AstroTool
Michele Marchesi, Net Service
Marco Di Francesco, Net Service

Project Overview

Main Topic
Scientific Visualization with Artificial Intelligence support

Specific Topic
Advanced development of visualization tools for scientific Big Data, with support for remote and immersive rendering of Astrophysical and Geophysical data (observational and theoretical)

The main goal is to achieve and validate a platform for efficiently visualize Astrophysical Big Data, using remote HPC resources, easily customizable to work in various Astrophysic Areas and flexible enough to be evolved and reuse in Geophysical applications in the near future

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ICSC
Centro Nazionale di Ricerca in HPC, Big Data and Quantum Computing

Project Overview

Consortium:
Auticon Srl (Milan),
Alkemy SpA (Milan)
Net Service (Cagliari, Cosenza, Lecce)

Consultants:
University of Cagliari, Department of Physics
MetaVerso

Technical Objectives, Methodologies and Solutions

Pre-Processing of Astrophysics Big Data for data analysis and pre-rendering on HPC environment

Remote Pre-Rendering of AstroPhysics Data on HPC environment

View and Interact with the rendered images on a modern PC through a specific client application

Test the framework on a well-defined use case (for example Gamma-Ray Burst)

Validate the product in a Laboratory Environment (TRL-4)

Release the Developed product As Open Source Code

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Technical Objectives, <u>Methodologies and Solutions</u>

We are going to use a **Design Thinking Approach** with 3 main phases:

- **Understand:** Look into the specific domain to detect problems, requirements with a multidisciplinary team and a strong governance to help achieving goals and make decisions

- **Build:** define, plan and implement efficiently MVPs (Minimum Viable Products) with an interactive approach to collect feedbacks and improve the products

- **Evolve:** support the adoption, understanding how to evolve the solution and measure the efficiency

Partners will work together with INAF to define the requirements, plan and interactly build this products, also by understanding, using and evolving INAF already done products and solutions

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Involved Staff and new recruitments

Role	Partner
Solution Architects	Net Service
Senior Developers	Net Service /Alkemy / Auticon
Lead Data Scientist	Alkemy
Domain Consultants	University of Cagliari
Rendering Consultants	Metaverso
Scientific Manager	Net Service
PM	Net Service
Governance	Auticon / Net Service / Alkemy
Designers	Net Service / Alkemy
HPC Experts	Net Service
Testers	Auticon / Net Service / Alkemy

Timescale, Milestones, SAL

WP	1	2	3	4	5	6	7	8	9	10	11	12
1 - Survey of libraries, tools, and technologies supporting the rendering and visualization of scientific big data of an astrophysical nature			M1.1									
2 - Definition of an architecture for remote data processing and data rendering of astrophysical data						M2.1						
3 - Development and integration of tools for remote data processing and rendering									M3.1			M3.2
4 - Development of the client application and validation on specific case studies (for example, Gamma-Ray Burst)									M4.1			M4.2
5 - Release of the software and documentation in Open format and dissemination of the results									M5.1			M5.2

Timescale, Milestones, SAL

DELIVERABLE		WP	Milestone	Month	SAL
D1	Libraries and technologies for rendering and visualization of astrophysical big data	WP1	M1.1	3	1 (3 months)
D2	Definition of the architecture for remote data processing of astrophysical data	WP2	M2.1	6	2 (6 months)
D3	Tools for remote data processing and rendering on HPC (Partial Release)	WP3	M3.1	9	3 (9 months)
D4	Client and report on validation of the case study (Partial Release)	WP4	M4.1	9	
D5	Report on dissemination activities	WP5	M5.1	9	
D3	Tools for remote data processing and rendering on HPC (Final Release)	WP3	M3.2	12	4 (12 months)
D4	Client and report on validation of the case study (Final Release)	WP4	M4.1	12	
D5	Final Open Source release and Report on dissemination activities	WP5	M5.2	12	