

Real-time visual attention measure in Virtual Reality

A Pilot Study

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Introduction

- Virtual Reality (VR) **professional training** provides full control on the learning environment and reduces risks and expenses
- **Real-time attention assessment** would allow adapting content to users and redirecting attention where it matters

Objective

Develop a **real time visual attention measure system** in VR, based on headset-integrated eye-tracking

Open contributions

- Experimental **environment** as a Unity VR platform collecting eye-tracking data in real-time
- Proposition of a **real time visual attention measure model** with partial implementation using the Microsoft \psi framework (C#)
- **Dataset** of scenarised eye-tracking data collected in the VR environment

Experimental environment

Environment used for attentional model validation.

3 tasks given to participants in VR :

- Fetch** objects on a messy table
- Build** a robot with matching limbs
- Sort** objects (no constraints)

Other activities act as **distractors** (basketballs, targets, wooden constructions...)

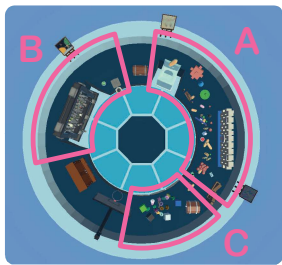


Fig 1 : Top-view, activities zones

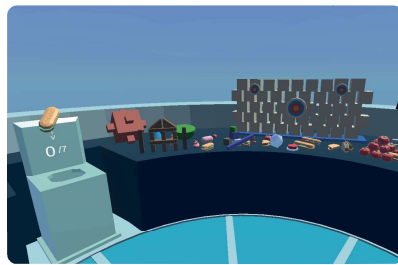


Fig 2 : Activity A (fetching)

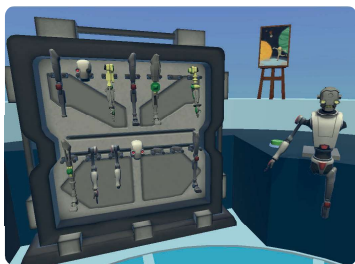


Fig 3 : Activity B (building)

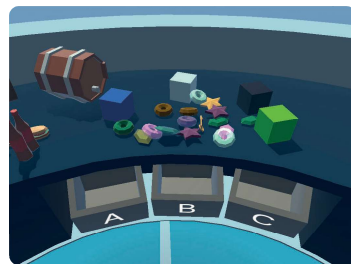
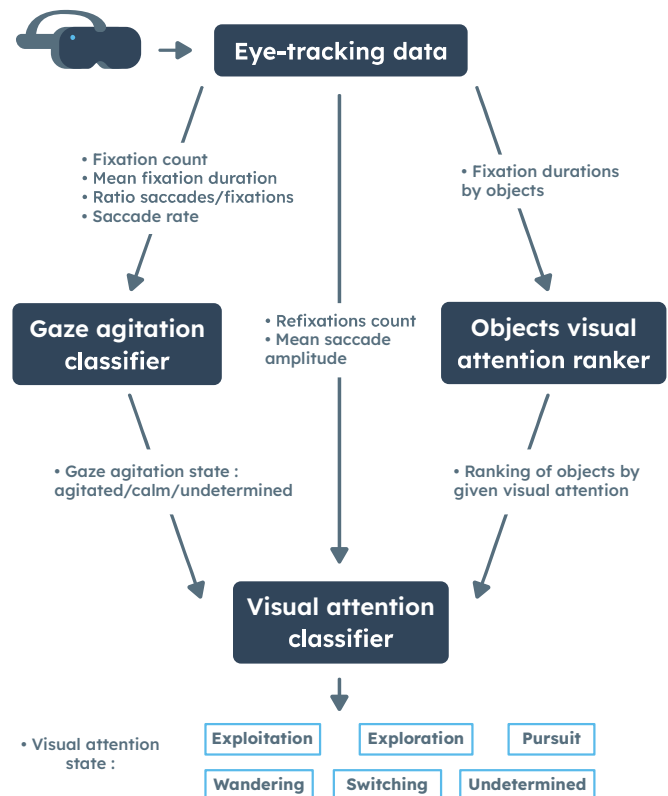


Fig 4 : Activity C (sorting)

Data processing model



Tuning and pre-validating

- Record **scenarized** eye-tracking behavior in the experimental environment for **ground truth**
- Use part of this scenarized data to **tune** the various **thresholds and weights** of the model
- **Test the system** for ground truth detection on the rest of the data

Next steps

- Completing the data processing model **implementation**
- Completing the **tuning and pre-validating**
- **Validating the system** with a large scale experiment in the virtual environment
- Accurately linking visual attention measures to cognitive attention and developing a **real-time attention redirection system**