Plan Overview

A Data Management Plan created using DMPonline.be

Title: Flexible Activity Tracking to Support Physical Activity (C3/24/018)

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Template: KU Leuven BOF-IOF

Project abstract:

This project aims to enhance wearable activity tracking (WAT) systems for persons using mobility aids such as canes, walkers, and rollators. Despite their widespread use in recreational, medical, and research settings, current WATs face significant challenges in accurately measuring physical activity (PA) for slower walkers and those with mobility aids. Existing systems tend to underestimate step counts due to inaccuracies in tracking gait, especially for older adults with varied physical capabilities. This project seeks to develop algorithms for real-time recognition of mobility aids and improve step count accuracy through machine learning, tailored to different walking modalities. A core objective is to design a flexible software library that automatically adjusts step counting methods based on the mobility aid in use. The system will also feature personalised visualisations, motivating users and providing actionable feedback to both individuals and caregivers. The expected outcome is a software package compatible with existing and new devices, offering improved PA tracking for mobility aid users and older adults, irrespective of which aid is used. Through iterative design and evaluation with stakeholders, this project will contribute to a more inclusive, accurate, and user-friendly WAT system, fostering healthier lifestyles among mobility aid users and older adults.

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End date: 30-09-2026

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Flexible Activity Tracking to Support Physical Activity (C3/24/018)

Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
Informed consent forms	Signed IFCs for study 1 and 2	New	Physical	Textual			1 form per participant
Study 1: Walking sensor data	Walking data (6 DoF) collected with 50-60 participants with or without using a mobility aid	New	Digital	Audiovisual, Numeric	mp4, csv	<1GB	
Study 1: Participant profile data	Survey data asking about habits regarding physical activity, preference regarding activity trackers, and experience with activity trackers	New	Digital, Physical	Textual	csv	<10MB	5 pages per participant
Study 2: Evaluation data	Evaluation with participants where profile data, test (walking) data, and comments regarding to UX are recorded	New	Digital, Physical	Sound, Textual	mp4, csv	<1GB	5 pages per participant

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

No data will be reused for this research project.

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- Yes, human subject data (Provide SMEC or EC approval number below)

All data collected in this study will originate from human participants, both for study 1 and study 2. Participants will always receive information about the study prior to voluntarily signing the informed consent form. SMEC number study 1: G-2024-8354-R2 (approved), SMEC number study 2: G-2024-8931 (approval pending).

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- Yes (Provide PRET G-number or EC S-number below)

We will collect personal data for each of the aforementioned datasets.

- Informed consent forms: for participants giving their explicit permission to collect the data, and for them to exert their rights within the context of GDPR. SMEC number: G-2024-8354-R2 and G-2024-8931 (approval pending).
- Study 1: Walking sensor data: numerical accelerator and gyrosensor data registered during walking. This will be pseudonymised. SMEC number: G-2024-8354-R2.
- Study 1: Participant profile data: only aggregate data is relevant here, everything will be pseudonymised. SMEC number: G-2024-8354-R2.
- Study 2: Evaluation data: numerical accelerator and gyrosensor data to evaluate the created algorithms; textual

questionnaire data and audio recordings on the UX of the designed application. SMEC number: G-2024-8931 (approval pending).

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- Yes

This only applies to 'Study 1: Walking sensor data'. During this part of the study, we will collect accelerometer and gyrosensor data with participants using a mobility aid or walking without using one. This will be used for training a machine learning model, with the potential for commercial exploitation in the form of licensing the solutation as a software package to external companies. The data is not part of a patentable invention.

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).

- Study 1: Walking sensor data: All recorded accelerometer and gyrosensor data will be stored in a csv file with clear headers for future reference. A README.txt will be stored together with this csv file. This txt file will contain detailed information about the followed procedure of the data collection, including the locations of the sensors on the body of the participants. None of the collected data will be made public - it will be used to create a machine learning model, which will be part of a software package and has the potential for commercial exploitation through licensing agreements.
- Study 1: Participant profile data: All data will be pseudonymised and recorded in a csv file with clear headers detailing the stored content. Due to the data containing information that makes it possible to identify participants, this dataset will not be shared publicly. No additional documentation is required to understand the collected questionnaire data.
- Study 2: Evaluation data: All data will be pseudonymised and recorded in a csv file with clear headers detailing the stored content. Due to the data containing information that makes it possible to identify participants, this dataset will not be shared publicly. A README.txt will be stored together with test data to detail the followed procedure. No additional documentation is needed to understand the collected questionnaire data.

Will a metadata standard be used to make it easier to find and reuse the data?
If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- No

Only for numerical data recorded using sensors, the accompanying metafile will include detailed information on the procedure followed to capture the data. Details about the data, such as the units or position of the sensor in relation to the participant's body can be found in the cvs file containg the actual data.

Data Storage & Back-up during the Research Project

Where will the data be stored?

- OneDrive (KU Leuven)
- Other (specify below)

Data collected on paper will be stored in a locked closet only accessible by researchers of this project.

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Digital data will only be stored on personal KU Leuven OneDrive accounts belonging to researchers of this project. Physical data (on paper) will be digitised at the earliest opportunity after the study and stored on researchers' KU Leuven OneDrive accounts as well. The physical copies, including the signed informed consent forms, will be stored securely in a locked closet in a locked office, only accessible by the researchers involved in this project.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

There are no expected costs for data storage and backup beyond the standard OneDrive account the KU Leuven provides for each staff member.

Data Preservation after the end of the Research Project

Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?

In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

- All data will be preserved for 10 years according to KU Leuven RDM policy

All numerical and textual data collected will be preserved for 10 years. Audiovisual data will be processed immediately after the study and converted to text, after which the original audiovisual data will be deleted for privacy reasons.

Where will these data be archived (stored and curated for the long-term)?

- Shared network drive (J-drive)
- Other (specify below)

Physical data (on paper) will be stored in a locked closet by the main PI involved in this project.

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

There are no additional expected costs.

Data Sharing and Reuse

Will the data (or part of the data) be made available for reuse after/during the project?
Please explain per dataset or data type which data will be made available.

- No (closed access)

Only aggregate data will be shared through scientific publications. Numerical datasets will not be shared publicly due to the potential for commercial exploitation.

If access is restricted, please specify who will be able to access the data and under what conditions.

Only reasearchers involved in this project will have access to the collected data due to the potential for commercial exploitation, in accordance with the obtained SMEC approval. For any other future use of the data, a new SMEC approval is required.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

Please explain per dataset or data type where appropriate.

- Yes, privacy aspects
- Yes, other

- Study 1: Walking sensor data: this will be used to create a machine learning model, with the potential for commercial exploitation; additionally, this data has a minor risk of allowing others to identify the participant, especially in combination with other pseudonymised data.
- Study 1: Participant profile data: non-aggregate data forms a high risk in allowing others to identify participants.
- Study 2: Evaluation data: the numerical data collected during the evaluation has a minor risk of allowing others to identify the participant, especially in combination with other pseudonymised data; non-aggregate textual (questionnaire) data forms a high risk in allowing others to identify participants.

Where will the data be made available?

If already known, please provide a repository per dataset or data type.

- Other (specify below)

The data will not be shared publicly due to the aforementioned restrictions.

When will the data be made available?

- Other (specify below)

Aggregate data will be made available upon publication of the research results. The dataset will not be made available due to privacy concerns and the potential to commercially exploit the research results.

Which data usage licenses are you going to provide?

If none, please explain why.

- Other (specify below)

The collected data will not be made available publicly. All data will be processed and a machine learning model will be derived from the numerical data collected during study 1. Reverse engineering the created model will not provide meaningful, identifiable information about the study participants. This model will be part of a softare package, which holds the potential to be licensed to interested parties. The specifics of this license are to be determined in collaboration with LRD.

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- No

What are the expected costs for data sharing? How will these costs be covered?

The collected data will not be shared.

Responsibilities

Who will manage data documentation and metadata during the research project?

Dimitri Vargemidis (main researcher)

Who will manage data storage and backup during the research project?

Dimitri Vargemidis (main researcher)

Who will manage data preservation and sharing?

Dimitri Vargemidis (main researcher), prof. Luc Geurts (promoter)

Who will update and implement this DMP?

Dimitri Vargemidis