AIoD: The European Open Science Commons for AI

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Abstract

AI on-Demand (AIoD Platform) is a collaborative platform designed to unify access to AI resources and accelerate research and innovation across disciplines. It provides a trusted ecosystem for sharing datasets, models, experiments, tools, publications, educational materials, and services. By integrating governance, participation, interoperability, and technical infrastructure, AIoD lowers barriers for AI research, fosters collaboration, and supports responsible and reproducible science.

In this demo, we will showcase the main services of the AIoD platform: the central portal, the AI Catalogue for browsing and searching assets and the Metadata Catalogue with its REST API and Python SDK for programmatic access. We will also demonstrate how services such as the Research and Innovation AI Lab (RAIL) rely on the Metadata Catalogue to enable experimentation, workflow design, and deployment. The objective of AIoD is to bring together the European AI community, promote open and reusable AI, and provide a sustainable commons to accelerate science, power innovation, and ensure responsible use of AI for society.

Keywords: AI, AI-on-Demand (AIoD), AI research infrastructure, FAIR principles

1 Introduction and Scientific motivation

AI research generates a rapidly growing volume of heterogeneous resources—datasets, models, workflows, and publication—often dispersed across domains and repositories. This fragmentation hinders discovery, reuse, and reproducibility. Addressing these challenges requires more than technical platforms: it demands a commons approach that combines infrastructure with governance, interoperability, and sustainability.

The AIoD platform positions itself as the European Open Science Commons for AI, aligned with the Research Data Alliance's Global Open Research Commons (GORC) model (Woodford [2023]). AIoD integrates federated authentication, metadata interoperability, compute infrastructures, and core services to enable scientists to discover, share, and build upon AI assets. Its long-term success depends not only on a robust technical architecture and integration with existing platforms, but also on a clear governance model and broad community adoption.

The AIoD platform offers:

- **Main portal:** the entry point with guides, documentation, community content (events, news, forums, success stories) and access to all services.
- **Metadata Catalogue:** a unified metadata schema for consistent cross-platform search and programmatic integration via REST API and a Python SDK. The catalogue supports programmatic synchronisation with external repositories such as Zenodo, Hugging Face, and OpenML.
- **AI Catalogue:** a discovery and bookmarking service for datasets, models, and educational resources. By connecting discovery, personalisation, and interoperability, the AI Catalogue acts as the gateway to AI resources within the AIoD platform.
- **AI Builder:** an open-source environment for developing and deploying AI models with reusable modules and visual workflow design. Users can combine modular AI components into visual workflows and deploy them on connected compute backends.
- **RAIL:** an interactive environment for experimenting with AI assets retrieved via the Metadata Catalogue and leveraging orchestration tools such as REANA.
- **Single-Sign-On:** federated identity management, enabling seamless access with institutional or social credentials.

2 The Demonstration

The demo session will guide participants through a complete workflow:

- **Exploration:** browsing the main portal, accessing documentation and exploring community content.
- **Discovery:** searching and bookmarking assets in the AI Catalogue.
- **Contribution:** uploading models, datasets, or papers via the Metadata Catalogue.
- **Experimentation:** using Jupyter Notebooks or RAIL to execute an experiment with selected assets.
- **Integration:** demonstrating how external services can synchronise with the Metadata Catalogue programmatically using the REST API or the Python SDK.

The demo requires only a laptop with a browser and internet access. A valid institutional or social login credential is required to access functionalities such as bookmarking or uploading resources.

3 Impact and Collaboration Potential

AIoD goes beyond being a catalogue of resources to becoming a sustainable, community-driven commons for collaborative and reproducible AI in science. By relying on shared services, researchers and projects can reduce duplication of effort, improve interoperability, and focus on their scientific objectives. Authentication, metadata, and workflow service exemplify reusable building blocks that external communities can adopt instead of developing their own.

As the community grows and shares outcomes, the ecosystem collectively benefits, fostering cross-disciplinary collaboration and accelerating scientific discovery in Europe and beyond.

4 Conclusions

The AI-on-Demand platform demonstrates how federated, open infrastructures can catalyse AI research and its applications in science. Through this demo, we will show how AIoD enables researchers to discover, access, and reuse AI resources, as well as contribute new assets for the benefit of the wider community. The session provides a comprehensive guide to the AIoD Platform with practical applications. Attendees will see the platform in action through a live demonstration and will be invited to join the community and explore collaborative opportunities within Europe's dynamic AI ecosystem–making AIoD their one-stop shop for AI Innovation in Europe.

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