Visão Artificial e Realidade Mista

Computer Vision and Mixed Reality

Mestrado em Engenharia Informática e Multimédia

Master in Informatics and Multimedia Engineering

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Goals

- Understand the concepts of Augmented Reality (AR), Augmented Virtuality (AV) and Virtual Reality (VR) - *Mixed Reality/Virtuality Continuum*
- Know examples and applications involving the concepts of AR/AV/VR
- Learn computer vision concepts for augmented reality
- Know devices and technologies to implement examples of augmented reality

Syllabus – Theoretical Component

- Chapter 1. Introduction to Augmented Reality
- Chapter 2. Displays
- Chapter 3. Tracking
- Chapter 4. Computer Vision for Augmented Reality
- Chapter 5. Calibration and Registration
- Chapter 6. Visual Coherence

Practical Component

- Implement 2 practical examples of augmented reality
  - Project 1 - Computer Vision based
    - Feature based
    - Marker based
  - Project 2 - Integrating AR application
- Devices: Cameras: mono, stereo, RGB-D (RealSense); LeapMotion; smartphone; HTC Vive
- Technologies: OpenCV, Unity, ARToolkit, Vuforia, ARCore, ARKit

Evaluation

- Final Grade = 50% P1 + 50% P2
- Each individual project includes the development of an application and a written report with final discussion.

Bibliography

- Augmented Reality: Principles and Practice, 1st Edition by Dieter Schmalstieg and Tobias Hollerer, June 2016, Pearson Education
- Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR, Steve Aukstakalnis, 2017, Addison-Wesley
- Augmented Reality for Developers, by Jonathan Linowes and Krystian Babilinski, October 2017, Packt Publishing Limited