Invitation to the Oral Examination – Department CS

For the occasion of his examination for a Doctoral Degree,

Ms. Vanessa Gonzalez Duque

will present her dissertation titled

Methods for the acquisition, learning-based segmentation, and quantitative analysis of ultrasound volumes

on Friday, November 15, 2024, at 9:00 AM (CEST)

Attendance to the presentation is open to the public. The presentation will be in English.

The candidate, all members of the Examination Committee, and authorized examiners of the TUM School of CIT are invited to the presentation and subsequent oral examination.

The presentation and subsequent examination will take place in hybrid form.

In person in room

Ecole Central Nantes

[1 Rue de la Noë, 44300 Nantes, France]

Building S. Amphitheater

And online via Zoom:

https://tum-conf.zoom-x.de/j/67629372390?pwd=La7j9uVGaZbtlJcErak5z21LCQoPo5.1

Meeting ID: 676 2937 2390
Passcode: 738352

Examination committee:

Vorsitzende/-r: Prof. Bertrand Michel (ECN)

1. reviewer, supervisor (TUM): Prof. Nassir Navab (TUM)

2. reviewer, supervisor (ECN): Prof. Diana Mateus (ECN)

3. reviewer: Assoc. Prof. Mohammad Yacub (MBZUAI)

4. reviewer: Assistant Prof. Maria Alejandra Zuluaga Valencia (EUROCOM)

Munich, **the 16 of October 2024**

Mailing list:

Members of the examination committee

Doctoral candidate

Abstract:

The goal of this work is to surmount challenges in 3D ultrasound image segmentation and boost the precision of lower limb muscle delineation. This PhD has two segments: The first is devoted to creating high-fidelity 3D ultrasound volumes and accurate 3D labels. This section aims to eliminate uncertainties from probe tracking inaccuracies and anisotropic annotations. The second segment presents segmentation architectures for ultrasound images with a focus on 3D volumes, specifically the muscles within the lower limb. Key contributions include 1) the IFSS-net architecture for precise muscle segmentation in 3D ultrasound volumes. 2) Comprehensive studies to evaluate label variability based on sound physics and the metrics used to rank the network's performance. 3) A new available open-source dataset. In this research, we push the boundaries by introducing a novel network architecture and adopting advanced methodologies to address the critical challenges in 3D ultrasound segmentation, aiming to enhance the accuracy and reliability of this pivotal diagnostic tool.