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A Conversational Assistant for Geoscientists in Virtual Research Environments

Biagio Peccerillo[1], Alfredo Oliviero[1], Marco Procaccini[2], Leonardo Candela[1], Luca Frosini[1], Francesco Mangiacrapa[1], Giancarlo Panichi[1], Massimiliano Assante[1], and Pasquale Pagano[1]
[1]Institute of Information Science and Technologies, National Research Council of Italy, Pisa, Italy (<name>.<surname>@isti.cnr.it)
[2]Institute of Geosciences and Earth Resources, National Research Council of Italy, Pisa, Italy (<name>.<surname>@igg.cnr.it)

D4Science provides web-based Virtual Research Environments (VREs) that support FAIR, open, and reproducible science across multiple research domains, including Earth science. These environments integrate data access, computation, and collaboration services, offering powerful capabilities to researchers and enabling complex, data-intensive scientific activities within a shared digital infrastructure.

This contribution introduces a conversational intelligent assistant integrated into D4Science VREs, designed to support Earth scientists in their research activity. The assistant provides a natural language interface that helps users interact with D4Science VREs' services, locate relevant datasets and research items, obtain guidance on common tasks, and support exploratory and operational activities within the VRE.

The assistant is designed with a modular approach. The user interacts with a coordinator agent that orchestrates a multi-agent system, where specialized AI agents collaborate to perform a variety of tasks. This architecture allows the assistant to handle heterogeneous requests and to support users across different phases of their research activities, while also facilitating maintenance and extensibility.

The conversational agent adopts a Retrieval-Augmented Generation (RAG) approach that leverages the knowledge already captured by the VRE through its regular use by research communities. In fact, as VREs naturally accumulate updated knowledge created and curated by researchers over time, the assistant's knowledge base evolves incorporating new information. This way, the assistant can ground its responses in domain-specific and up-to-date information, effectively acting as a domain-aware expert embedded within the research environment.

By serving as an accessible entry point to the VRE, the assistant complements existing interfaces without altering established workflows. The presentation discusses the motivation, design choices, and integration strategy. It also presents various concrete use cases relevant to Earth scientists, demonstrating how the conversational assistant can be effectively employed to support their research activity.