Plan Overview

A Data Management Plan created using DMPonline.be

Title: CHAI: Cracking built Heritage with AI

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Principal Investigator: n.n., Els Verstrynge

Data Manager: n.n., Els Verstrynge

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Template: KU Leuven BOF-IOF

Principal Investigator: n.n. n.n., Els Verstrynge

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Project abstract:

Monitoring and preservation of our architectural heritage is a vital aspect in building a sustainable society that takes full advantage of its cultural resources. When preservation and resilience of architectural heritage is questioned, the structural condition is one of the primary aspects that need to be assessed. It is well know that structural models for architectural heritage often lack accuracy due to lack of input data. An important improvement in the structural assessment of built heritage can be made if effects of on-site crack patterns and material pathologies can be included in an efficient manner. In the CHAI project, we envision a paradigm shift from a separation between structural engineering and surveying models to a methodology in which enhanced structural modeling techniques are tightly coupled with 3-dimensional and multi-modal survey data to improve the overall assessment of the structural conditions of historical masonry. This is achieved through close collaboration between the research groups of Materials and Construction, and Geomatics in the establishing of joint benchmark datasets for masonry pathologies, training of AI algorithms towards dynamic on-site condition surveying, development of data-driven structural models based on finite element approaches for masonry, and validation of the coupled approach on three experimental test series and selected cases.

ID: 209887

Start date: 01-10-2024

End date: 30-09-2028

Last modified: 28-11-2024

CHAI: Cracking built Heritage with AI

Research Data Summary

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
		Indicate: ***N****(ew data) or* *E(xisting data)*	Indicate: **D**(igital) or **P**(hysical)	Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
lab tests	experimental tests on masonry in the lab	N	D	A, I, T, ...	various (xlsx, jpg, dat, ...)	<1TB	/
numerical models	numerical models of masonry	N	D	N, T, M, SO	various (Diana, Abaqus, python and Matlab files)	<1TB	/
Survey data	point clouds, images, and mesh models of surveying campaigns	N	D	I,SO	various(jpg, png, e57,recap Pro)	<5TB	/
Deep Learning models	Parameters of trained models	N	D	N, SO	Pytorch	<100GB	/
Labeled Data	Annotated data for image segmentation	N	D	I, T, SO	Json, jpg	<1TB	/

Following existing data will be used:

- pictures taken during MCMS courses that are available in internal student reports - no identifier available
- experimental results obtained in the Reyntjens Laboratory for building materials testing (internal reports): pictures, excel files, ... - no identifier available
- data from open access repositories (to be defined)
- Datasets for training foundation models from open access repositories.

- No

all data and pictures are related to historical masonry buildings.

- No

- No

- No

- No

Documentation and Metadata

A wide variety of data in different formats is collected, the most important are: Images, multi-spectral data, 3D scans, 3D models, internal and interchange formats, GPS data, etc. The AI algorithms and software-user interactions will result in annotations and meta-data. Important data for structural analysis are: FEM in/output files, coding in Matlab, Pyton, etc.
For the case studies, results are presented in graphs and color-coded images that are meaningful for engineers, as well as the wider group of stakeholders in built heritage conservation.

- Yes

(to be updated)

Data Storage & Back-up during the Research Project

- Shared network drive (J-drive)
- Personal network drive (I-drive)
- Large Volume Storage

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

- Yes

KU Leuven servers are protected by 2-factor authentication

few 100 euros, covered by the project funding

Data Preservation after the end of the Research Project

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

- Large Volume Storage (longterm for large volumes)

few 100 euros, covered by other projects' funding

Data Sharing and Reuse

- Yes, as open data

Within this project, the main outcome is not only the (annotated) data on specific case studies, but also the developed methodologies and generalized datasets. Selected datasets are published in open-data repositories (e.g. RDR).

NA

- No

- KU Leuven RDR (Research Data Repository)
- Other (specify below)

others: to be updated

- Upon publication of research results

- CC-BY 4.0 (data)

- Yes, a PID will be added upon deposit in a data repository

Responsibilities

the PhD researchers under supervision of the promoters

the PhD researchers under supervision of the promoters

the PhD researchers under supervision of the promoters

the PhD researchers under supervision of the promoters