Titolo: EXPAND: scalable algorithms for EXPloratory Analyses of heterogeneous and dynamic Networked Data

Codice Progetto: 2022TS4Y3N

Responsabile scientifico UNIPD: Fabio Vandin

Coordinatore nazionale: Università degli Studi di Padova

Partner-Unità di ricerca: Luiss Libera Università internazionale degli studi sociali Guido Carli, Università degli Studi di Perugia, Università degli Studi di Pisa, Università degli Studi Roma Tre

CUP: C53D23003680006

Bando: PRIN 2022 - Decreto Direttoriale n. 104 del 02-02-2022

Durata: 28/09/2023 – 27/09/2025 (24 mesi)

Budget totale progetto: 388.337,00 €

Budget UNIPD: 91.422,00 €

Abstract del Progetto: Many of today's applications are based on networks, either explicitly represented or implicitly defined by the linked nature of the data. These networks are usually heterogeneous, with feature-rich nodes and edges, and dynamic, evolving over time at high rates. The ambitious goal of EXPAND is to produce novel powerful algorithmic tools to handle complex networkanalytics, providing scientific groundwork and technological advances for processing and visualizing networked data. The project will investigate novel algorithmic techniques and will apply them especially to the domain of biological networks. A particular emphasis will be given to visualization tools, which are crucial for exploratory analyses that allow the user to assess the multitude of patterns and trends appearing in multi-faceted datasets. The heterogeneity and dynamicity of the data, combined with the sheer scale and high noise typical of many domains, poses new algorithmic challenges, which will be addressed in two workparts (WPs) of the project.

WP1: Designing novel algorithms for heterogeneous and dynamic networked data will develop new algorithmic techniques to understand and effectively represent meaningful properties and patterns of heterogeneous and dynamic networks.

WP2: Engineering scalable algorithms will explore the practical application of the methodologies developed in WP1, addressing crucial issues related to the scalability of algorithms on real-world data and modern computing platforms, and also design implementations tailored to the domain of biological networks.

Nowadays, every endeavor in all areas of science, engineering, technology, industry, and even most everyday personal activities are producing increasingly huge amounts of complex, uncertain, and heterogeneous data. Such data embody an extraordinary potentiality in terms of information content, but at the same time modern datasets are very hard to display and to analyze. In this scenario, the algorithmic methodologies developed in EXPAND have a high potential to make a scientific, industrial, and social impact.

Finanziato dall'Unione europea NextGenerationEU | Ministero dell'Università e della Ricerca | Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA