DEEDS: a platform to support the entire research process

In research investigations, scientists and engineers often carry out intricate, team-shared activities involving the collection and integration of data, execution of computational software, analysis and visualization of data and software output, and synthesis of results to produce conclusions. In most disciplines this process is done in an ad-hoc manner because existing IT platforms support only part of the investigative workflow. Some platforms provide data storage, some provide services for computing, and others help produce analytics from results. This means that data, computing, analysis, and outcomes reside in disconnected environments. The lack of continuity in the research process hinders it in many ways: the process is inefficient, difficult to share, and difficult to validate. It also compromises reproducibility of results and makes reuse and reinterpretation of data and algorithms more difficult.

 The Digital Environment for Enabling Data-Driven Science (DEEDS) brought together scientists from civil engineering, electrical engineering, agriculture, chemistry, biology, health and human services, and computer science to build a powerful, user-friendly platform for big data and high-performance computing that provides end-to-end support for diverse scientific workflows. Research teams build and share DEEDS datasets using an interactive 'dashboard' that provides full-featured services for:
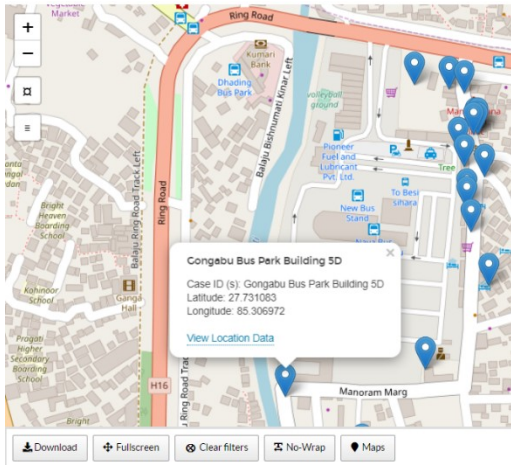
- **DATA**: Upload, preserve, manage & explore data. Assign metadata and specify rules for metadata standards. Integrate scripts to automatically validate, curate, and check completeness of your data. Collected data for a dataset can consist of
    - **Files** classified by type, format and use, including standard categories (reports, images, video, figures, data) and user-customizable categories such as sensor data, geospatial data, and protocols. DEEDS offers built-in applications to search, explore and visualize files by type and use.
    - **Data Tables** that represent hierarchical, multi-dimensional models for qualitative and quantitative measurements and other data. Data Tables can be customized, organized, re-organized, cloned, and annotated across the investigation lifecycle. Users can upload spreadsheets or interactively enter data to update data tables, including bulk updates. Data tables can be viewed, browsed, searched, filtered and downloaded.
- **COMPUTING**: Bring research computing code, statistical models, and other analysis tools into your dataset, where they can be launched from the DEEDS dashboard, connected to your data, executed (on HPC facilities if needed), and tracked. DEEDS automatically retrieves and uploads output back to the dataset with full annotation. Computing workflows are captured and displayed to link input → algorithms→ output for data provenance, results traceability and reproducibility.
- **ANALYSIS**: Interactively search, explore, visualize your collected data and generated results. Use analytics to build 'R data frames' with selected data tables, then apply R-based statistical analysis and generate graphs using the DEEDS built-in toolkit. Create and share Jupyter notebooks.
- **FAIR compliance**: DEEDS guarantees adherence to the principles of Findable, Accessible, Interoperable, and Reusable data management and stewardship for your research. DEEDS offers fine-grained access control as needed for your data and computing tools.
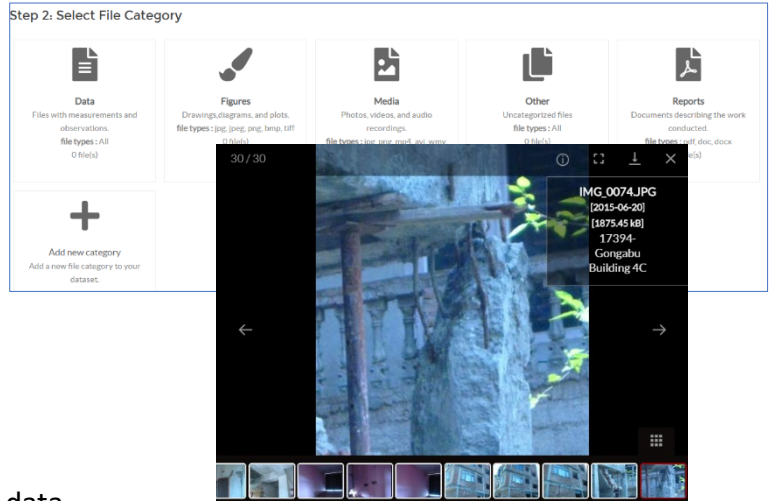
Building Surveys after Earthquakes

⚗ Cases   📄 Files   🗄 DataTables   🔧 Tools   📈 Analytics   **Explore**

Team-shared dataset: Collect, preserve, share, and analyze data across your entire investigation lifecycle. Execute your research computing code — workflows are captured to guarantee results traceability. Use analytics for statistical modeling and graphics. User-friendly applications let you view, search, and explore.

Cases: Organize your research activities

Congabu Bus Park Building 5D
Case ID (s): Gongabu Bus Park Building 5D
Latitude: 27.731083
Longitude: 85.306972

View Location Data

⬇ Download   ✛ Fullscreen   ⊘ Clear filters   ⤢ No-Wrap   📍 Maps

Files: Upload, annotate and manage your files

Step 2: Select File Category

Data	Figures	Media	Other	Reports
Files with measurements and observations. file types : All 0 file(s)	Drawings,diagrams, and plots. file types: jpg, jpeg, png, bmp, tiff 0 file(s)	Photos, videos, and audio recordings. file types: jpg, png, mp4, avi, wmv	Uncategorized files file types : All 0 file(s)	Documents describing the work conducted. file types : pdf, doc, docx

➕ Add new category
Add a new file category to your dataset.

IMG_0074.JPG
[2015-06-20]
[1875.45 kB]
17394-
Gongabu
Building 4C

DataTables: Upload, annotate and curate tabular data

＋ Add New DataTable

Top Level (4)	Sort By : Default	Name	Date Created	Custom			
Sub Levels	🗄	🗄	🗄	🗄
Completed (4)	2015 Nepal Earthquake # cases: 149 March 19th, 2019 05:56 pm Jonathan Monical	2016 Taiwan Earthquake # cases: 130 March 22nd, 2019 03:06 pm Jonathan Monical	2016 Ecuador Earthquake # cases: 173 June 28th, 2019 03:16 pm Jonathan Monical	2017 South Korea Earthquake # cases: 75 June 28th, 2019 03:19 pm Jonathan Monical
Drafts (0)				

Edit Column Attributes

Label*
The label of the column
Priority Index

☐ Column has Location Coordinate —Coordinate— ▼

Variable
variable name of the column. It should be unique.
dex

cription
description of the column
= CI + WI where, PI = Priority Index (Hassan Index,
CI = Column Index WI = Wall Index

Type*
data type of the column (This field cannot be changed)
at (≤ 4 decimals) ▼

Units
The units
%

Backg
The ba
the col

Alignm
The text
Left

Width
The width

Visibilit
The visib

Priority Index
(float)
[%]

| 0.16 |
| 0.19 |
| 0.31 |
| 0.31 |
| 0.21 |

Show 25 ▼ entries   Search:

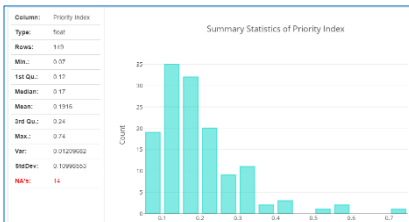| (V)	Structural Damage	Masonry Wall Damage	Captive Columns	Column Index [%]	Wall Index (NS) [%]	Wall Index (EW) [%]	Min WI [%]	Priority Index [%]
🔍	Severe ✕	Severe ✕	🔍	🔍	🔍	🔍	🔍	🔍
	Severe	Severe	No	0.15	0.00	0.00	0.00	0.15
	Severe	Severe	No	0.12	0.00	0.02	0.00	0.12
	Severe	Severe		0.16	0.13	0.08	0.08	0.24
	Severe	Severe	Yes	0.20	0.22	0.06	0.06	0.26
	Severe	Severe	Yes	0.14	0.03	0.04	0.03	0.17
	Severe	Severe	No	0.19	0.05	0.00	0.00	0.19
	Severe	Severe	Yes	0.19	0.12	0.00	0.00	0.19
	Severe	Severe	No	0.20	0.13	0.00	0.00	0.20

Analytics: Integrate, analyze, visualize your data

Distribution & summary statistics Priority Index of all surveyed buildings Nepal 2015 Earthquake

Distribution No of Floors for Priority Index < 0.5