install a reliable antivirus software and avoid new software installation during the study.

Additional information that cannot be determined at this point such as server setups, formats and security measures will be found in:

D3.1 Implementation of Proactive Entity Recommender - UH M12

D6.3 Evaluation of Proactive digital Entity Recommender - UH M26

5.3 Adaptive Assembly line with co-bots

Short description: the activity comprises the introduction of an adaptive workstation paired with a collaborative robotic arm (i.e., a cobot) that will support the employees in the unfolding of their regular working tasks. More specifically, the adaptive assembly workstation, will adjust its features to the physical and perceptual characteristics of each specific user, e.g., height and level of brightness. Furthermore, the workstation will assist the worker as s/he is performing her/his usual activities. Indeed, several implicit metrics (e.g., pupil dilation, blink duration and rate) will be continuously and unobtrusively acquired to monitor the user's workload by means of wearable devices (e.g., eye-tracking glasses, smart T-shirts/chest band, surface electromyography (EMG). By doing so, the workstation will detect transient changes in the employees' status and will adjust accordingly and in real-time its operating, so as to support her/him. For instance, if the system senses that the user's cognitive workload or stress level have overpassed a given threshold, it would activate a 'light-guidance' indicating to the employee the next action to accomplish or it would slow down the workflow speed. In addition, the cobot should assist employees in repetitive tasks, e.g., handing over the components to be assembled, thereby relieving their workload. Taken together, such interventions are expected to reduce the overall level of stress and to positively impact on well-being and satisfaction. Overall, the targeted working activities will be video-recorded in order to allow a subsequent computer-supported video-analysis to investigate how and to what extent the employee's working practices change as a consequence of the cobot introduction. The working experience will be assessed also through self-reported metrics, i.e., questionnaires and interviews.

Data collected: Overall, several metrics will be gathered in order to accomplish the planned adaptations in the work system: physical characteristics of the workers (e.g., height), measures of cognitive workload (i.e., pupil dilation, blink duration and rate, saccades amplitude and duration), indices of stress (i.e., heart rate and heart rate variability, prolonged muscle contraction as well as reduction in the frequency of de-contraction). Part of the measures are collected in order to assess the effect of the adaptations in terms of: efficiency (system log-files, time on tasks, errors, decrease in accidents); perceived well-being, safety, security, and satisfaction (self-reported measures). The actual working practices observed before the introduction of the cobot will be investigated using computer-supported video-analysis that will allow to understand both quantitative aspects of the work (e.g., frequency of specific behaviors, time required to accomplish specific tasks) and qualitative aspects of the working activities (e.g., need to use special equipment). A subsequent computer-supported observation, following the cobot introduction, will allow to understand the changes in the working practices brought about by the robot.

Pupil dilation, blink duration and rate, saccades amplitude and duration will be collected utilizing eye-tracking glasses (i.e., 120 Hz Pupil Labs). Pupil Capture software will record the raw eye-tracking data while Pupil Player will allow to export the above-mentioned eye-tracking metrics.

A smart T-shirt/chest band (i.e., Smartex) will be utilized to record heart rate and heart rate variability. Furthermore, surface electrodes (i.e., ProComp Infiniti 5) will be considered to monitor electromyographic activity. Dedicated software will be utilized to record and export the data (e.g., Biograph Infiniti).

The software The Observer by Noldus will be utilized for the video-analysis of the operator-cobots interactions.

The measures collected are then motivated by the multifold goal of the activity, that is evaluating the performance of the user's interaction with the adaptive assembly workstation; identifying the most suitable and informative psychophysiological and cognitive indices upon which the adaptive system should rely; and finally, comprehensively investigating the workers' perceptions regarding their own overall experience.

Additional information regarding the security measures, that cannot be determined at this point, will be found in:

D2.3 Design and usability of adaptive assembly line with cobots - UNIPD M12

D2.4 Ethical Issues in Adaptive Systems for Active Ageing - UNIPD - M24

D6.2 Evaluation of Adaptive Line Work Station including cost-benefit ratios - UNIPD - M36

Data security and management

Data security: the level of security will be appropriate to the sensitivity of the collected data (i.e., implicit psychophysiological and cognitive metrics, self-reported evaluations, interviews recording and transcriptions, video-recordings) and the associated risks. All the data in their raw format, either digital or not, and in their processed versions will be archived in a dedicated location at the premises of the HIT Center, where only the researchers directly involved in the project will have the access. They will be anonymized, meaning that each user will be assigned a pseudonym (e.g., P01) unrelated to his/her actual identity, to protect his/her privacy.

Data management: Before starting the activity, all participants will receive full and detailed explanation regarding the data that will be collected, the modality that will be employed and the possible risks. To maximize the understandability of the information, care will be given to avoiding technical jargon, and participants will be encouraged to make any question to the researchers. In addition, they will be provided an informed consent describing all the details pertaining to the data collection, storage and management. The aim of collecting and exploiting also implicit personal data (e.g., psychophysiological metrics), by means of wearable devices, will be clarified in order to avoid any possibility of privacy and ethics violation insofar as participants have reduced control on this type of information. The informed consents, containing the personal data of the participants, will be never converted in digital format and will be kept within secure locations.

The data collected using paper and pencil surveys will be converted into electronic spreadsheets, assigning an encrypted code to each participant, to allow their processing. Similarly, qualitative data pertaining to the interviews will be transcribed to allow for thematic analysis.

5.4 CO-ADAPT conversational agent

Short description: The CO-ADAPT conversational agent supports the communicative engagement between ageing workers, digital professionals (e.g. counsellors, psychotherapists) through AI-based conversational technology. The conversational agent will support ageing workers and digital therapists in coping and assessing states of stress or anxiety as they go through major life changes at home and at work. The conversational technologies will be able to learn from different streams of signals: implicit physiological and explicit linguistic signals. Conversational agents will be personalized to deliver therapies to ageing workers and monitoring compliance and support digital therapy.

The conversational agent will infer their actions and behaviour (linguistic or multimodal) from the interaction signals with users and from the behavioural knowledge base. The knowledge base will model and encode the possible relationships between emotional patterns and factors of change (e.g. life events) and resistance to change, and the role of persuasion in that process.

The framework will manage data in compliance to the processes and API that will be established in the data collection and analytics work package (WP4).

Data collected:

The knowledge base to be used to feed the conversational agent includes physiological signals - recorded by wearable sensors, and behavioural data. According to GDPR definition, in CO-ADAPT we will deal with sensitive personal data, including biometric data. Sensitive personal data will be held separately from other personal data, and both categories of data will be pseudonymised by replacing identifying information with artificial identifiers. Pseudonymised data will be dealt with by CO-ADAPT partners IDEGO and UNITN. Pseudonymised individual data of the subjects participating in the data collection will be kept on separate file and locked cabinet by IDEGO. UNITN will receive data in pseudonymised format, and will store such data by technical measures that prevent the re-identification of data subject. Security incidents, if any, will be immediately notified by UNITN researches to their DPO (see Section 6). Data in the pseudonymised format will be kept and dealt with for the purposes of the CO-ADAPT project. After the completion of the project, data may be used by UNITN for further research activities, and will not be transferred to third parties outside of an agreement that takes into account the GDPR and the National regulations for the application of such legislation. In particular, the data will not be transferred to research or industrial organizations outside the European Union.

6 Data Protection Officers

Five of our partners, who process and/or store large amounts of personal data, have appointed DPOs. They will be in charge of monitoring performance and providing advice on the impact of data protection efforts. In addition, they will maintain comprehensive records of all data processing activities.

Table 1. DPOs and contact details

Partner	DPO	Details	E-mail
FIOH	Specialized researcher Simo Virtanen	Topeliuksenkatu 41B, 00250 Helsinki, Tel. +358 43 825 6330	simo.virtanen@ttl.fi
UH	Professor Giulio Jacucci	Department of Computer Science P.O. Box 68 (Gustaf Hällströmin katu 2b) FI-00014 University of HelsinkiI Finland, Tel. +358 29 415 1153	giulio.jacucci@helsinki.fi
UNITN	Anti-corruption and Transparency Officer Fiorenzo Tomaselli	Via Verdi, 8 - 38122 Trento, Tel. 0461 281114	fiorenzo.tomaselli@unitn.it
UNIPD	Postdoctoral Researcher Valeria Orso	Human Inspired Technology Research Centre Via Luzzatti, 4 - 35121 Padova, Italy. Tel. +39 049 827 5796	valeria.orso@unipd.it
AALTO	Research Assistant Zeinab Rezaei Yousefi	Department of Computer Science Aalto University, Konemiehentie 2, 02150 Espoo, (P.O.Box 15400, FI-00076 Aalto) Finland , Tel. +358 46 951 8283	zeinab.rezaeiyousefi@aalto.fi

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