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SWORDS: A framework for the Scan and revieW of Open Research Data and Software

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Software

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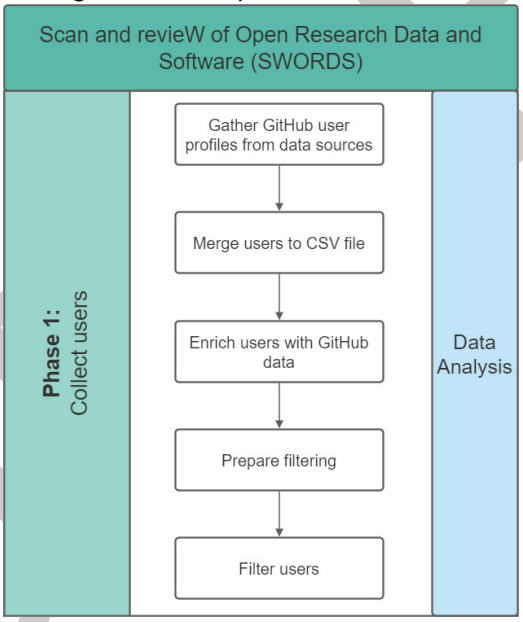
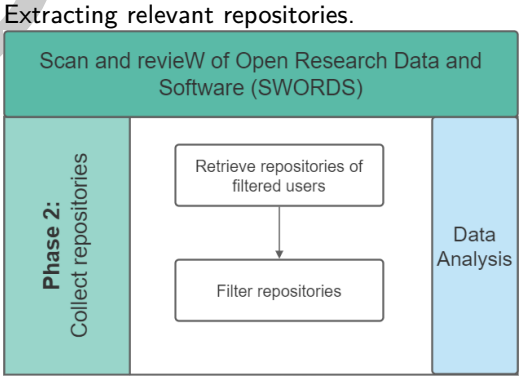
Summary

SWORDS (Scan and revieW of Open Research Data and Software) is a framework designed to provide insights into an organization's open-source activities through a structured approach. The framework is divided into three core stages that can be executed independently:

1. Finding GitHub user profiles associated with an organization.



2. Extracting relevant repositories.



3. Studying the contents of the repositories. Content evaluation includes aspects of quality assessment, documentation availability, and FAIRness (Wilkinson et al., 2016) scores (Spaaks et al., 2022) (Findability, Accessibility, Interoperability, and Reusability).

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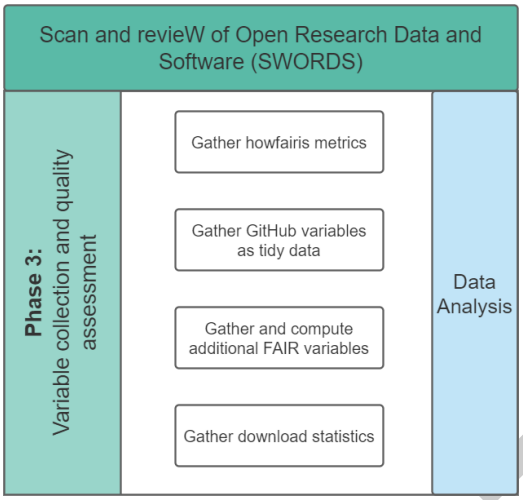

Written in Python, SWORDS provides a template for easy implementation within any organization and focuses on GitHub, which is the go-to reference for mining open-source repositories (Cosentino et al., 2017).

Statement of need

Open Science, promoting transparency in academic publications, data, software, and other types of output, is crucial for enhancing scientific and societal impact in today's research climate. The application of Open Science principles to research data and software is vital for ensuring scientific integrity and reproducibility, which can sometimes be lackluster (Allison et al., 2016). However, substantial challenges persist in tracking, managing, and understanding open-source research software due to the scattered and fragmented nature of these activities across multiple platforms (Lamprecht et al., 2020).

The SWORDS framework addresses this need by providing a systematic approach to collating, analyzing, and understanding an organization's open-source research software. The insights gained from implementing SWORDS can help organizations connect initiatives, improve quality, reward and recognize contributions, and foster a collaborative and open research environment. Thus, SWORDS presents an invaluable tool for any research organization aiming to improve and gain a better understanding of its open-source activities and drive forward the principles of Open Science.

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References

Allison, D. B., Brown, A. W., George, B. J., & Kaiser, K. A. (2016). Reproducibility: A tragedy of errors. *Nature*, *530*(7588), 27–29. https://doi.org/10.1038/530027a

Cosentino, V., Cánovas Izquierdo, J. L., & Cabot, J. (2017). A Systematic Mapping Study of Software Development With GitHub. *IEEE Access*, *5*, 7173–7192. https://doi.org/10.1109/ACCESS.2017.2682323

Lamprecht, A.-L., Garcia, L., Kuzak, M., Martinez, C., Arcila, R., Martin Del Pico, E., Dominguez Del Angel, V., Sandt, S. van de, Ison, J., Martinez, P. A., McQuilton, P., Valencia, A., Harrow, J., Psomopoulos, F., Gelpi, J. Ll., Chue Hong, N., Goble, C., &

Capella-Gutierrez, S. (2020). Towards FAIR principles for research software. *Data Science*, *3*(1), 37–59. https://doi.org/10.3233/DS-190026

Spaaks, J. H., Verhoeven, S., Tjong Kim Sang, E., Diblen, F., Martinez-Ortiz, C., Etuk, E., Kuzak, M., Werkhoven, B. van, Soares Siqueira, A., Saladi, S., & Holding, A. (2022). *howfairis* (Version 0.14.2). https://github.com/fair-software/howfairis

Wilkinson, M. D., Dumontier, M., Aalbersberg, Ij. J., Appleton, G., Axton, M., Baak, A., Blomberg, N., Boiten, J.-W., Silva Santos, L. B. da, Bourne, P. E., Bouwman, J., Brookes, A. J., Clark, T., Crosas, M., Dillo, I., Dumon, O., Edmunds, S., Evelo, C. T., Finkers, R., … Mons, B. (2016). The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data*, *3*(1), 160018. https://doi.org/10.1038/sdata.2016.18