Collaborative ELINT immersive analytics in augmented reality

IMT Atlantique

NICOLAS BAUDIN
INTERNSHIPS IN FRANCE INITIATIVE

Name of the hosting institution in France	IMT Atlantique
Name of the host laboratory / research team	Lab-STICC équipe IHSEV/INUIT
Address	Technopôle Brest-Iroise CS 83818 – 29238 Brest Cedex 3
Web site	https://www.labsticc.fr/en/index/
Name of the supervisor	Thierry Duval
Function	Full Professor of Computer Science – co leader of the IHSEV team of the lab-STICC Lab
Email	thierry.duval@imt-atlantique.fr
Phone number	+33 6 71 04 48 64

Internship offer

Topic of the internship (title)	Collaborative ELINT immersive analytics in augmented reality			
Proposed dates of the internship*	Start	2020-11-02	End	2021-04-30

* The supervisors have indicated the dates proposed are flexible and are able to be postponed subject to COVID-19 border closures.

Scientific and academic objectives of the internship (detailed description of the internship content, work expected from the intern and expected outcomes):

In the context of their joint research laboratory ATOL (Aeronautics Technico-Operational Laboratory), Thales DMS France and IMT Atlantique are studying how immersive devices and virtual (VR) or augmented (AR) reality can facilitate the work and increase the performance of operators dealing with important amounts of complex structured data, as is it the case in the domain of electronic intelligence (ELINT) i.e. classification of radar signals. As the result of a PhD work on this topic, Thales and IMT Atlantique have patented a new interaction paradigm for ELINT immersive analytics in VR, called HeloVis, which has been demonstrated as more intuitive and more efficient than existing ELINT analysis tools, with the help of French ELINT military operators. HeloVis has been prototyped in several VR set-ups for a single isolated operator: headset, stereoscopic 3D monitor (with 3D glasses) and cave. In order to extend the range of use of HeloVis, ATOL partners are willing to study how the concept could be adapted to AR in order to get rid of the VR isolation constraint and facilitate a collaborative work between several operators on the same dataset. The device envisioned for this work is the Microsoft Hololens AR headset. The objective of the internship will be to adapt HeloVis to a multi-operator collaborative task and to the Hololens headset, in order to assess both the feasibility and interest of AR for ELINT immersive analysis. The work of the interne will comprise the following activities:
i) studying the transposition of the HeloVis paradigm to AR
ii) specifying ELINT immersive analytics in a collaborative AR set-up and
iii) prototyping the AR version of HeloVis with the Hololens.
The outcomes of this work expected by Thales is an extension of the range of contexts of use for HeloVis and a demonstration of the potential of HeloVis in AR for collaborative ELINT immersive analytics, eliminating some of the constraints of the use of VR in an operational context.

Name of industrial partner	Thales
Role of the industrial partner	Thales DMS France will provide a realistic operational context with a real use-case in the domain of electronic intelligence. The French part of the funding of the internship will come from Thales through ATOL, a joint research lab between Thales, IMT Atlantique and Ecole Navale.
Main contact at the French industrial partner	Olivier Grisvard
Email	olivier.grisvard@fr.thalesgroup.com
Name of the Australian partner institution	University of South Australia
Name of lab/department/team involved in the Collaboration at the Australian partner institution	Advanced Computing Research Centre – the Wearable Computer Lab
Main contact in the Australian partner institution	Bruce Thomas
Function	Full Professor - Head of the Wearable Computer Lab
Email	Bruce.Thomas@unisa.edu.au
Outside of this ongoing collaboration, will applications coming from students of other eligible Australian universities be considered by the hosting institution in France?	Yes

Expected profile of applicant

Level of study	Master's student or bachelor with honors
Discipline	Computer science
Required qualities, knowledge and skills	Knowledge in Computer Graphics, HCI, VR, AR, software development with Unity 3D (C#)

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