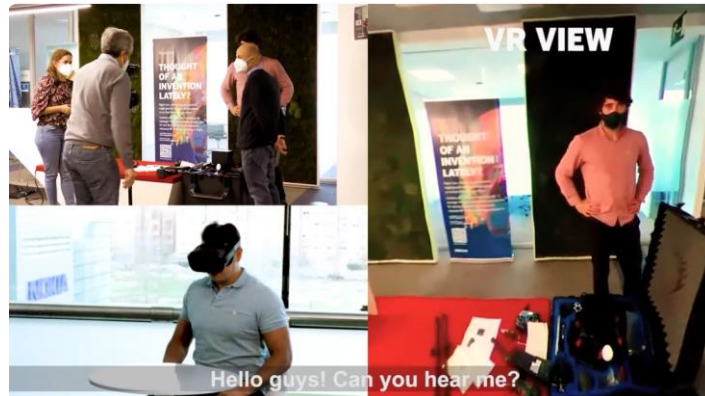# [1] Development of User Interface for Immersive Reality Platform

Description

At Nokia eXtended Reality Lab we have developed an immersive telepresence platform to connect users distributed across different localizations (The Owl). We have used immersive reality tools, 360 video, VR goggles…

At this moment we are adding to the platform new functionality, and we are improving the user experience, to enable any person with minimal technical skills to use it. For that reason, the way in which users interact with devices is paramount. During this internship you will work with the research team in the improvement of the user interface, based mainly on a web application, and visualized through a touchscreen, from which the whole platform is managed: audiovisual flows, 360 cameras, integrated microphones, and transmission to remote users.

Conditions

- Half-time: 20 hours/week (flexible schedule)
- Scholarship: 750 €/month
- Minimum duration: 6 months (optional extension up to 12)
- Expected start time: September 2024
- Location: Nokia Spain (Las Tablas), Maria Tubau 9, Madrid

Requirement

- Students at finishing their BsC or MsC studies related to Computer Science, Electrical Engineering, or similar.
- Front End programming knowledge (Node, JavaScript, React, HTML, CSS preferred)
- Linux knowledge is required (scripting, system administration).
- Code version control usage (GIT)
- Knowledge of UX and Docker will be positively valued
- Team group, initiative, self-management, and critical thinking
- Good English level and academic marks

Contact

If you are interested, please send your CV, mark records and motivation letter to juan.torresarjona@nokia.com **before June 28th.**

[2] Voice Control for Immersive Telepresence Applications

Description
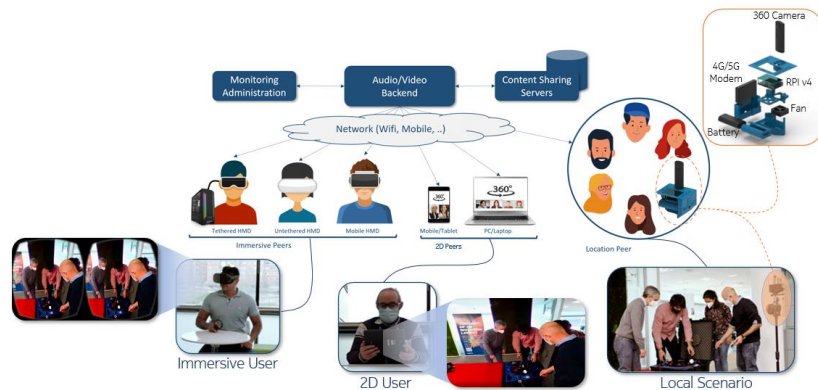
At Nokia eXtended Reality Lab, we have developed an immersive communication application that uses telepresence to provide an experience much closer to a real meeting with human contact. This technology has plenty of applications, e.g., events, healthcare, education, etc. More specifically, in our Lab we have several projects in which people with disabilities use our technologies for remote support to improve their autonomy or training for employment.

With this internship we aim to improve the usability of this system by:

- Adding voice commands to stablish, finish, and control an immersive video call for the local participants: controlling Linux processes.
- Adding voice commands to stablish, finish, and control an immersive video call for the remote participants: controlling the Unity application running in the HMD.
- Study the possibility of adding LLMs to the immersive call.

Conditions
- Half-time: 20 hours/week (flexible schedule)
- Scholarship: 750 €/month
- Minimum duration: 6 months (optional extension up to 12)
- Expected start time: September 2024
- Location: Nokia Spain (Las Tablas), Maria Tubau 9, Madrid

Requirement
- Students at finishing their BsC or MsC studies related to Computer Science, Electrical Engineering, or similar.
- Linux knowledge is required.
- Some Unity and Machine Learning knowledge would be positively valued.
- Good English level and academic marks.
- Self-management, and critical thinking.

Contact
If you are interested, please send your CV, mark records and motivation letter to amaya.jimenez@nokia.com **before June 28th**

[3] Real Time Egocentric Segmentation of Local Reality for eXtended Reality Applications

Description

At Nokia eXtended Reality Lab, we have developed a Deep-learning based algorithm able to segment human body parts from egocentric videos in real time. This algorithm is already integrated in several eXtended Reality / Mixed Reality applications, as the one you can see in this video. With this internship we aim to improve the algorithm by:

- Adding new real objects to be included in the mixed reality applications, as objects in the hands of the user, cutlery, kitchen tools, food and ingredients, etc.
- Creating a proper dataset, by adding the new required images.
- Training the segmentation algorithm adding the new classes.
- Testing the functionality of the algorithm, so that, it can be used in real-time applications.

Conditions

- Half-time: 20 hours/week (flexible schedule)
- Scholarship: 750 €/month
- Minimum duration: 6 months (optional extension up to 12)
- Expected start time: September 2024
- Location: Nokia Spain (Las Tablas), Maria Tubau 9, Madrid

Requirement

- Students at finishing their BsC or MsC studies related to Computer Science, Electrical Engineering, or similar. Machine Learning and Deep Learning knowledge are required.
- Python and some knowledge about DL framework: Keras, Tensorflow, Pytorch.
- Good English level and academic marks.
- Self-management, and critical thinking.

Contact

If you are interested, please send your CV, mark records and motivation letter to amaya.jimenez@nokia.com **before June 28th.**

[4] Scene Analysis for Robotics and Immersive Telepresence Applications
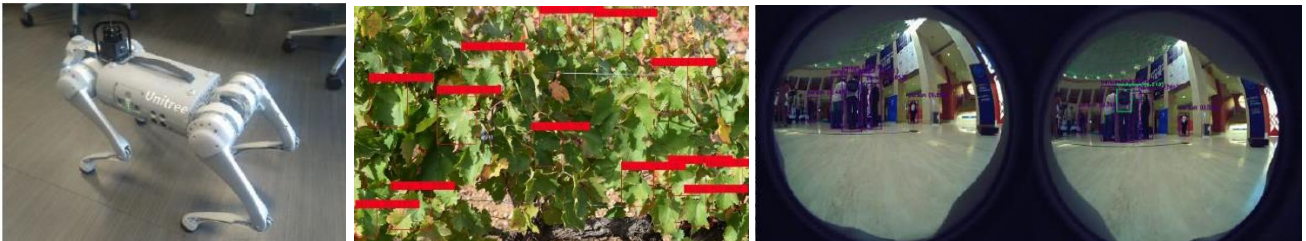
Description

At Nokia eXtended Reality Lab, we develop technologies for immersive communication applications, remote supervision, and teleoperated vehicles. Image analysis of the video captured by the cameras is a key part of these applications, as it allows us to find some objects in the scene, classify them, and take decisions with such information. With this internship we aim to incorporate to our applications a more complete scene analysis by:

- Developing scene understanding algorithms using computer vision techniques. What type of scene is shown in the image, what objects are visible, and relations between the observed objects.
- Evaluation of machine learning and deep learning techniques for scene understanding.
- Exploring what type of information/events can be useful in our applications.
- Implementation of the selected techniques in different applications, e.g. vehicles or immersive communication.

Conditions

- Half-time: 20 hours/week (flexible schedule, partial remote working)
- Scholarship: 750 €/month
- Minimum duration: 6 months (optional extension up to 12)
- Expected start time: September 2024
- Location: Nokia Spain (Las Tablas), Maria Tubau 9, Madrid

Requirement

- Students at finishing their BsC or MsC studies related to Computer Science, Electrical Engineering, or similar. Machine Learning and Deep Learning knowledge are required.
- Python and some knowledge about DL framework: Keras, Tensorflow, Pytorch.
- Good English level and academic marks.
- Self-management, and critical thinking.

Contact

If you are interested, please send your CV, mark records and motivation letter to amaya.jimenez@nokia.com **before June 28th**.

[5] Using Depth for Enhancing Semantic Segmentation in Extended Reality Applications
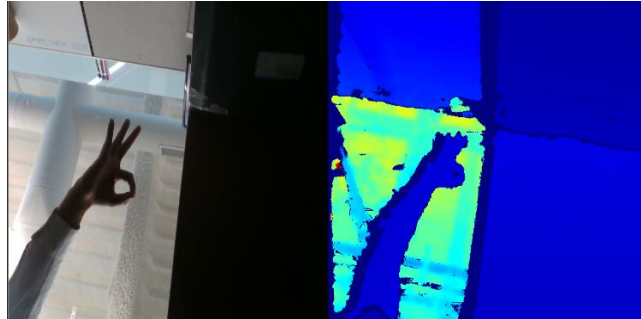
Description

At Nokia eXtended Reality Lab, we have developed a deep learning based algorithm able to segment human body parts from egocentric videos in real time, as well as some pre-defined objects inspired from state-of-the-art algorithms and making big efforts on data capturing and data engineering. This algorithm is already integrated in several eXtended Reality / Mixed Reality applications, as the one you can see in this video. With this internship we aim to improve the algorithm by:

- Exploring a new sensor that captures both mono RGB and depth information, including calibration of both cameras, and physical integration into VR googles.
- Adapt or update existing proprietary datasets for the new task.
- Train deep learning network architectures for real time semantic segmentation
- Explore techniques to render in Unity segmentation results using depth information.

Conditions

- 20 hours / week (flexible arrangement and remote working)
- Remote Supervision
- Salary: 750 €/month
- Minimum duration 6 months (optional extension up to 12 months)
- Expected starting time: October 2024
- Location: Nokia Spain (Las Tablas), María Tubau 9, Madrid

Requirements

- Students at finishing their BsC or MsC studies related to Computer Science, Electrical Engieneering, or related. Machine Learning and Deep Learning knowledge are required.
- Python and some knowledge about DL framework: Keras, Tensorflow, Pytorch
- Previous projects related to camera calibration, depth perception or 3D vision are desirable.
- Good English level and academic marks
- Self-management, and critical thinking

Contact

If you are interested, please send your CV, mark records and motivation letter to ester.gonzalez@nokia.com **before June 28th**.

[6]Quality of Experience in eXtended Reality Applications.

Description

Study of acceptance, quality of experience, including other socioemotional aspects, such as presence, immersion, empathy in XR experiences designed and developed by the eXtended Reality Lab, Nokia.

You will work in a project which aim is to show the benefits and the potential that eXtended Reality technology must improve the inclusion of people in situation of psychosocial vulnerability, such as people with intellectual disability, dependency or neurocognitive impairment. For this reason, you will be part of a transversal team of engineers and psychologists who work together to explore the possibilities of the technology and the impact on the daily life of people.

Additionally, you will be involved in the entire process of the user experience assessment and modelling: test design, test execution, data analysis, and reporting of results. You will learn test methodologies design and data analysis of results, while being in touch with emerging XR technologies.

Conditions

- 20 hours / week (flexible arrangement and remote working).
- Salary: 750 €/month.
- Minimum duration 6 months (optional extension up to 12 months).

- Expected starting time: September 2024.
- Location: Nokia Spain (Las Tablas), María Tubau 9, Madrid.

Requirements

- Last year students (BsC or MsC studies) related to Electrical Engineering, Data Science or similar
- Programming skills for data analysis and statistics (Python).
- Basic knowledge of Linux (scripts, command lines…).
- Ability to work with other colleagues and empathize with participants in subjective assessments.
- Proactive, autonomous, and critical thinking.
- Availability to move in work-schedule to different locations inside the Community of Madrid.
- Good English level.

Contact

If you are interested in the application of the technology and the impact of it from a human-centered perspective, please send your CV, transcript of records and motivation letter to marta.orduna@nokia.com **before June 28th**