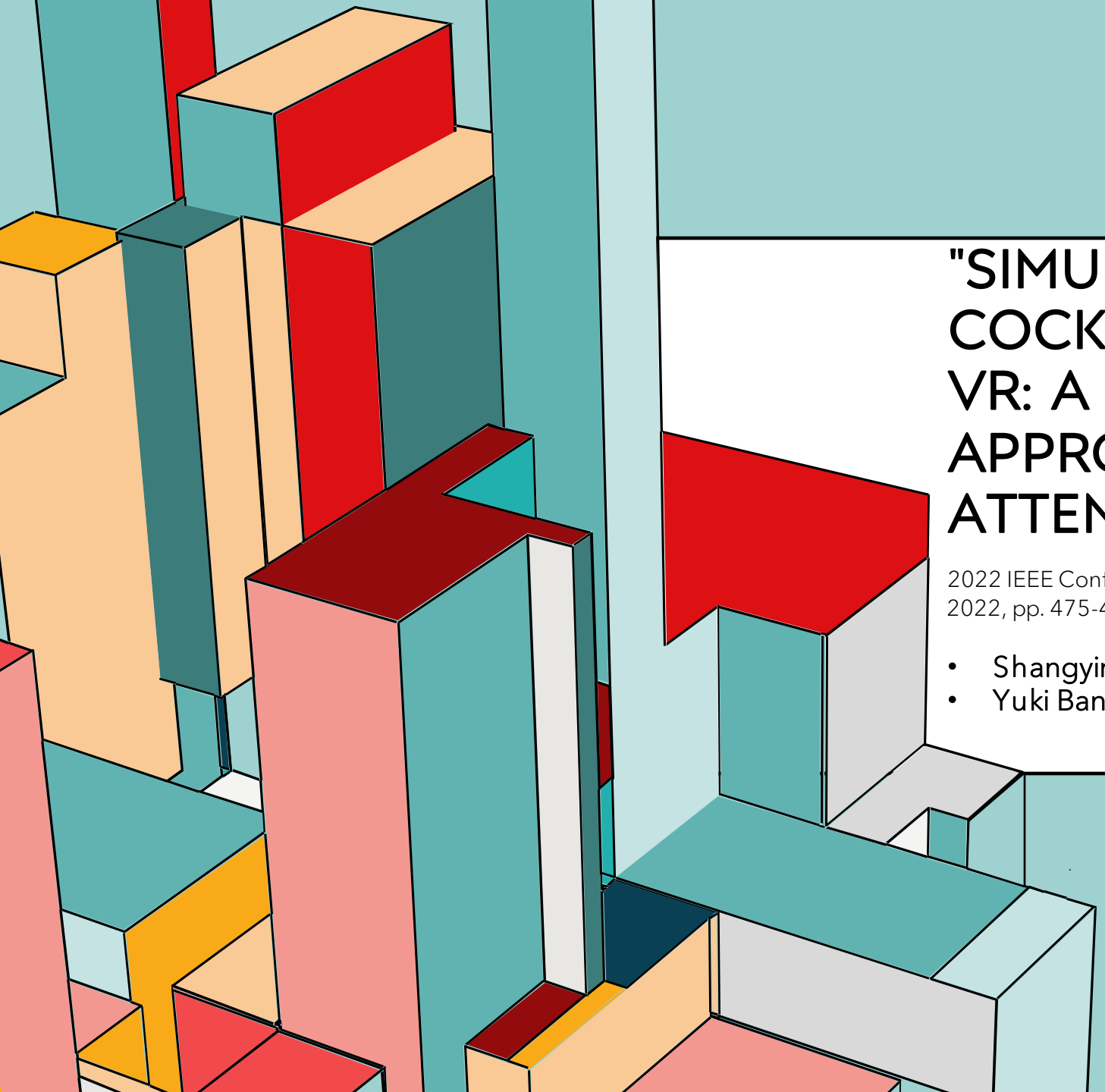

"SIMULATING OLFACTORY COCKTAIL PARTY EFFECT IN VR: A MULTI-ODOR DISPLAY APPROACH BASED ON ATTENTION"

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• Shangyin Zou
• Xianyin Hu
• Yuki Ban
• Shin'ichi Warisawa

HCI, April 12th

Diogo Silva 104341
Marco Almeida 103440
Computer and Informatics Engineering

MOTIVATION

Why did we choose this topic?

- Prior experience with Virtual Reality (VR)
- Fast growing technology
- Interesting concept
- Relatively unexplored field

INTRODUCTION

Head Mounted and Olfactory Displays

- Visual and Odor displays are used to enhance user's virtual sensory experience.
- But humans have poor ability to analyze distinct odorant components from a mixture. How do we solve this?

Cocktail Party Effect?

- Capacity for the brain to focus on only one stimuli.
- In our context, users would be able to distinguish scents in a mixture.

RELATED WORK

Cocktail Party Effect

- Initial studies referred to one's ability to selectively focus their auditory attention on a target voice in the presence of competing voices.
- Multiple studies proved that human's olfactory awareness is dependent on attention.

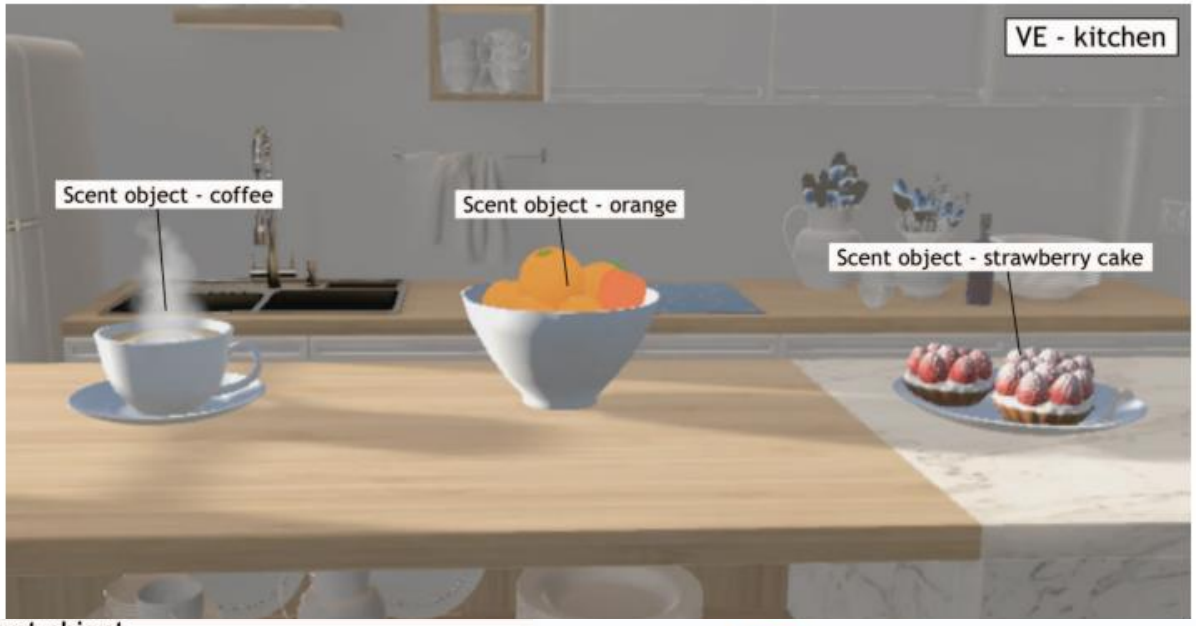
Existing Virtual odor displays

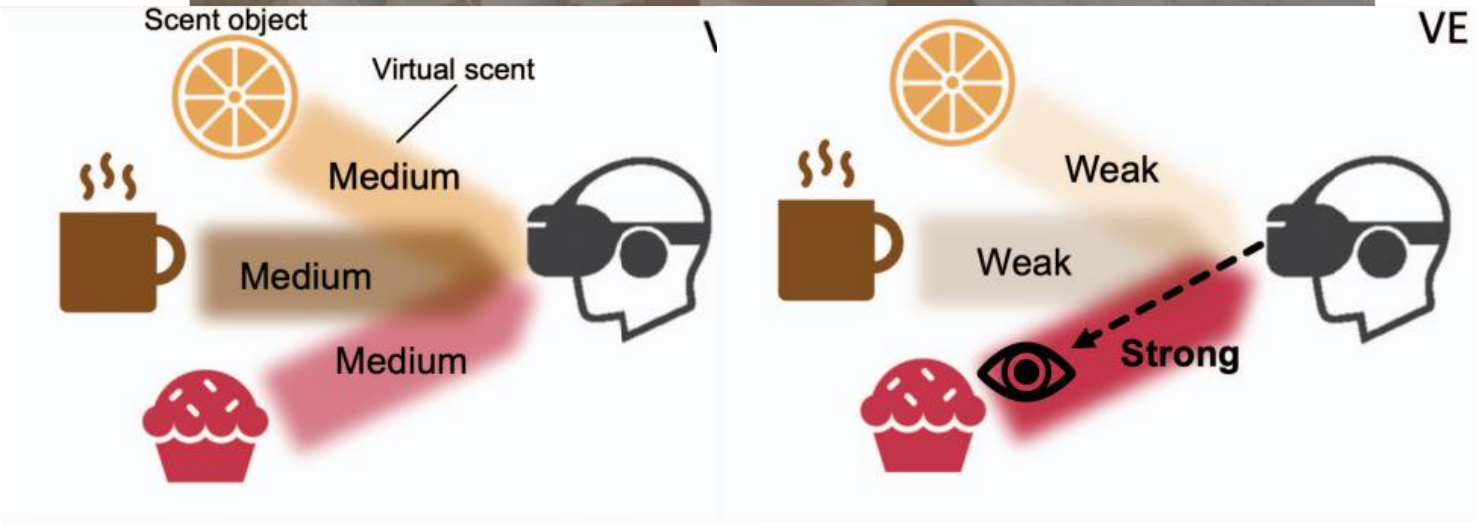
- A wearable olfactory display was developed to present the spatiality of odor in an outdoor environment, also able to adjust the odor intensity according to the user's position in the virtual environment.
- A study discovered that correct perception and identification of the olfactory stimulus was associated with the heightened presence.

METHODS

Set up

- As a first step, a virtual environment had to be set up. In it, the user is facing a kitchen table, and 3 scented objects were placed on it.
- The general idea is that when a user has their attention on a certain scented object, that scent will dynamically become more intense, as shown in the images.





METHODS

Odor display

- A device with multiple odor mixtures and computer controllable functionalities was needed.
- The commercial device Aroma Shooter was chosen.

Attention-odor System

- Eye-tracking was the technique used to acquire information about the user's attention.
- The device chosen is Tobii HTC VIVE which has embedded eye-tracking sensors.

EXPERIMENTS

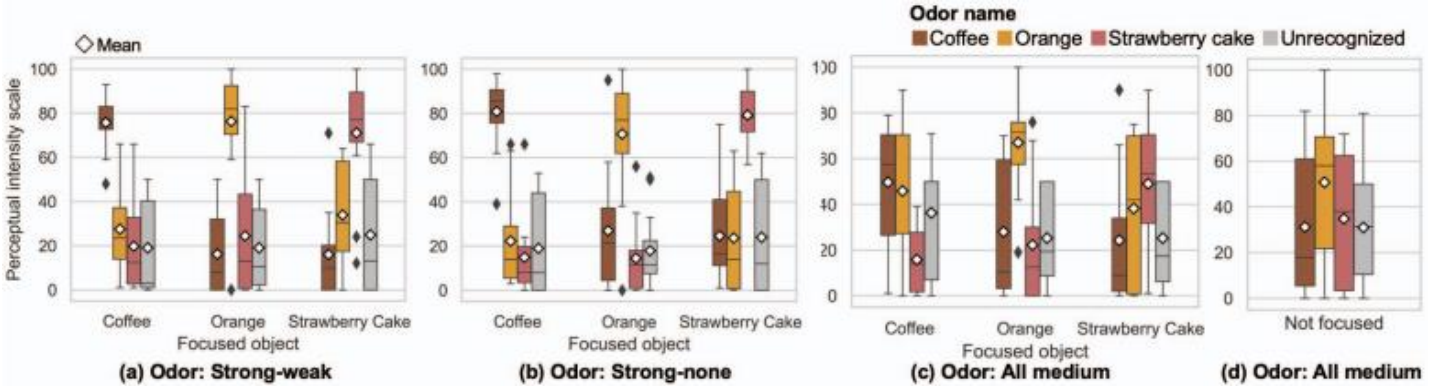
Evaluation methods

- Two methods were used:
  - Strong scent only
  - Strong scent mixed with weak scents
- Non-dynamic odor display based on spatiality used as control unit.

RESULTS

Procedure

- Users rated the olfactory perception of odors in the different environments
- Participant's self-rated themselves on various metrics.



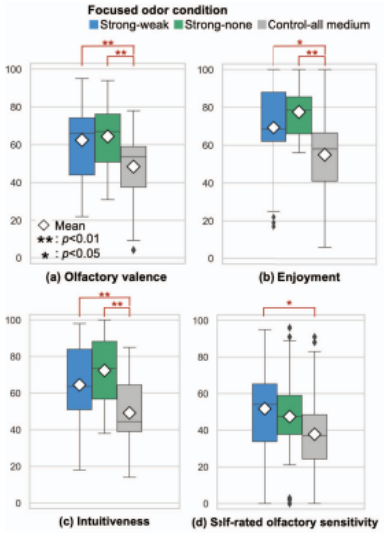
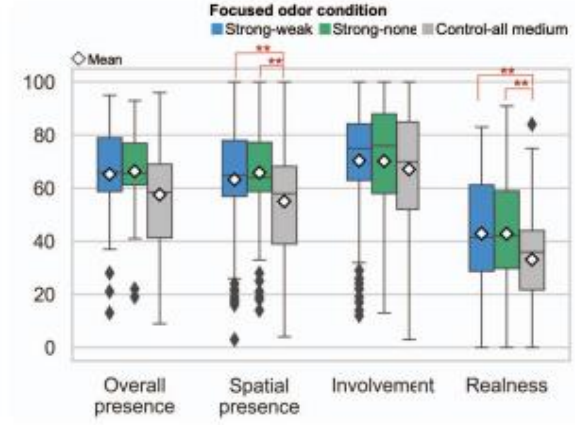


Figure 7: The subjective experience evaluation.

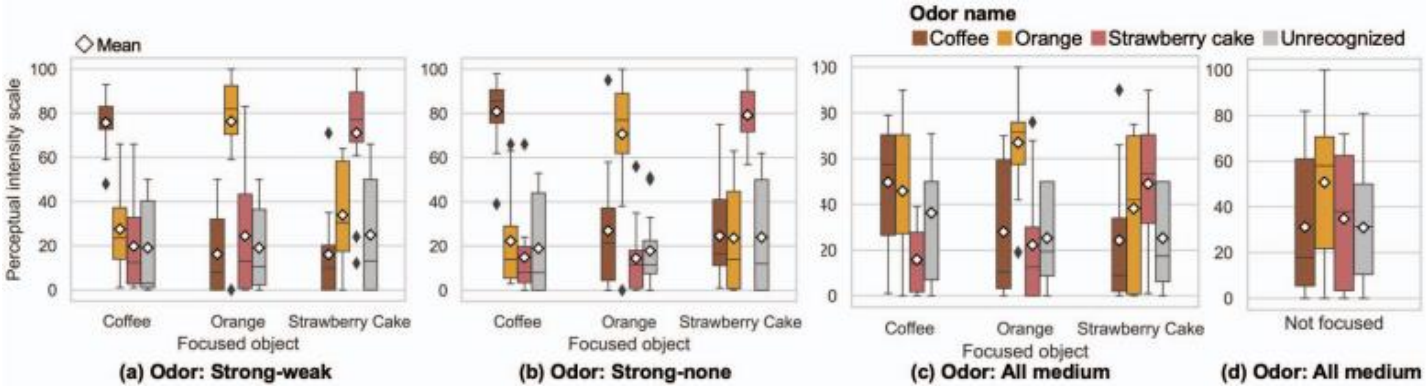


	Condition	
	Strong-weak	Strong-none
Olfactory valence	0.70	0.85
Enjoyment	0.61	1.16
Intuitiveness	0.70	1.22
Self-rated olfactory sensitivity	0.59	0.42

DISCUSSION

Perceptual scale

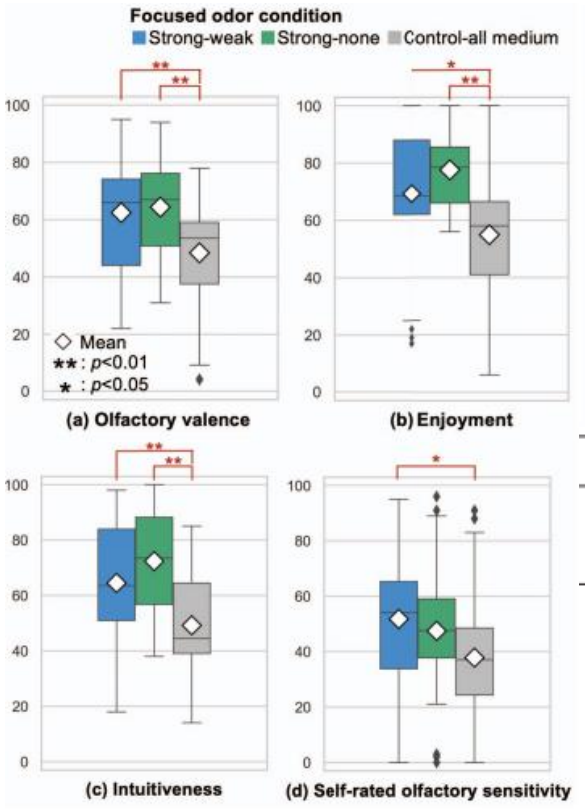
- Participants could sense the increased intensity of the focused and non-focused mixture correctly.
- Participants sensed weak levels of odor's when none were being presented.
- Participant's sensed strong levels of an odor that was visually in front of them while other odors had the same intensity.
- This reveals that visual senses can influence olfactory ones.

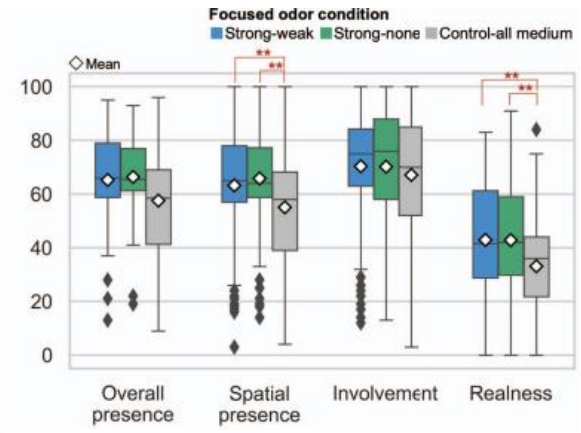


DISCUSSION

Subjective scale

- Dynamic attention-odor presentation improved user's pleasant experience compared to all-medium .
- Intuitiveness was higher for the strong-weak and strong-none conditions .
- Only the strong-weak condition showed improvement regarding Participant's olfactory sensitivity.
- This shows that background odors are important to enhance VE's.
- Realness was low because the VE lacked photographic materials .





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Olfactory valence	0.70	0.85
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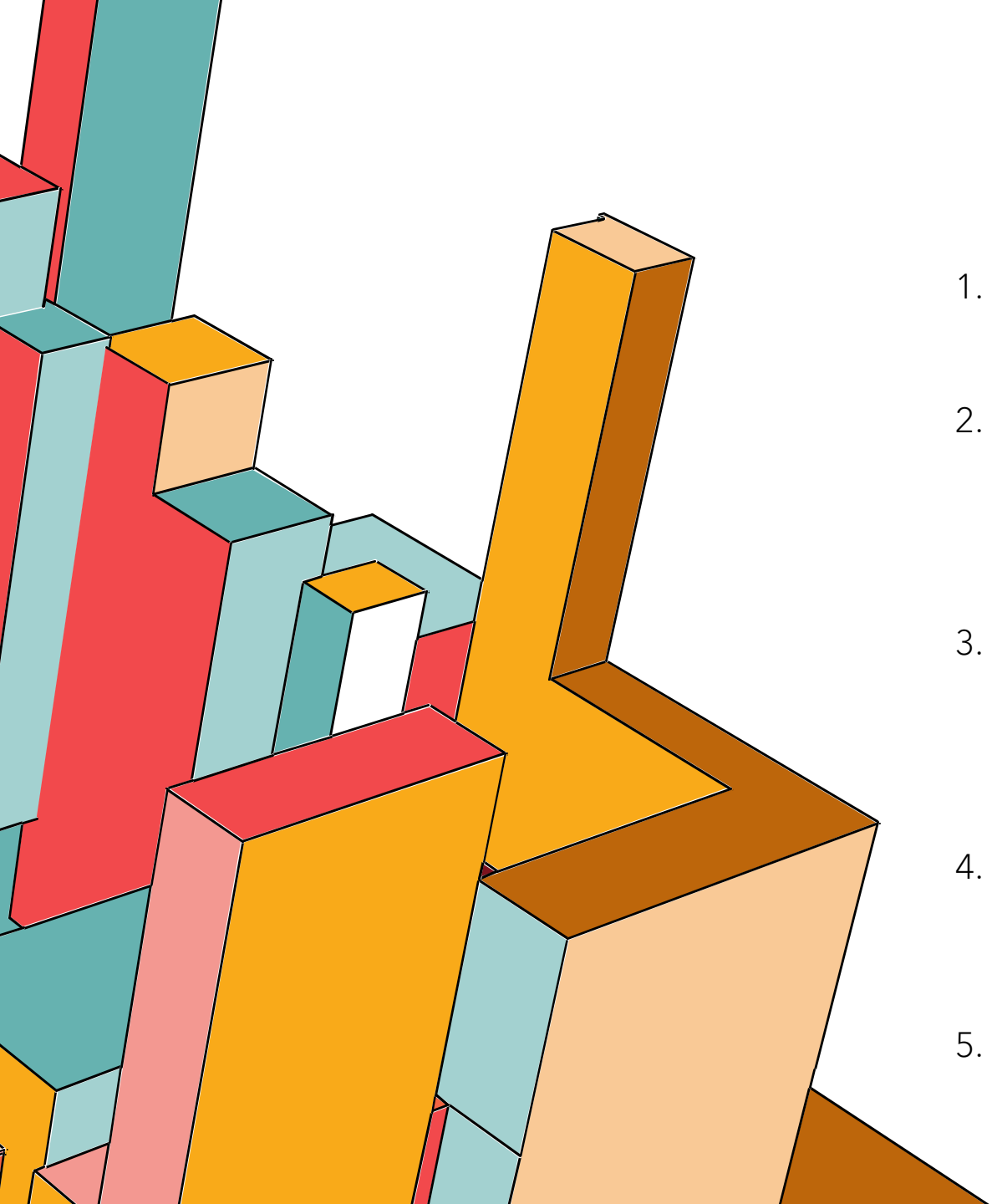
CONCLUSIONS

Despite being a young field of research, conclusive evidence was found that shows that the proposed method performs better in providing pleasant and intuitive experiences.

The researchers also found that it is important to keep a weak level of background odors and real-life visual references to give the user an augmented self-sensed olfactory and visual sensitivity.

QUESTIONS



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