Construction Digital Twins for automated digital construction site monitoringDMP title

Project Name My plan (FWO DMP) - Construction Digital Twins for automated digital construction site monitoringDMP title

Project Identifier u0094523

Grant Title 1251522N

Principal Investigator / Researcher Maarten Bassier

Project Data Contact maarten bassier, 0478649173, maarten.bassier@kuleuven.be

Description This research targets construction site monitoring using remote sensing techniques. As such, it is a data driven technology research that aims to improve the construction industry.The research entails the creation of automated tracking methods for the quality, progress and quantities on a variety of construction site. All data collected in the project are solely used to develop the above mentioned tracking methods. The lidar and imagery are semantically segmented and used as training and testing data for the machine learning methods that will process the inputs in an unsupervised manner. The geometric information derived from the inputs will be used to quantify the quality and the quantities while the visual information will be used for the damage detection and progress analysis. As the study only focusses on the processing of visual and geometric information of construction objects, there are no personal data in this project and thus no ethical concerns.

Institution KU Leuven

1. General Information

Name applicant

maarten bassier

FWO Project Number & Title

1251522N: Construction Digital Twins for automated digital construction site monitoring

Affiliation

- KU Leuven

2. Data description

Will you generate/collect new data and/or make use of existing data?

- Generate new data
- Reuse existing data

Describe in detail the origin, type and format of the data (per dataset) and its (estimated) volume. This may be easiest in a table (see example) or as a data flow and per WP or objective of the project. If you reuse existing data, specify the source of these data. Distinguish data types (the kind of content) from data formats (the technical format).

Type of data	Format	Volume	How created
Construction imagery	.jpg/.png	100Gb	UAV/hand-held cameras
Construction lidar scans	.e57	1Tb	TLS or iMMS lidar sensors
Processed mesh geometry	.obj	10Gb	Processed from lidar/photogrammetric inputs
BIM models	.rvt/.ifc	2Gb	BIM models obtained from project partners
CAD models	.dwg/.dxf/.3dm	2Gb	CAD models obtained from project partners
Orthomosaics	.tiff	10Gb	Orthomosaics processed from construction imagery

3. Legal and ethical issues

Will you use personal data? If so, shortly describe the kind of personal data you will use. Add the reference to your file in KU Leuven's Register of Data Processing for Research and Public Service Purposes (PRET application). Be aware that registering the fact that you process personal data is a legal obligation.

- No

Privacy Registry Reference:
Short description of the kind of personal data that will be used:

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, add the reference to the formal approval by the relevant ethical review committee(s)

- No

Does your work possibly result in research data with potential for tech transfer and valorisation? Will IP restrictions be claimed for the data you created? If so, for what data and which restrictions will be asserted?

- No

Do existing 3rd party agreements restrict dissemination or exploitation of the data you (re)use? If so, to what data do they relate and what restrictions are in place?

- Yes

Datasets acquired from construction sites will solely be used for academic purposes

4. Documentation and metadata

What documentation will be provided to enable reuse of the data collected/generated in this project?

1. All raw and processed data files will be stored conform the research group’s file structure. This includes a division between captured and modelled information and is accompanied by .txt files that explain the contents of the data.
2. All research files will be stored on the research group’s gitlab/github and will be enriched with the detailed descriptions of the functions, inputs, outputs and purpose of the definitions. These repositories are managed by the research group and are structured in a normalized manner.

Will a metadata standard be used? If so, describe in detail which standard will be used. If no, state in detail which metadata will be created to make the data easy/easier to find and reuse.

- No

5. Data storage and backup during the FWO project

Where will the data be stored?

1. The time-stamped master copy of the data will be kept on our research unit central storage facility which is raid protected. Copies can be made and kept on personal devices.
2. Onedrive and Google drive are used to locally backup research and management files
3. The research group’s Github and Gitlab will be used to backup algorithms, functions, definitions and other code contents.

How is backup of the data provided?

1. The time-stamped master copy of the data will be kept on our research unit central storage facility which is raid protected. Copies can be made and kept on personal devices.
2. Onedrive and Google drive are used to locally backup research and management files
3. The research group’s Github and Gitlab will be used to backup algorithms, functions, definitions and other code contents.

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available then explain how this will be taken care of.

- Yes

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

The group pays for the data storage of the data and research. FWO benchfee will be partially used for this purpose.

Data security: how will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The research group’s raid protected storage sits behind KUL firewalls. The code repositories are SSH key and password protected. The head of the lab is in charge of data security.

6. Data preservation after the FWO project

Which data will be retained for the expected 5 year period after the end of the project? In case only a selection of the data can/will be preserved, clearly state the reasons for this (legal or contractual restrictions, physical preservation issues, ...).

All project data will be retained for more than 5 years since these data are essential to keep improving prediction and analysis models. This includes both the raw data files that are frequently reused in consecutive researches and the source code developed in the project, that are used as a stepping stone for further research.

Where will the data be archived (= stored for the longer term)?

1. The time-stamped master copy of the data will be kept on our research unit central storage facility which is raid protected. Copies can be made and kept on personal devices.
2. Onedrive and Google drive are used to locally backup research and management files
3. The research group’s Github and Gitlab will be used to backup algorithms, functions, definitions and other code contents.

What are the expected costs for data preservation during the retention period of 5 years? How will the costs be covered?

The group pays for the data storage of the data and research. After the FWO project is finished, the group's annual research fee will be used to pay for the storage of the data.

7. Data sharing and reuse

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

- No

Which data will be made available after the end of the project?
The datasets will be only available for internal usage.
The source code will be released on GitHub/gitlab
Publications will be available online

Where/how will the data be made available for reuse?

- Other (specify):

The datasets will be only available for internal usage.
The source code will be released on GitHub/gitlab
Publications will be available online

When will the data be made available?

- Upon publication of the research results

Who will be able to access the data and under what conditions?
The datasets will be only available for internal usage. => only researchers of the research group
The source code will be released on GitHub/gitlab => Open access
Publications will be available online => Open access or persons with subscriptions to the specific journals where we publish

What are the expected costs for data sharing? How will the costs be covered?
The publications will be made Open Access as much as possible. As this costs around 2k per paper, we estimate a 4-6k cost per year for publications. The group's budget and the FWO benchfee will be used for this purpose. The source code can be freely distributed.

8. Responsibilities

Who will be responsible for data documentation & metadata?
the documentation will be provided by the researcher himself.

Who will be responsible for data storage & back up during the project?
the data storage will be conducted by the researcher himself.

Who will be responsible for ensuring data preservation and reuse ?
the reusability will be ensured by the researcher himself and the head of the lab that is responsible for the data storage servers

Who bears the end responsibility for updating & implementing this DMP?
The PI bears the end responsibility of updating & implementing this DMP.