Saliency heat maps for interactive 3D scenes using virtual reality

Supervisors / Encadrantes

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Coordonnées / Contact

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Durée / Duration

3-6 months, between March - September 2021

Lieu du stage / Location

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Type de stage / Type of internship

(X) recherche / research ( ) développement / development

Description

Context

Saliency maps are the most common way of visualizing human attention, and is broadly used to understand how people view visual content, how style and visual arrangement in media changes the way people explore, perceive, and even interpret the content [2]. Virtual reality further offers the opportunity to observe visual attention in an immersive 360° environment [4], which has been a prominent topic in multimedia studies for images, film [3], and static 3D objects [5].

Objective

This project aims to explore the creation of saliency maps in 3D interactive scenes to visualize gaze data collected from integrated eye trackers.

Steps

1. Conduct a state of the art study of saliency maps for 2D and 3D content
2. Design and implement a number of 3D scenes that (1) require the user to carry out simple interactive tasks, (2) involve movement of objects in

the 3D scene (either animated or through interaction), and (3) can be procedurally generated for randomization.
3. Establish workflow to collect and process eye tracking data to pinpoint the depth dimension of gaze in the 3D scene
4. Compilation of the 3D scene for VR headsets, and connecting integrated eye tracking data to the workflow
5. Visualizing and rendering gaze data as a point cloud [1] overlayed on the 3D scene, along with a temporal axis (i.e. shifts of gaze over time)

Langages et utils / Languages and Tools

Unity (C#), HTC Vive Eye Pro

Mots clés / Keywords

Saliency map, gaze tracking, virtual reality, 3D animations/graphics

Références bibliographiques / References

[1] Alexiou, E., Xu, P., & Ebrahimi, T. (2019, September). Towards modelling of visual saliency in point clouds for immersive applications. In 2019 IEEE International Conference on Image Processing (ICIP) (pp. 4325-4329). IEEE.

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[5] Wang, X., Koch, S., Holmqvist, K., & Alexa, M. (2018). Tracking the gaze on objects in 3D: How do people really look at the bunny?. ACM Transactions on Graphics (TOG), 37(6), 1-18.