Proposal of Master Research Project / Proyecto fin de Master for the academic year 2025-26

Group name: Neural circuits in vision for action
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Title of the MRP/TFM:

Immersive platform for the study of Attention and Distraction

How does the brain select relevant information in complex environments, and what causes distraction? This project aims to develop an immersive Virtual Reality (VR) platform to study human attention, visual saliency, and distractor processing in ecologically relevant tasks.

Participants will perform visually guided tasks in controlled 3D environments where salient distractors are precisely manipulated in space and time. Integrated eye tracking will quantify gaze dynamics, saccades, fixations, and pupil dilation as measures of attentional engagement and arousal. The project will also incorporate bio-inspired computational models of visual saliency to estimate how bottom-up visual features capture attention and predict distractor-driven behavior.

The platform is designed to support future electroencephalogram (EEG) integration for synchronized brain–behavior recordings and translational research into attention-related disorders.

Main Objectives

- Develop immersive VR attention tasks
- Measure gaze behavior and pupil dynamics
- Compute visual saliency maps from complex scenes
- Relate saliency and behavioral distraction
- Build a platform compatible with future EEG integration

Techniques and Skills Acquired

- VR development (Unity or Unreal Engine)
- Eye-tracking and pupilometry
- Computational saliency analysis
- Behavioral data analysis (Python/MATLAB)
- Human cognitive neuroscience experimentation

Candidate Profile

Ideal for students interested in attention, VR, computational neuroscience, and neurotechnology.

Prospective students are encouraged to establish early contact to discuss the project and their background.

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