The Journal of Open Source Software

GRASS Tutorials

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DOI: 10.xxxxxx/draft

Software

- Review
- Repository
- Archive

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Submitted: 01 January 1970
Published: unpublished

Summary

Describe the submission and explain its eligibility for JOSE.

- Overview of GRASS
  - GRASS as geoprocessing engine (GRASS Development Team et al., 2025)
    - Features (Gebbert & Pebesma, 2017; Haedrich et al., 2023)
    - Integrations
    - Well documented, but lacking official tutorials
- GRASS Tutorials
  - Tutorials with computational notebooks
    - Integrations
    - Core features
    - Thematic topics
  - Dual licensed GFDL-1.2-or-later & CC-BY-SA-4.0
  - Audience: GRASS and wider FOSS4G community

Statement of need

Include a Statement of Need section, explaining how the submitted artifacts contribute to computationally enabled teaching and learning, and describing how they might be adopted by others.

- Growing the GRASS ecosystem
  - GRASS has extensive documentation, but lacked official tutorials
    - Manual pages, api documentation, programming manual, etc.
    - Community developed tutorials
      - Not maintained by GRASS Dev Team
  - Introduction to GRASS as geospatial engine
    - Examples of how to interface with engine needed
      - GUI, CLI, Py, R, Cloud, Jupyter, etc.

Description / Features

Describe the learning objectives, content, instructional design, and experience of use in teaching and learning situations.

Learning Objectives

- Learn the fundamentals of geoprocessing with GRASS
- Learn disciplinary applications of GRASS

Instructional Design

- Design
  - Learning modules for self-study, classes, & workshops
  - Modular design for reuse and remixing
  - Scaffolded: getting started > core features > disciplinary topics
  - Interactivity for active learning
  - Worked examples for reduced cognitive load
  - Computational thinking with live coding
  - Scaffolding of explanations and code
- Audience
  - GRASS community of practice
    - Academics, professionals, & agencies
    - OSGeo Foundation
    - Broader FOSS4G community
  - Beginners to advanced
  - Self-learners: getting started tutorial series
- Mode
  - Online tutorials with computational notebooks
- Implementation, Infrastructure, & Deployment
  - Quarto > GitHub Pages
    - HTML pages & Jupyter notebooks

Contents / Tutorials

- Tutorials
  - Get started
    - Get started with GRASS GUI
    - Get started with GRASS & Python in Jupyter Notebooks
    - Get started with GRASS & R: the rgrass package
    - Get started with GRASS in Google Colab
    - Get started with GRASS in Jupyter Notebooks on Windows
  - Core features
    - Basics of map algebra
    - Making plots with GRASS
    - Visualizing and Modeling Terrain from DEMs in GRASS (English & Portuguese)
    - Modeling Movement in GRASS (English & Portuguese)
    - Introduction to remote sensing with GRASS
    - Procedural noise
    - Quick comparison: R and Python GRASS interfaces
  - Disciplinary topics
    - Deep dive into time series analysis with GRASS
      - Introduction to Time Series in GRASS
      - Temporal aggregations
      - Temporal algebra
      - Temporal accumulation
      - Temporal gap-filling
      - Temporal query with vector data
      - Temporal subset, import and export
    - Earthworks
      - Basic earthworks
      - Gully modeling
      - Coastal infrastructure
      - Terrain synthesis
- External Tutorials

- Physically-based hydrologic modeling using GRASS GIS r.topmodel
- GRASS for Remote Sensing data processing with Jupyter Notebooks
- Teledetección, OBIA y series de tiempo
- GISMentors - GRASS GIS školení
- GISMentors - Courses
- Unleash the power of GRASS GIS
- Deforestation study using GRASS GIS
- NCSU Geospatial Modeling and Analysis Course
- Urban growth modeling with FUTURES
- GIS for Designers
- Geoprocessamento com GRASS GIS
- OpenGeoHub 2019: GRASS GIS for environmental monitoring and disease ecology applications
- Processing lidar and UAV point clouds
- Tutoriales de GRASS GIS en grasswiki
- Spatio-temporal data handling and visualization
- Ecodiv.earth tutorials
  * Species distribution modeling using Maxent in GRASS
  * Mapping the distribution of the White-tailed deer in Minnesota
  * From suitability to suitable regions
  * Tree species diversity distribution

Story

`Tell us the story of the project: how did it come to be?`

Please add to the story!

- Teaching experiences
  - HTML: NCSU Geospatial Modeling (MEAS582/GISXXX) (**?**)
  - Jupyter: NCSU Geospatial Computing and Simulation (GIS714) (Haedrich et al., 2023)

Acknowledgements

The initial development of these tutorial was partially supported by the U.S. National Science Foundation under Grant 2303651.

References

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Haedrich, C., Petráš, V., Petrášová, A., Blumentrath, S., & Mitášová, H. (2023). Integrating GRASS GIS and jupyter notebooks to facilitate advanced geospatial modeling education. *Transactions in GIS*, *27*(3), 686–702. https://doi.org/10.1111/tgis.13031