

Creating and Integrating Solutions to Enable the Complete Trip

Introduction

Many DMPs include an introduction. If your DMP includes an introduction, add it here.

This project proposes the development of a hands-free mobile app that provides integrated, "complete trip" support to pedestrians with disabilities, including pedestrian friendly route planning and navigation, safe intersection crossing, coordination with public transit, and autonomous wheelchair assist. As such, data collection or production is not an explicit goal of the project. Nonetheless, to assess the efficacy of the wearable app, experiments will be performed and data will be collected to measure and quantify aspects of performance. In some cases, training data will also be collected to provide a basis for developing app capabilities via machine learning. Finally, the project intends to generate publications, presentations and documentation to make the results of the research accessible to the research community at large, and intends to make all software produced during the project available as open source code.

This data management plan describes the approach to be taken to archiving this data and making it available for reuse. The plan will be reviewed periodically by the PI and the co-PIs to confirm its adherence and to determine if any adjustments are warranted.

Types of data produced

Types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project. Click on box size (small | medium | full) for detailed guidance.

The following types of data are expected to be collected and/or produced:

1. Experimental data obtained from testing/evaluating various technology components embedded in the app or commanded by it, including test scenario data and measurement data collected
 1. to assess effectiveness of the speech-based interface to the apple watch for route-planning, navigation, autonomous wheelchair commanding and street crossing capabilities,
 2. to quantify the benefit of V2X capabilities for (i) synchronizing with bus arrivals and (ii) providing awareness of pedestrian presence at the intersection to approaching vehicles (and vice versa)
 3. to quantify the effectiveness of autonomous wheelchair navigation through intersections (negotiating curb cuts, staying with the crosswalk, avoiding oncoming pedestrian traffic, etc.).
2. Video streams and image data of typical sidewalk obstacles - e.g., construction cones, freshly poured concrete, crumbling pavement, etc. - to be used to provide training data for purposes of developing obstacle recognizers. This data may include manually added annotations (labels) to define positive and negative examples for learning.
3. Journal articles, conference papers, technical documentation, and presentations describing experimental analyses and research results obtained.
4. All software developed during the course of this project will be provided open source, so this is a final type of data that will be produced.

Data and metadata standards

Standards to be used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies). Click on box size (small | medium | full) for detailed guidance.

With regard to performance data collected during experimentation with the developed technology, data will be stored in a standard accessible format such as comma separated form (CSF). A data dictionary will be provided along with each file containing the data and header information in CSF to explain the semantics of the values in each field (column). Data dictionaries will be stored as ASCII text files.

Video data will be collected and stored in a standard codec such as H.264. Still frames will be captured and compressed in the JPG

format. Metadata, e.g., for describing datasets, acquisition parameters, annotations/labels, etc will be saved in an accompanying ASCII text file.

Documents will be stored using standard MS Word, Latex, and pdf formats.

Software will be stored in standard source code formats.

Policies for access and sharing

Policies for access and sharing; Provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements. Click on box size (small | medium | full) for detailed guidance.

All experimental performance data that is collected will be appropriately anonymized to protect the privacy of test subjects other than project team developers. Institutional Research Board (IRB) approval will be obtained for any user testing that is determined to be necessary by individuals from the local disability community, and IRB procedures established to protect privacy will be adhered to.

All experimental performance data will be made accessible to other researchers seeking to replicate or extend the experimental analyses that are produced and published over the course of this research project. Data will be made available once it has been processed and properly analyzed, and in the worst case will be released at the time of published results.

Likewise video data used to create sidewalk obstacle recognizers will be made available to other researchers seeking to replicate or improve upon our research results. Faces and license plates will be blurred before making video data available for public dissemination.

As mentioned earlier, all software developed under this project will be designated open source and made available (as is) to any party interested in further developing it in any way.

In all cases, data will be stored on secure servers and made accessible through a website request form.

Policies for re-use, redistribution

Policies and provisions for re-use, re-distribution, and the production of derivatives. Click on box size (small | medium | full) for detailed guidance.

Scenario data, performance results data and video data (once anonymized) will be made accessible to anyone working on similar technologies and interested to perform comparative experiments. Software developed under this project will be made accessible to any external party for free use and incorporation into derivative technologies.

Plans for archiving & preservation

Plans for archiving data, samples, and other research products, and for preservation of access to them. Click on box size (small | medium | full) for detailed guidance.

All data will be archived, preserved on a data server (NAS-- with redundancy for 2-drive failure) in the Illumination and Imaging Laboratory of the Robotics Institute on the CMU campus. Prior to the start of this project, the server is expected to have a storage capacity of 180 tera-bytes, and also on the SCS network for continuous independent tape drive backup. For archival purposes, all data will be stored on dedicated hard drives when the award period ends. Software will be stored on github or bitbucket.

Software Sharing Plan

Some NSF solicitations require software sharing plans in the DMP. Please check with your specific solicitation for this requirement.

As mentioned earlier, all software developed on this project will be open sourced.

