Using Eye Tracking for Gathering Attention Data

Complex Computer Rendering Methods in Real-Time

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Agenda

1. Visual attention & Eye Tracking

2. Eye Tracking in Marketing Research

3. Related Work

4. Project purpose

5. Progress & future agenda

6. Demonstration

Visual attention

Visual attention is one of the most important in many situation of life
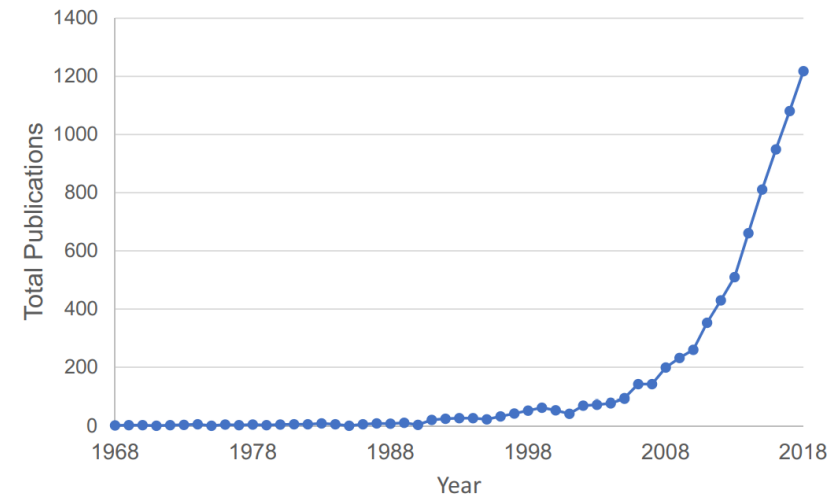

Surgery

Drawing

Driving

Eye tracking

- Psychology and Cognitive Science
- Human-Computer Interaction (HCI)
- Market Research and Advertising
- Neuroscience and Neuroergonomics
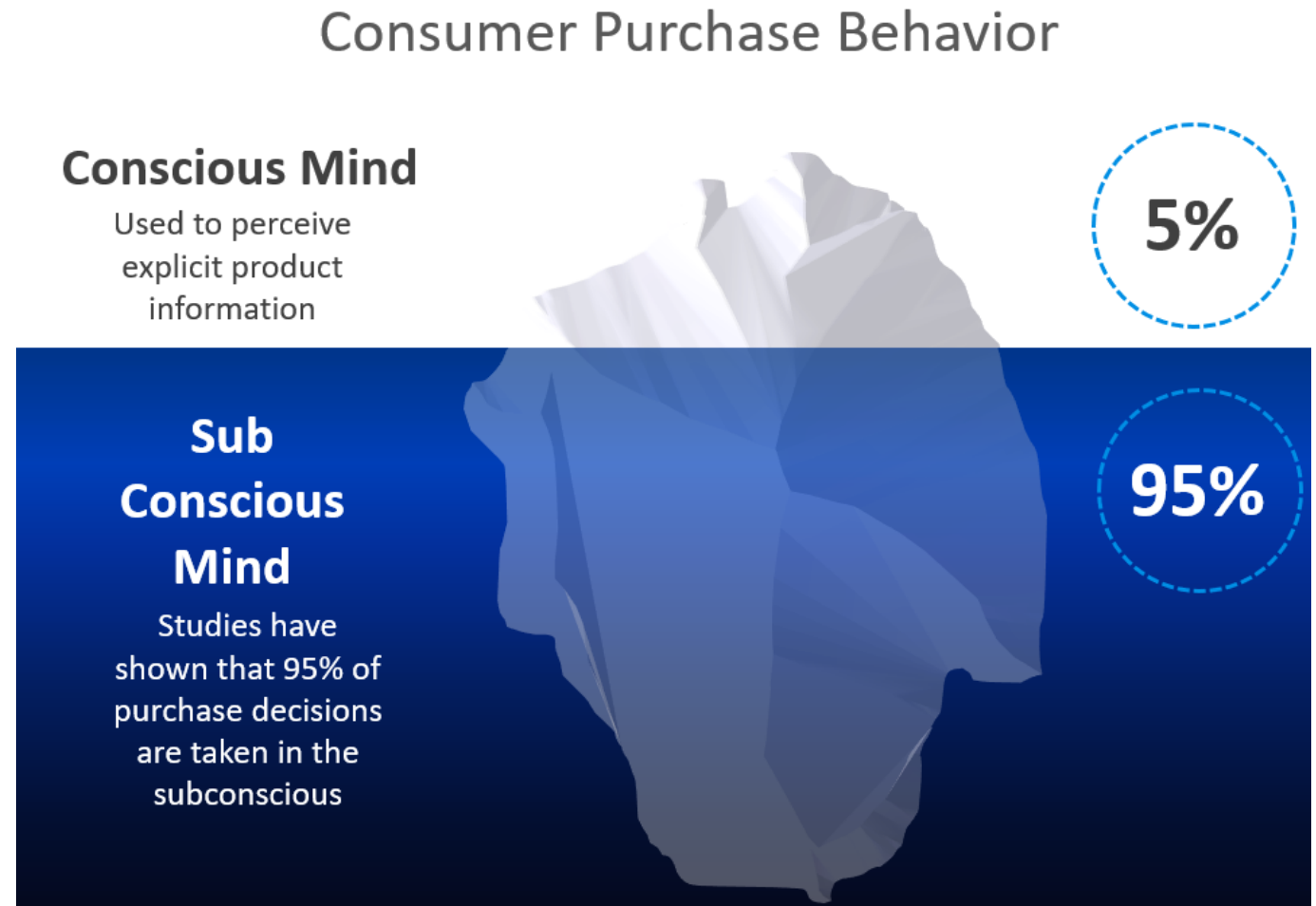- Medical and Clinical Applications

Number of publications per year of TOPIC: "eye tracking"
Carter, B. T., & Luke, S. G. (2020)

Eye-Tracking in Marketing Research

■ Calvert and Brammer stated that 95% of purchase decisions happen in the subconscious mind

Eye-Tracking is essentially a window to understand people's behaviour and assess what is going on in the subconscious.

Consumer Purchase Behavior

Conscious Mind
Used to perceive explicit product information

5%

Sub Conscious Mind
Studies have shown that 95% of purchase decisions are taken in the subconscious

95%

Calvert, G. A., & Brammer, M. J. (2012)

Eye-Tracking in Marketing Research

- Using the eye-tracking in marketing research is the intention to understand the actions of consumers

- Visual attention is essential in examining consumer behavior and understanding its role in the decision-making process can provide valuable knowledge that enables to effectively design marketing activities using visual messages

- The goal of marketing activities is to provide consumers with product information in an efficient enough way to increase awareness among potential buyers and to identify the needs that can be met through it. Consequently, awareness of product availability increases the likelihood of buying it

Eye Tracking Application on Emotion Analysis for Marketing Strategy

H. Zamani, A. Abas, M. K. M.Amin

Bio Cognition Laboratory, Bio-Inspired System and Technology iKohza (Research Group), Malaysia – Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM) 54100 Kuala Lumpur, Malaysia. Hadii.zamani@gmail.com
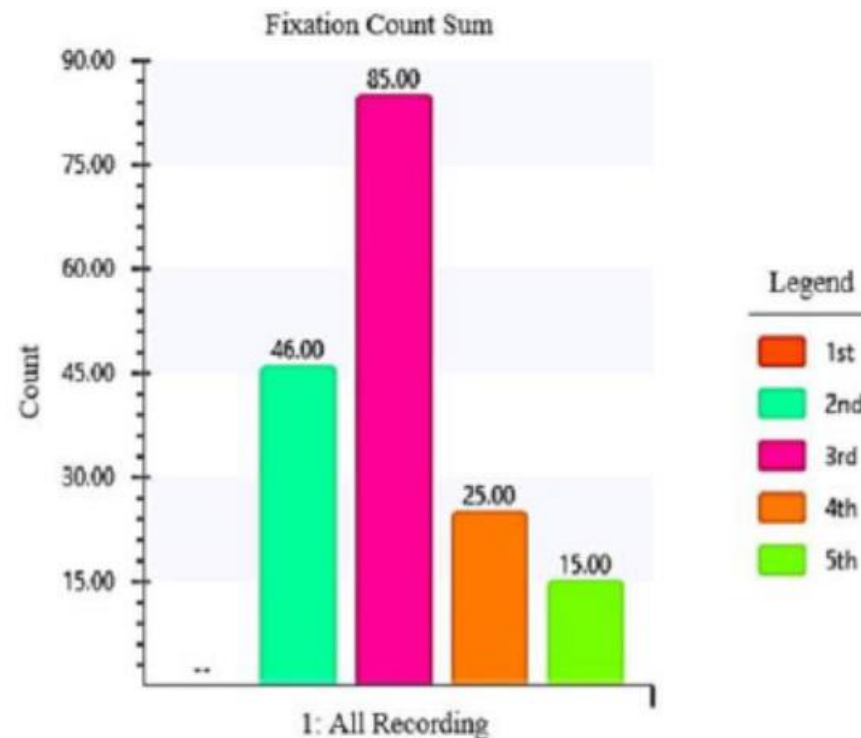
a) Original Image

b) Area of Interest

c) Gaze Plot

d) Heat Map

e) Total Fixation Count for Each AOIs Defined

Problem:

1. Using Tobii eye tracking, The participants have to stable without movement during experiment (i.e. look at display)

2. 2D images lack some information of the products

3. Participant observers are more likely to shift their gaze to such visually salient features (e.g. center of screen..)

A system for three-dimensional gaze fixation analysis using eye tracking glasses

Ryo Takahashi *, Hiromasa Suzuki, Jouh Yeong Chew, Yutaka Ohtake, Yukie Nagai, Koichi Ohtomi *
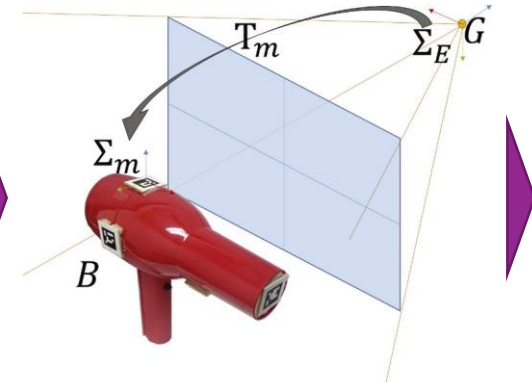
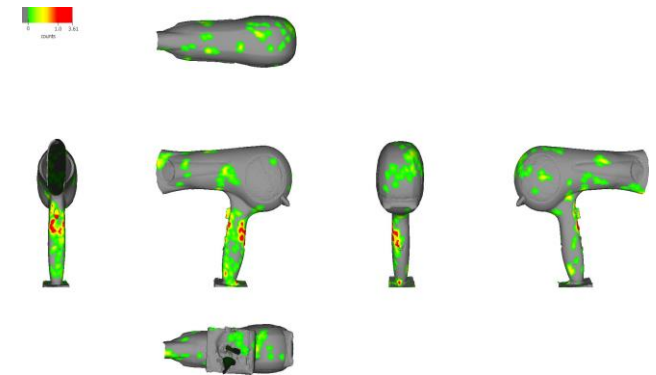Department of Precision Engineering, The University of Tokyo, Tokyo, Japan

AR markers

Experiment

Visualizing the attention data using AR maker to calculate position and posture of given products

Results

Problem:

1. Using AR markers greatly affect the product's outlook to draw attention of users.

2. Visualization of gaze direction, location, and time. Here, gaze direction should be informative, but it is not visualized in current implementation.

Goal

Using Eye Tracking Feature on Quest pro headset for gathering and visualization attention data of users in VR environment.
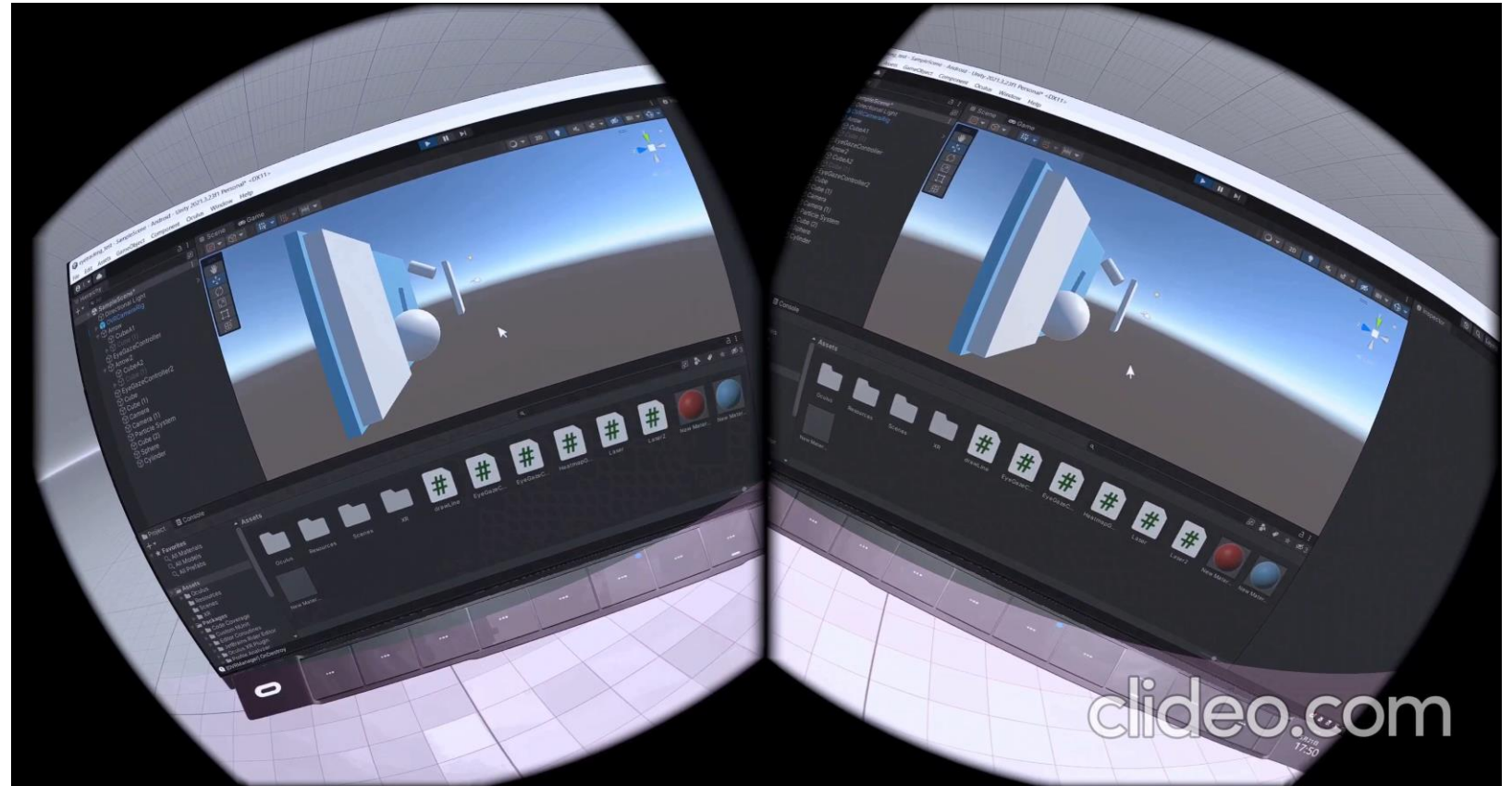

Source: https://twitter.com/StrangeNative/status/1592561315108728832?s=20
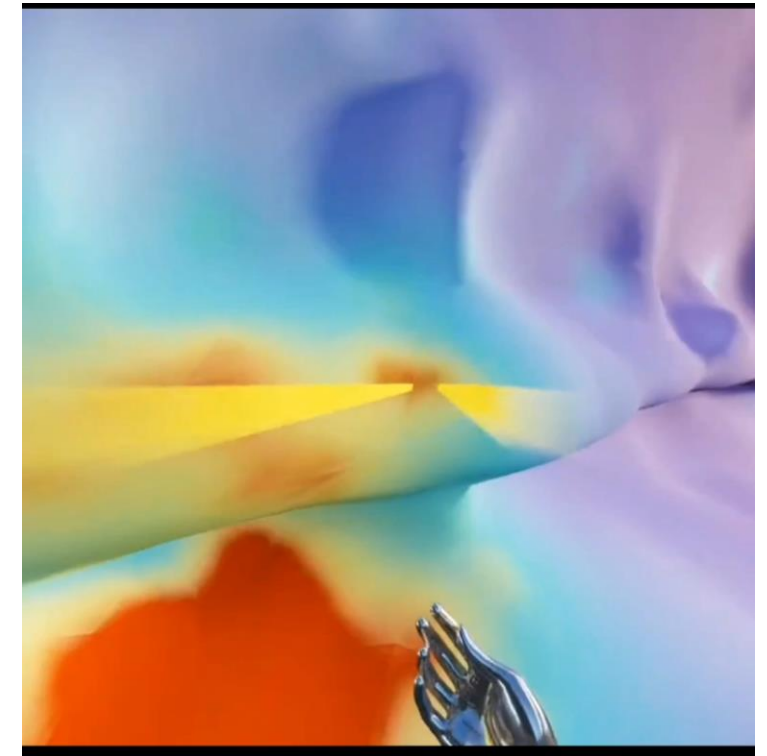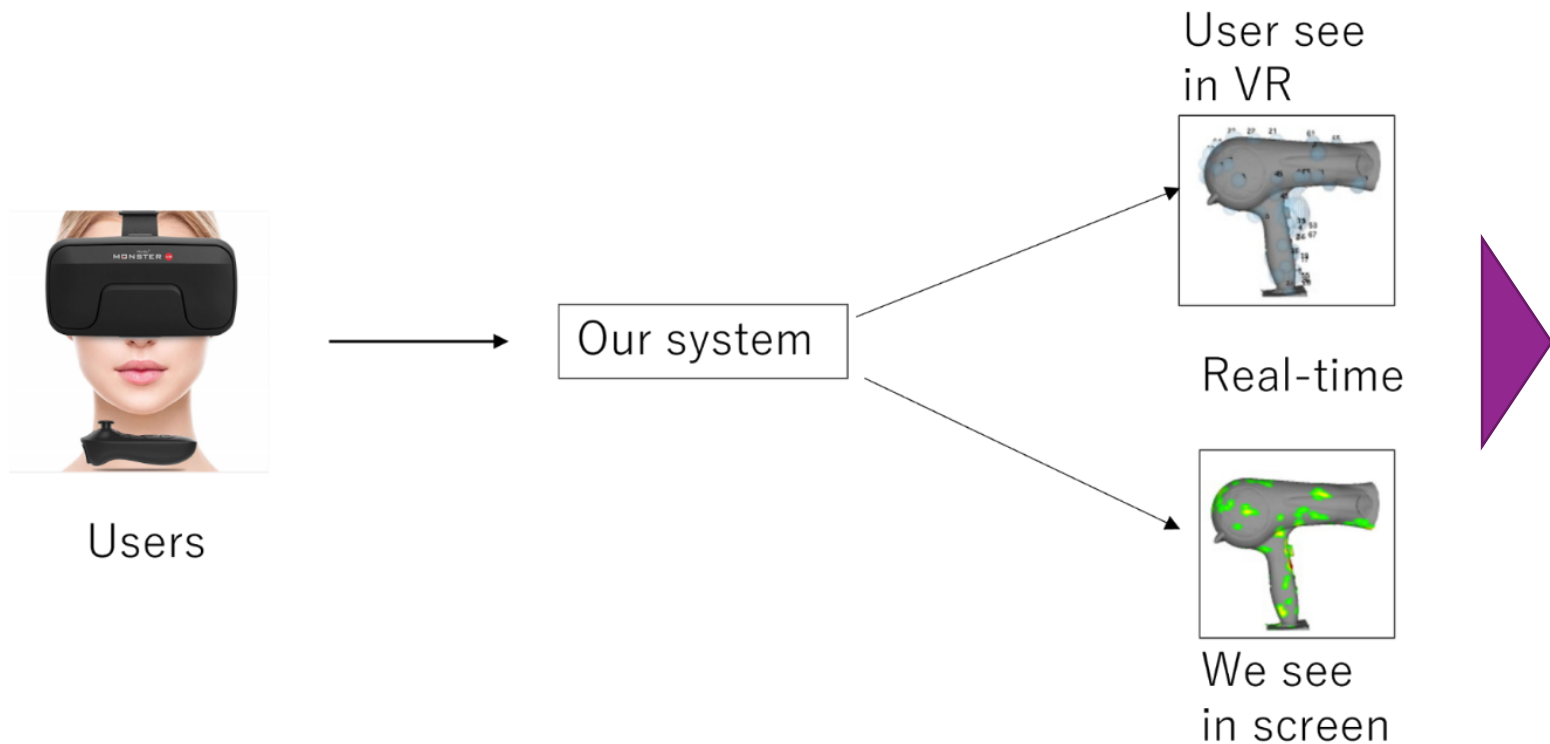
Initial Process

1. Acquisition of UV coordinates via gaze detection (2D) in unity scene by using eye tracking feature on Quest Pro.

2. Real-time Visualization of gaze data using Shader (2D)

3. Object grabbing using hand tracking (3D)

4. Acquisition of UV coordinates via gaze detection (3D)

5. Real-time visualization of gaze using shaders (3D)

6. Saving UV coordinates to a CSV

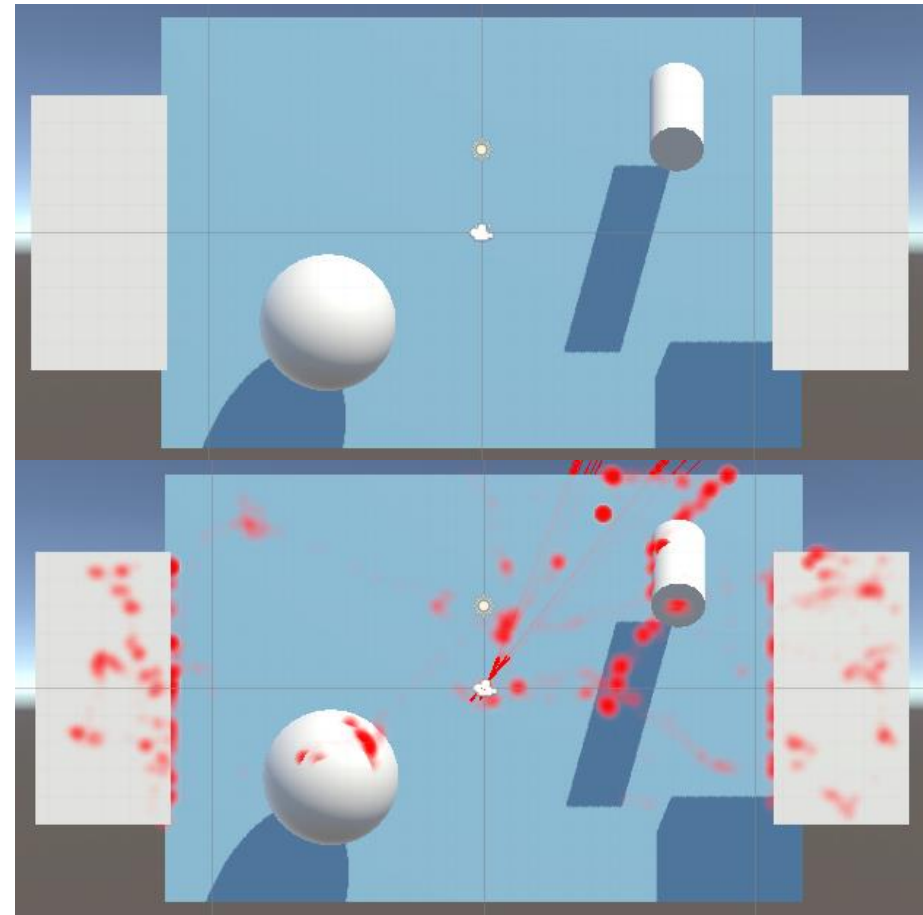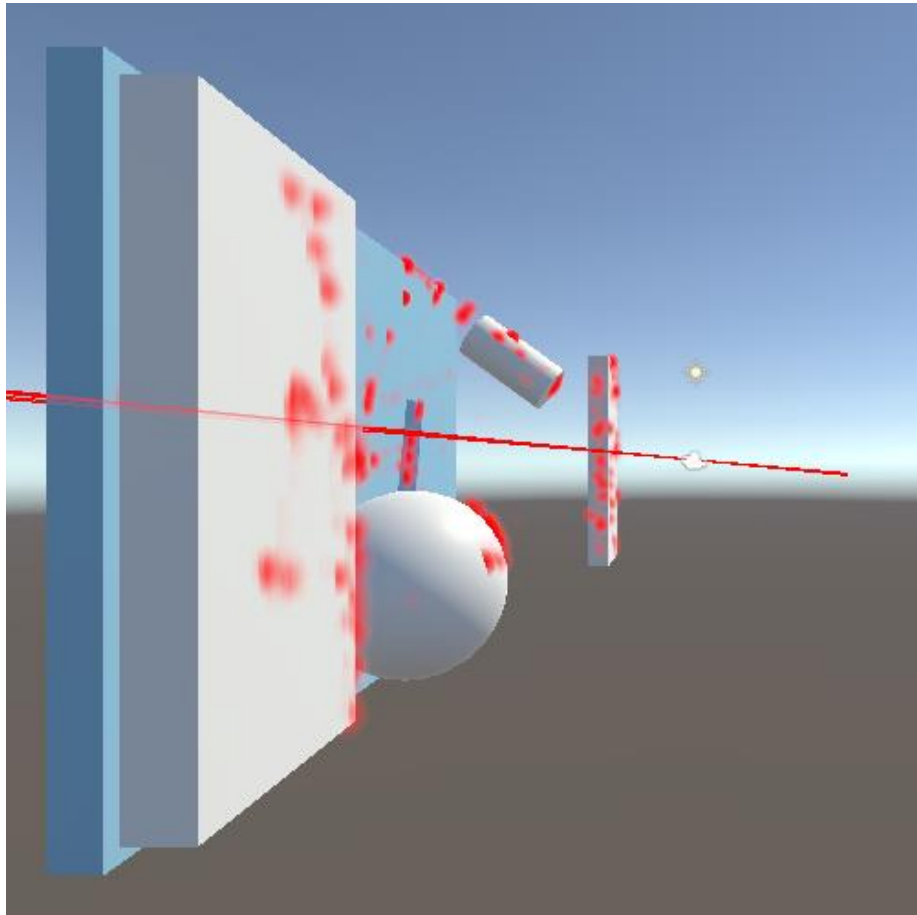7. Visualizing the gaze data using the CSV in other tools

Progress

- Eye tracking setup

- Data extraction(X, Y, Z)

- Visualize attention data in real-time

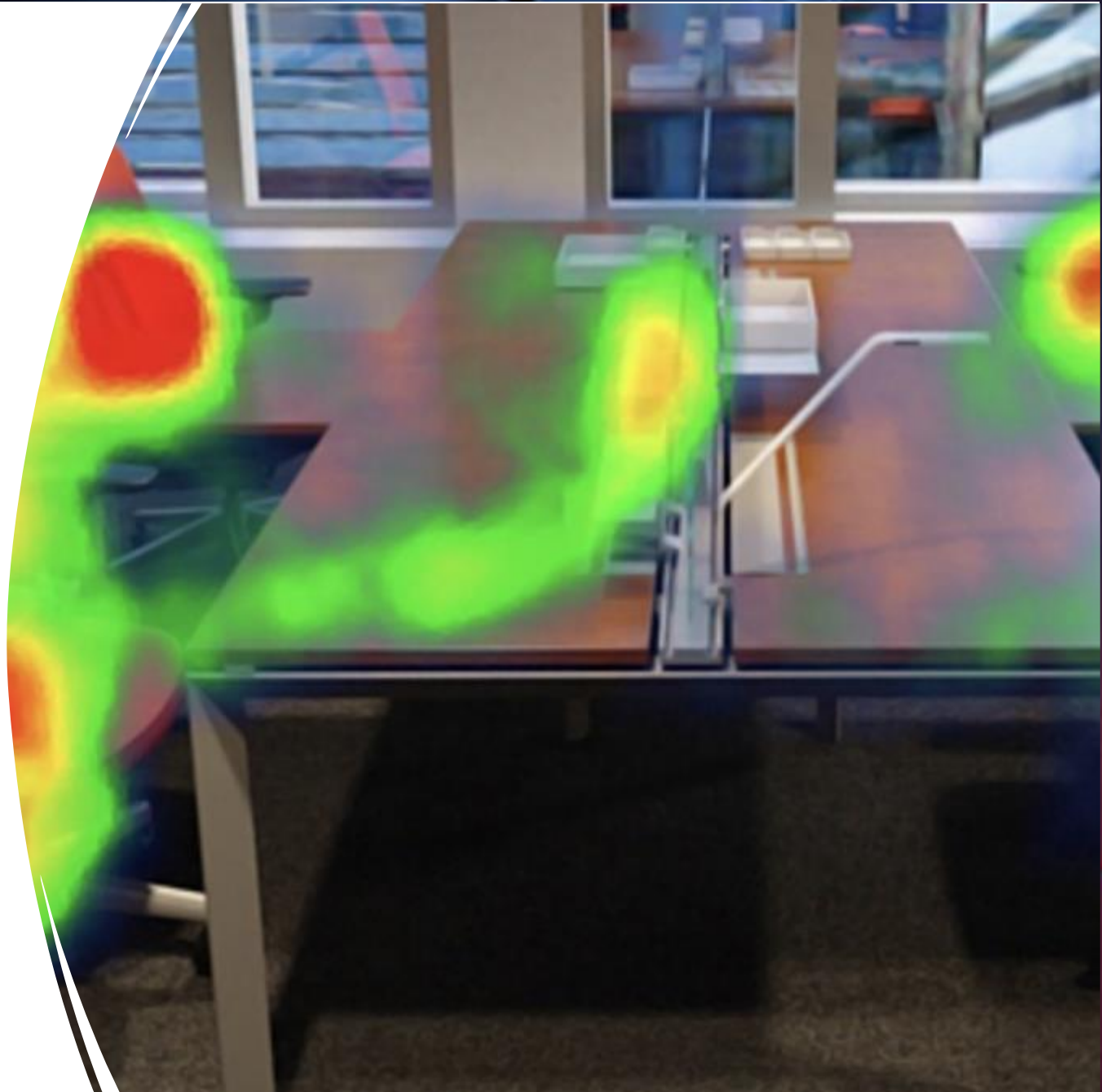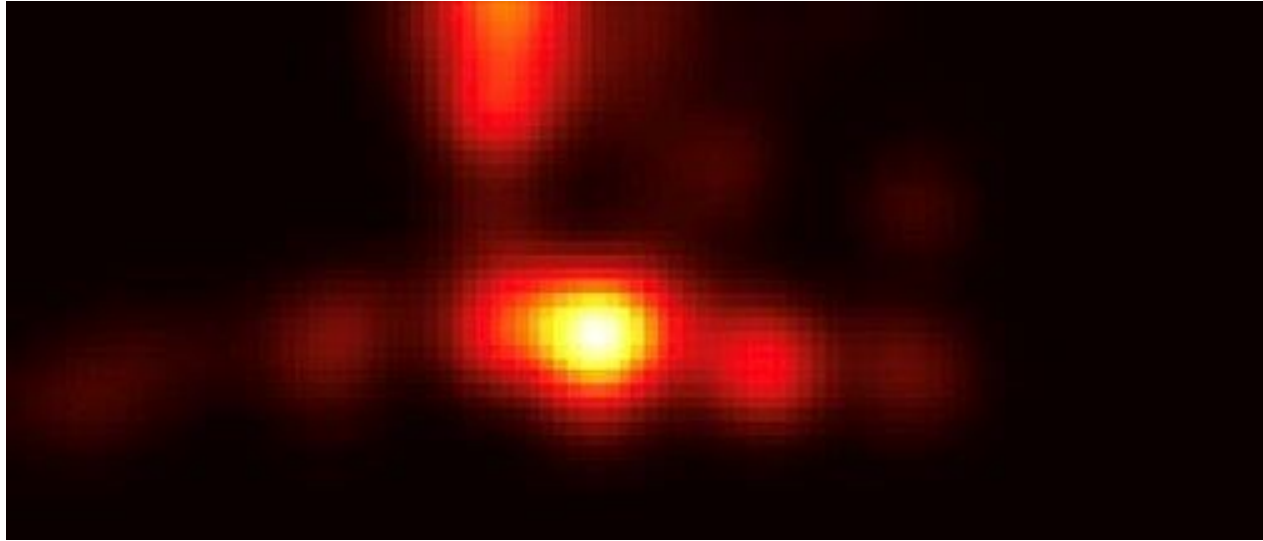# Progress

Future agenda

- Improve the clarity and visual information of heatmaps
- Create heatmaps from CSV data(not real time)
- Create Virtual world in Unity

Demonstration

Heat map using python

What we have done

1.Acquisition of UV coordinates via gaze detection (2D) in unity scene by using eye tracking feature on Quest Pro.
2.Real-time Visualization of gaze data using Shader (2D)
3.Object grabbing using hand tracking (3D)
4.Acquisition of UV coordinates via gaze detection (3D)
•Only with no rigid body
5.Real-time visualization of gaze using shaders (3D)
6.Saving UV coordinates to a CSV
7.Visualizing the gaze data using the CSV in other tools

Problem

- When using Rigid Body, UV coordinates cannot be obtained through collision detection using RayCast (cause unknown)
  - Using Rigid Body is essential for lifting objects

Future work

- Solving the issue of not being able to obtain UV coordinates from objects with attached Rigid Body

- Real-time visualization of gaze on 3D objects using shaders