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A web-based platform for multimodal data integration: the ARIANNA project

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Dealing with heterogeneity is the main challenge that scientists are facing in several diseases, including Autism Spectrum Disorders (ASD). This complexity urges the implementation of dedicated analysis techniques to obtain the maximum from the interrelationship among the numerous variables that describe affected individuals, including clinical phenotypic characterization, genetic profile and multimodal brain imaging. The ARIANNA project has developed a collaborative web-based interdisciplinary research environment that is accessible to the community of researchers working on ASD (https://arianna.pi.infn.it). The main goals of the project are: to extract reliable measurements from multimodal and multicentric neuroimaging data; to identify both structural and functional brain characteristics that allow distinguishing individuals with ASD from control subjects through multivariate approaches based on machine learning and deep learning techniques; to identify neuroimaging-based criteria to stratify the population with ASD to finally support the future development of personalized treatments. The platform provides secure data handling and storage as well as the access to fast computational resources. This paper outlines the web-based architecture, the computing infrastructure and the collaborative analysis workflows at the basis of the ARIANNA interdisciplinary working environment.

Primary author: BOSCO, Paolo (INFN)

Presenter: BOSCO, Paolo (INFN)

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