Title: Development of Visualizations and Interactions for a 3 x 3 Video wall [project CVA.UA]

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Context/ application area

Data visualization, Interaction, Distributed systems.

Project Description

University of Aveiro has been recently assigned an Advanced Visualization Centre (CVA.UA) that includes a **3x3 video wall visualization centre,** an **Oculus Quest 2** VR headset, and a graphic workstation to support scientific visualization and provide advanced visualization services to the university community allowing researchers and industrial companies to access and use SoA visualization Hardware.


VideoWall installed in the Reitoria of UA, Workstation and VR Headset of CVA.UA

The objective of this work is to further explore the capabilities of the recently installed Centre developing visualizations, interactions, and services for the project.
On one side, students are supposed to **identify visualization needs** in the DETI/UA community and develop preliminary **visualization applications** for applications that might benefit from a video wall visualization/analysis.
Some possible lines to investigated (but other can be added during the project are)

- Study and evaluation of Visualization software for distributed data visualizations. **SAGE2** software is already defined as the main software to be used, but alternatives might be investigated or tested.
- Interview with potential researchers/users that might have interesting **visualization case study** to be used as demonstration of the potential of the video wall installation. Such possible applications that might be investigated are:
    - **Dashboard** for wireless network other STIC applications
    - Environment visualization of air pollution
    - Visualization of the information from the climate group in the physics department
    - …

Some other important topics on the project are:

- Provide alternative interaction methods for the video wall (for example, using optical tracking of HTC Vive controllers, or body tracking from kinect sensors)
- Investigate the possibility to support distributed visualization, involving other centre of the RNCA (namely the MACC Minho Advanced Computing Centre)
- Develop some native visualization to fully exploit the resolution and area of the video wall.

- Study and compare the benefits of exploring a visualization in a large display (video wall) versus Immersive visualization (in Oculus Quest 2).

Main project goals

- Study and test of **software and architectures** that would better fit **distributed data visualization** for the Visualization centre. Selection and configuration of the Software layer of the centre.
- Interview and identification of interesting **visualization case studies** that can be used to demonstrate the potential of the installation.
- Development of **visualizations** for new case studies selected in the previous step.
- **Integration and test** of other interaction methods besides the usual mouse/keyboard.
- Perform a **preliminary user** study to compare benefits and limitations of Immersive and large display visualizations.

Minimum project goals

As a minimum output of the project, we expect at least **three new demonstrations** based on case studies identified during the project, the **adaptation of the videowall to support the HTC vive wireless controllers** as alternative interaction method and **a demonstration of distributed visualization** with a remote location (MACC or other)