

Emerging Technology Experience

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IxD, NTUT





PumpingLife
ACM SIGGRAPH Asia 2019 XR
Runner-Up in Best XR Content



LiquidMask
ACM SIGGRAPH 2019 VR,AR,MR



TransFork
ACM VR/AR 2018 Demo
Best Demo Award



Lotus
ACM SIGGRAPH Asia 2018 XR
Best VR/AR Tech. 3rd Award



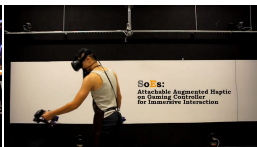
AoEs+
Laval Virtual 2018
3D Games & Entertainment Award



BoEs
ACM SIGGRAPH Asia 2017 VR
Showcase



AoEs
ACM UIST 2017 E-Tec
Laval Virtual Award



SoEs+
ACM UIST 2016 Demo
Best Demo Award



OoEs
ACM SIGGRAPH 2016 VR Village



Spider Silk
ACM SIGGRAPH 2015 E-Tec



For more detail please visit
<http://pinghsuan.info>

slido



What is the difference between "Emerging Technology" and "Emerging Experience"?

你覺得"新穎科技"和"新穎體驗"有甚麼差別?

① Start presenting to display the poll results on this slide.

「新穎科技」往往伴隨著「新穎體驗」，
“Emerging Technologies” always comes with “Emerging Experience”，

而「新穎體驗」不見得是「新穎科技」...
but "Emerging Experience" not always comes with "Emerging Technologies" ...



MORI Building DIGITAL ART MUSEUM

teamLab★Borderless



teamLab★

What do you think? Is this an
“Emerging Technologies” or
“Emerging Experience”?

你們覺得這是「新穎科技」
，還是「新穎體驗」？

This is an
“Emerging Experience”
這是「新穎體驗」



Borderless
teamLab★

In 1992, this was an “Emerging
Technologies”.
在1992年時，這曾經是「新穎科技」



The CAVE
(Cave Automatic Virtual Environment)
Carolina Cruz-Neira, Daniel J. Sandin, and
Thomas A. DeFanti.





What do you think Birdly is an
“Emerging Technologies” or
“Emerging Experience”?

你們覺得這是「新穎科技」
，還是「新穎體驗」？



This had “**Emerging Technologies**” and come with “**Emerging Experience**” in 2015.

在2015年, 這是「**新穎科技**」也伴隨著「**新穎體驗**」。



[Cardin et al. CASA'07]

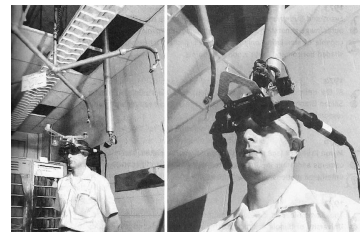


[Deligiannidis et al. 3DUI'06]



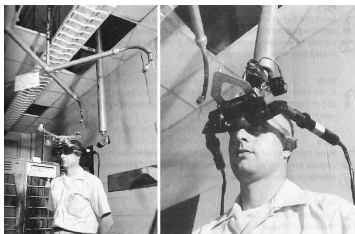
[Oculus Rift CV1 2016]

⋮



[Ivan Sutherland 1968]

If you want to date back those technologies, there are some concepts may be similar !



[Ivan Sutherland 1968]

- Looks real
- Moves realistically
- Feels real
- Sounds/Smells real
- Real-time Response

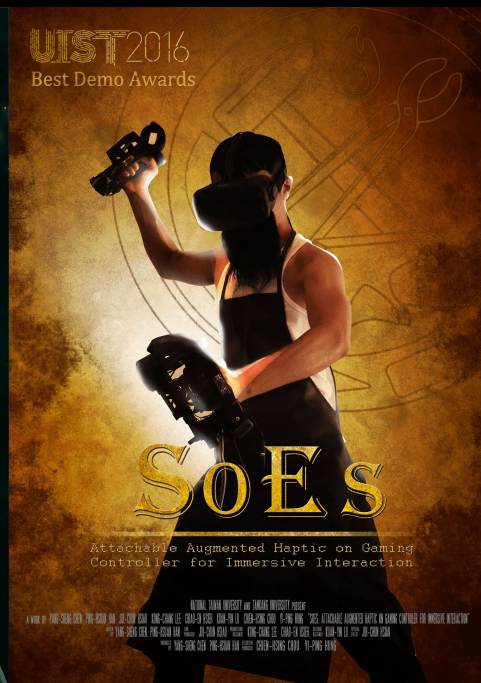
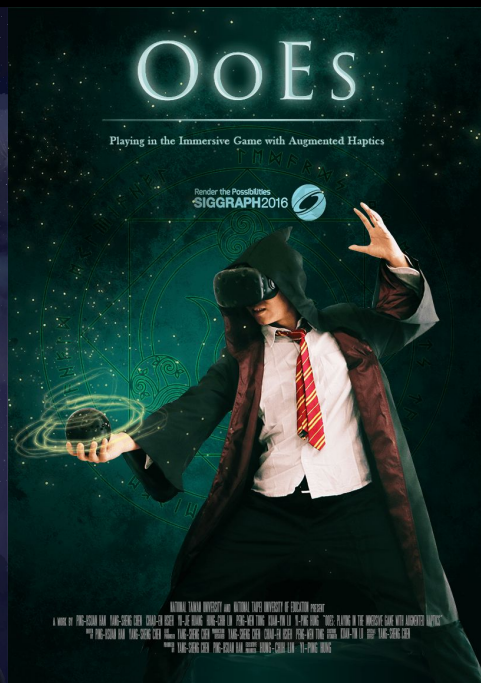
After
48 years



[Oculus Rift CV1 2016]

Display	PenTile ^[6] OLED 2160x1200 (1080x1200 per eye) @ 90 Hz
Sound	Integrated 3D audio headphones (user removable/exchangeable)
Input	6DOF (3-axis rotational tracking + 3-axis positional tracking) through USB-connected IR LED sensor, which tracks via the "constellation" method
Controller input	Xbox One game controller. Oculus Touch motion tracked controllers.
Connectivity	HDMI 1.3, USB 3.0, USB 2.0
Mass	470 g (1.04 lb)

https://en.wikipedia.org/wiki/Oculus_Rift_CV1



How many works is related with 「Emerging Technology」?
請問上述四件作品，有幾個是「新穎科技」？

Outline

- 人機互動研究 HCI Research

- Incremental and Radical Innovation
- Design-Driven Innovation

- 新穎科技 Emerging Technology

- VR Simulation/Application with Haptic Feedback
- Multisensory Feedback in VR

- 新穎體驗 Emerging Experience

- Human Food Interaction (Edible Interaction)
- Physical Training with IoT (Work-in-Progress)

Human-Computer Interaction

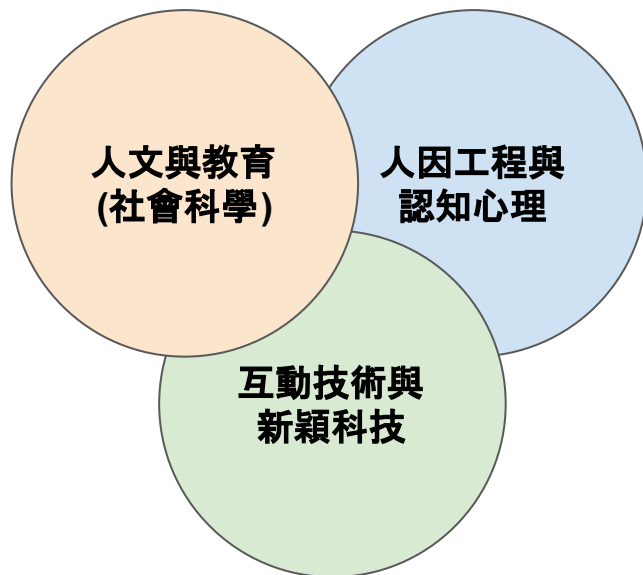
HCI Research

人機互動研究

Human-Computer Interaction

HCI Research

人機互動研究



SIGCHI 2021 Subcommittees 分類

- [User Experience and Usability](#)
- [Specific Applications Areas](#)
- [Learning, Education, and Families](#)
- [Interaction Beyond the Individual](#)
- [Games and Play](#)
- [Privacy and Security](#)
- [Visualization](#)
- [Health](#)
- [Accessibility and Aging](#)
- [Design](#)
- [Interaction Techniques, Devices, and Modalities](#)
- [Understanding People: Theory, Concepts, Methods](#)
- [Engineering Interactive Systems and Technologies](#)
- [Critical and Sustainable Computing](#)
- [Computational Interaction](#)

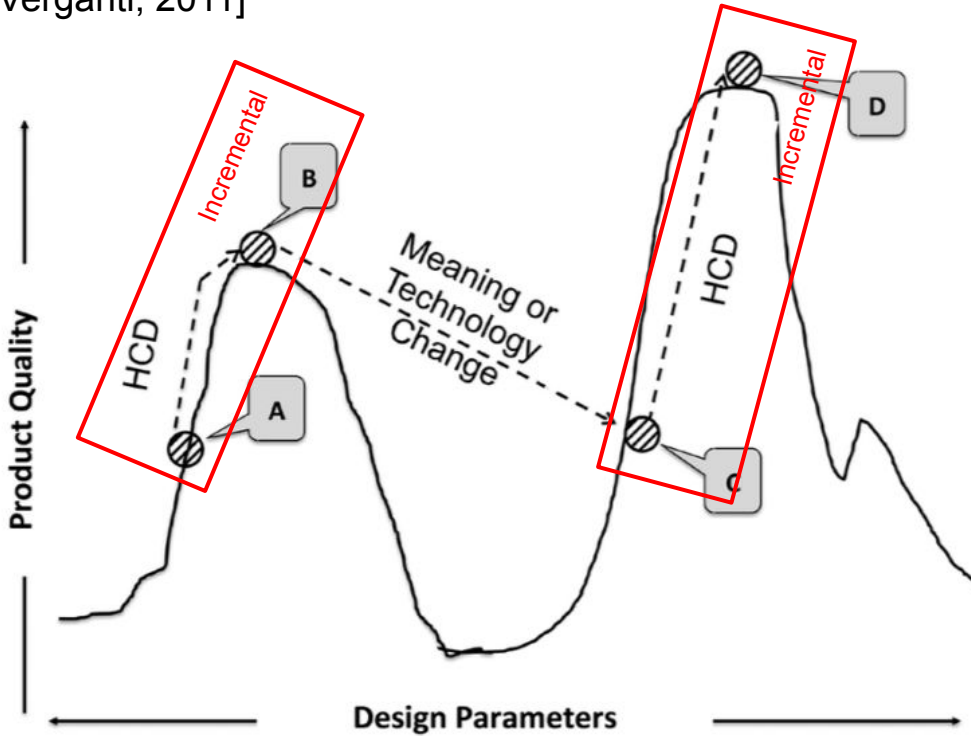
Design-Driven Innovation

設計力創新(設計驅動創新)

[Roberto Verganti, 2011]

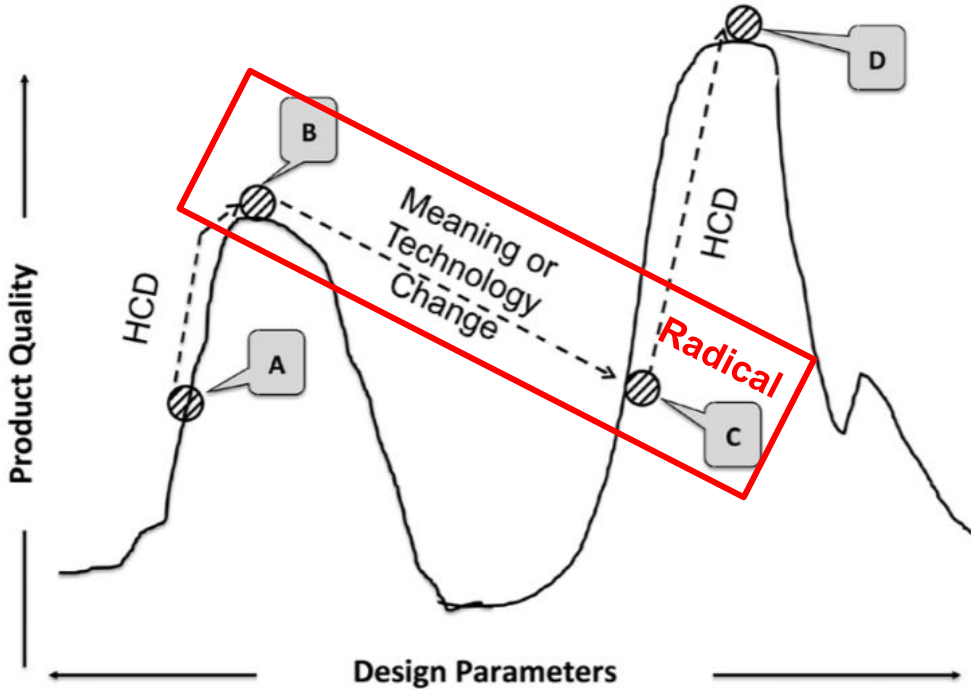
Incremental and Radical Innovation

[Roberto Verganti, 2011]



Incremental and Radical Innovation

[Roberto Verganti, 2011]



Technology Change:

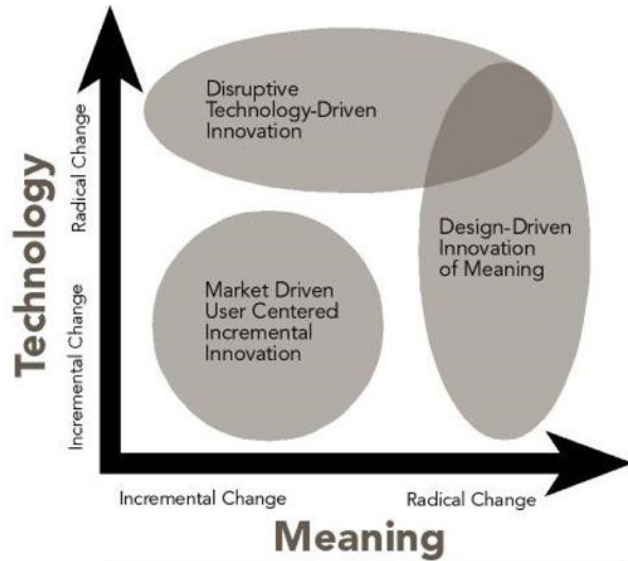
4G -> 5G

Meaning Change:

Clubhouse

Design-Driven Innovation

[Don Norman and Roberto Verganti, 2012]



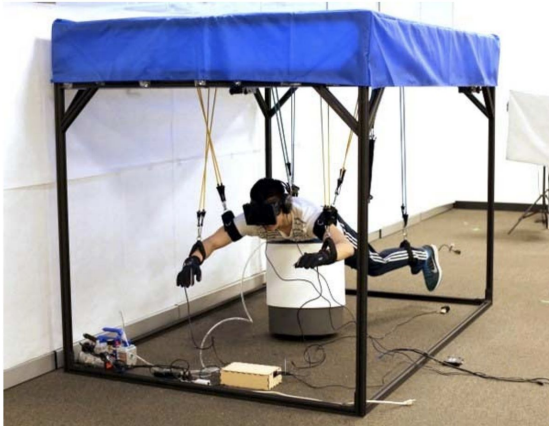
Design Driven Innovation by Roberto Verganti

Emerging Technology

新穎科技

VR Simulation/Application with Haptic Feedback

Immersive Scuba Diving



[Jain et al. UIST'16]

Birdly an attempt to fly



[Rheiner et al. SIGGRAPH'14]

VR ZON



BANDAI NAMCO Entertainment Inc.



Moving Around in Virtual Space with Spider Silk





Paul Giacoppo Writer
Ultimate Spider-Man(Animated Series)



超能力者般的探索



甩盪&飛梭



飛翔&滑翔



攀岩&走壁



Moving Around in Virtual Space with Spider Silk

Technology Change	Performance Enhancement						
	Olfactory Display for Environment						
	Effect Area Enhancement						
	Hybrid-Haptic System						
	Haptic Display for Environment						
	Attachable Module						
	Attachable Structure						
	Haptic Display for Interaction						
		Single Tactile Sensation	Multiple Tactile Sensations	Attachable	Environmental Feedback	Hybrid-Haptic Interaction	Olfactory Feedback
		Meaning Change					

The Human Somatosensory System



Hardness
(Hard/Soft)

Warmness
(Warm/Cold)

**Fine
roughness**
(Tough/Smooth)

**Macro
roughness**
(Uneven, Relief)

Friction
(Moist/Dry/Sticky/S
lippery)

“Psychophysical Dimensions of Tactile
Perception of Textures” by Okamoto et al., 2013



Render the Possibilities
SIGGRAPH2016

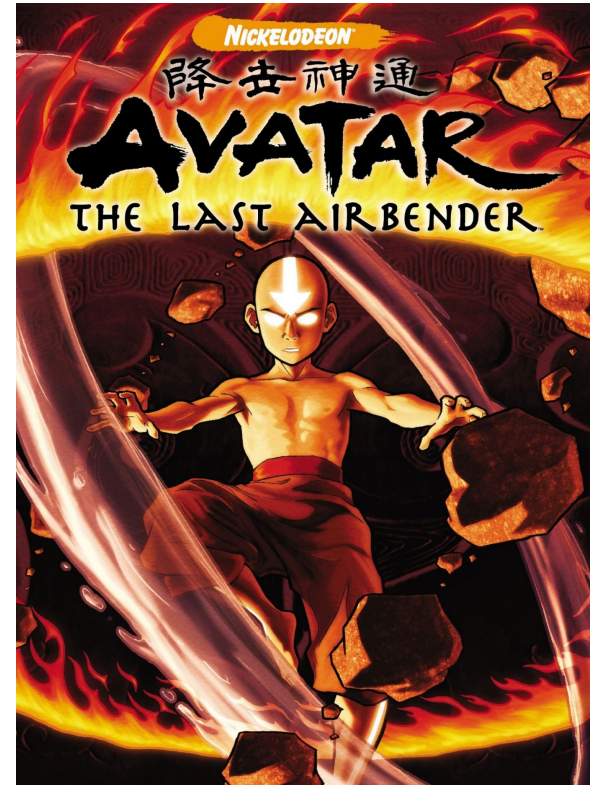


OoEs: Playing in the Immersive Game with Augmented Haptics



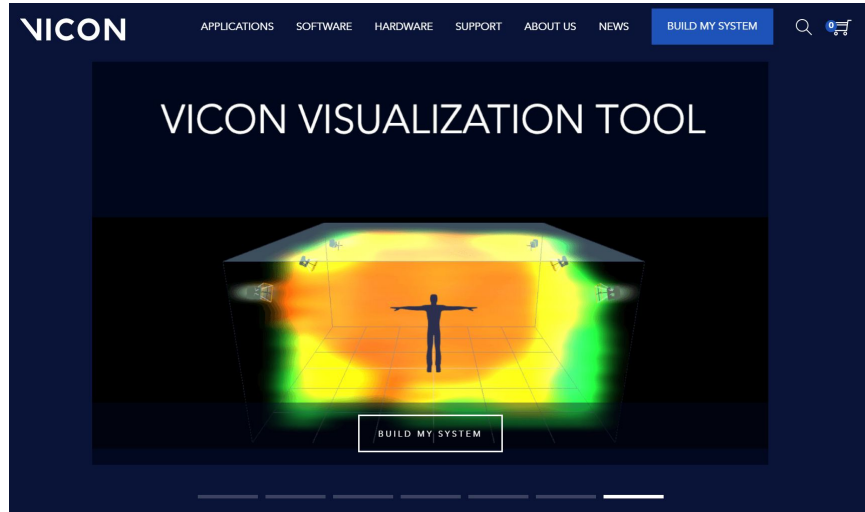


Movie



Animation

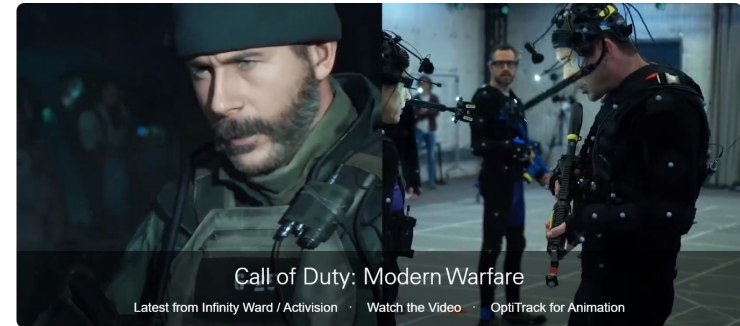
Tracking System



X ?? W



OptiTrack Applications Hardware Software Accessories Build Your Own Support Contact



UIST2016



SoEs: Attachable Augmented Haptic on Gaming Controller for Immersive Interaction.



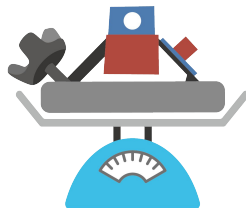
UIST 2016

29th ACM User Interface Software and Technology Symposium
TOKYO, JAPAN / OCTOBER 16-19, 2016





V.S.



Weight



Battery

“很重”

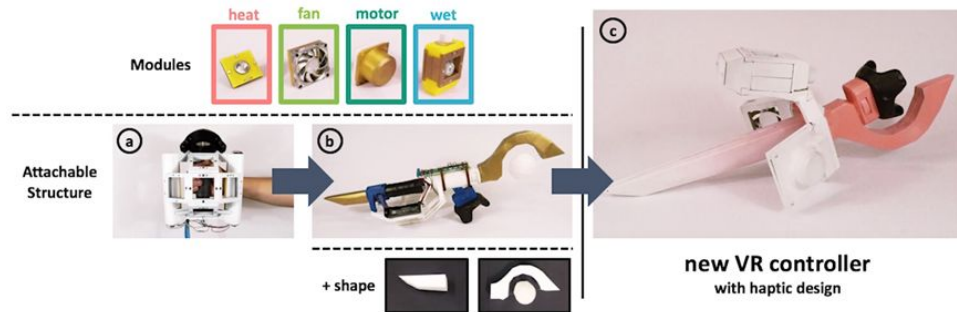
- 輕量化->\$\$\$\$。
- \$能解決的事可能是小事，但不見得是我們能創造價值的事情。
- 處理對策：

“方向性問題，強度可以再強一點”

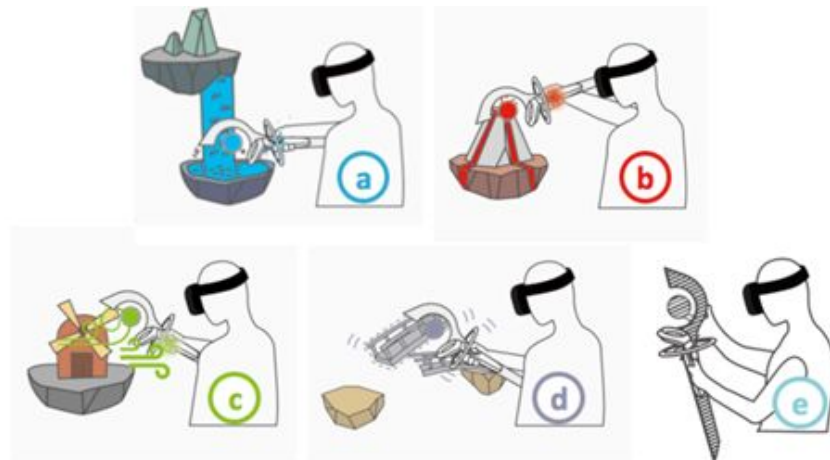
- 觸覺回饋的方向 & 多元性。

Bits of Elements(BoEs)

@SIGGRAPH ASIA 2017



Utilizing BoEs for designing haptics experience on VR controller



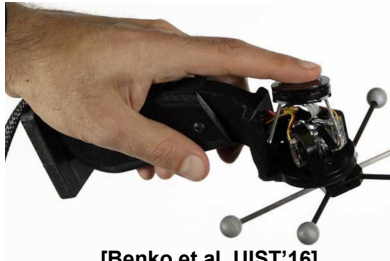
Enhanced Immersive Interaction with Haptic Feedbacks



[Simeone et al. CHI'15]



[Murakami et al. SIGGRAPH'15]



[Benko et al. UIST'16]

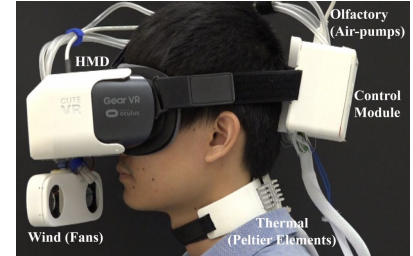


[Fujinawa et al. VRST'17]

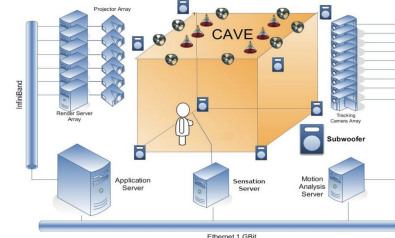
Enhanced Virtual Environment with Haptic Feedbacks



[Cardin et al. CASA'07]



[Ranasinghe et al. CHI'18]



[Hülsmann et al. VRIC'14]

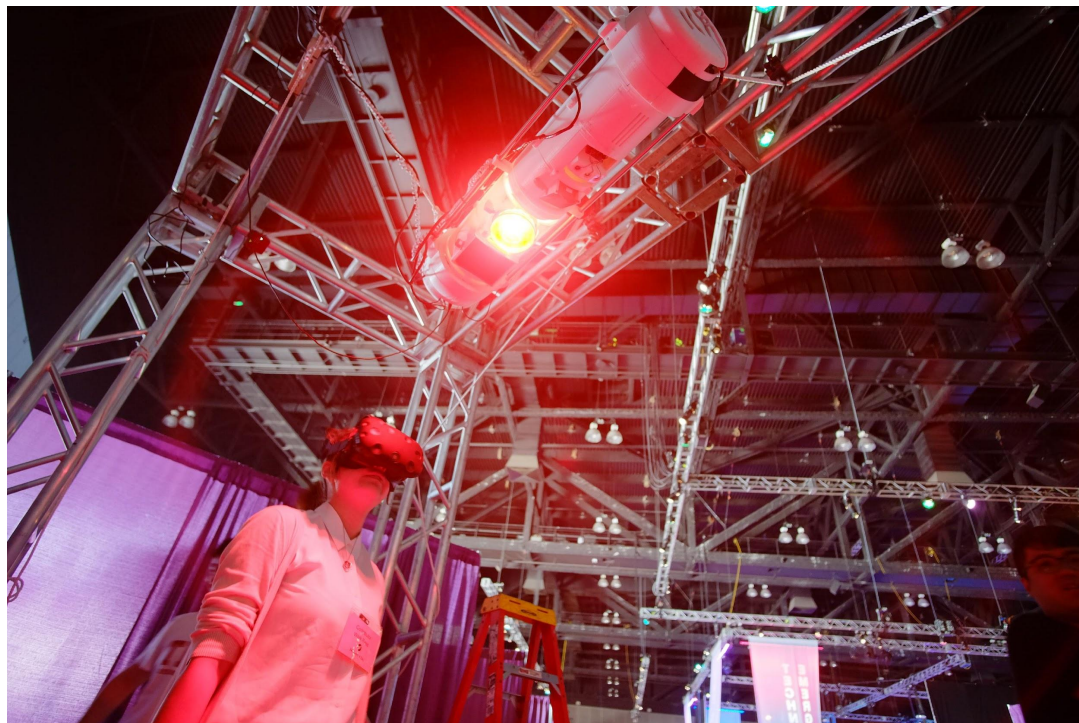


[Cheng et al. UIST'15]

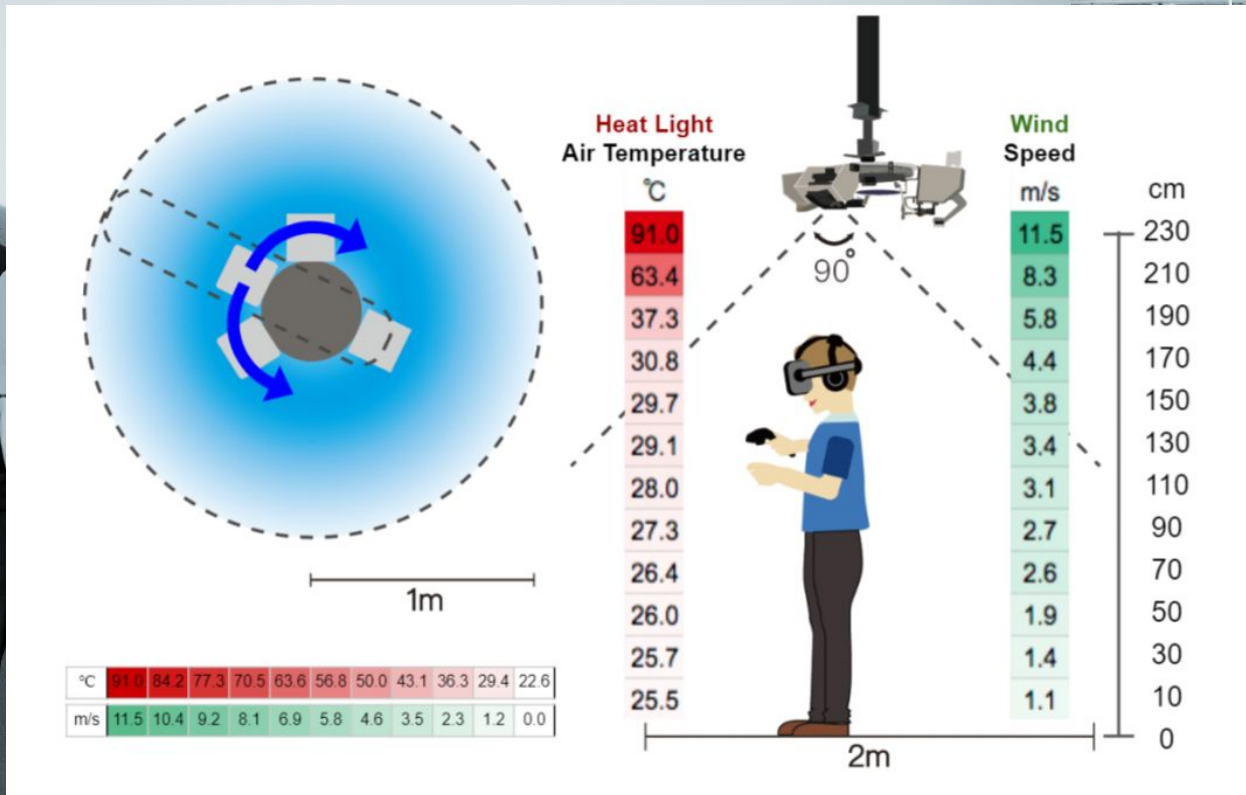


To create the teleportation experience with haptics,
we need to simulate two virtual environments in the portal simultaneously
with each of multiple tactile sensation.

30 JULY-3 AUGUST *Los Angeles*
SIGGRAPH2017
Emerging Technology









[Konishi et al.
SIGGRAPH'16]



[Cheng et al.
UIST'15]



[Han et al.
SIGGRAPH'15]



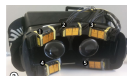
[Kojima et al.
ACE'09]



[Cardin et al.
CASA'07]



[Moon et al.
VRST'04]



[Peiris et al.
CHI'17]



[Hülsmann et al.
VRIC'14]



[Deligiannidis et al.
3DUI'06]



[Ranasinghe et al.
CHI'17]



[Rheiner et al.
SIGGRAPH'14]



[Ranasinghe et al.
CHI'18]



[Jain et al.
UIST'16]

Haptic Around



[Han et al.
SIGGRAPH'17]



[Han et al.
SA'17]

**Multiple
Tactile
Feedback**

1

2

3

4

5



[Israr et al.
SIGGRAPH'15]



[Lopes et al.
UIST'15]



[Azmandian et al.
CHI'16]



[Benko et al.
UIST'16]



[Lopes et al.
CHI'17]



[Fujinawa et al.
VRST'17]



[Simeone et al.
CHI'15]



[Cheng et al.
UIST'17]



[Han et al.
SIGGRAPH'16]



[Chen et al.
UIST'16]



[Murakami et al.
SIGGRAPH'17]

Design Space

Haptic Around:

Multiple Tactile Sensations for Immersive Environment and Interaction in Virtual Reality

Ping-Hsuan Han ¹

Yang-Sheng Chen ¹

Kong-Cheng Lee ²

Hao-Cheng Wang ¹

Chiao-En Hsieh ¹

Jui-Chun Hsiao ¹

Chien-Hsing Chou ²

Yi-Ping Hung ^{1,3}

VRST 2018

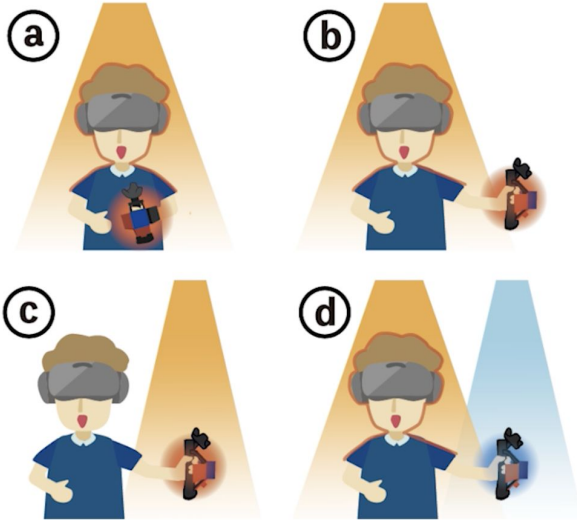
¹ National Taiwan University

² Tamkang University

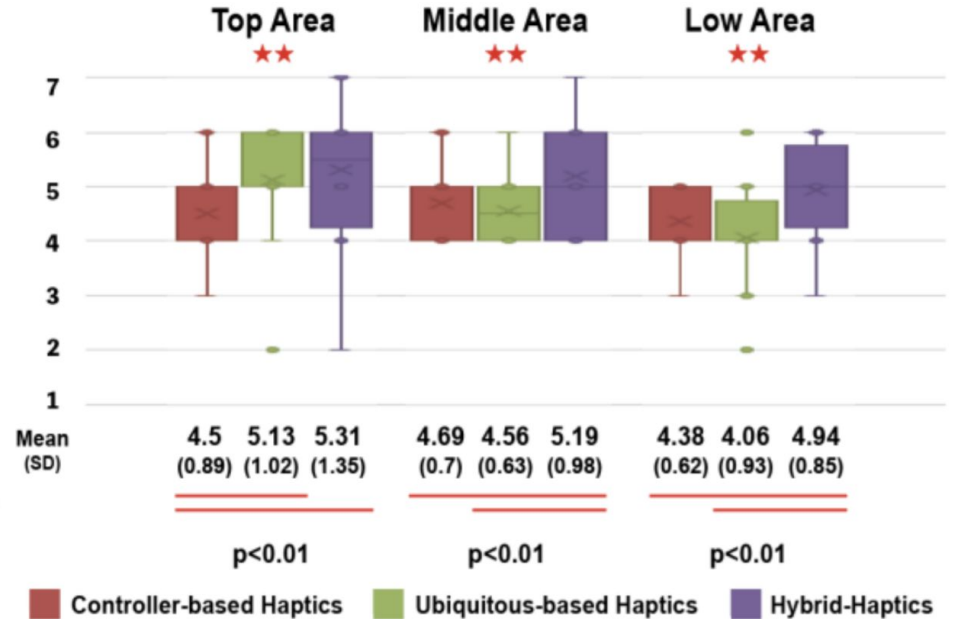
³ Tainan National University of The Arts

Interaction Design with Hybrid-Haptics

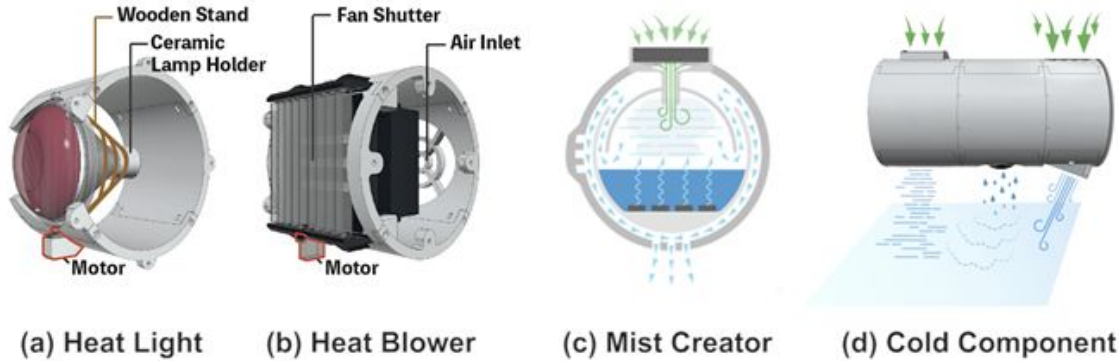
The Hardware Design of Attachable Modules and Structure



Several Interaction Design
with Hyper-Haptics



Walking Area & Two Water Tank



Two water tank need to be filled with water.



**Heat on the left side,
Cold on the right side.**

AoEs+

Enhancing Locomotion Experience in Immersive Environments with Mid-Air Haptics



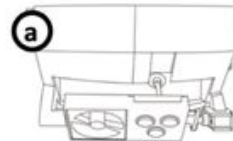
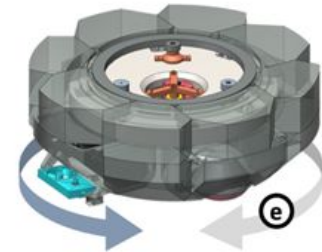
create
cold wind, hot wind,
wet air and heat
feedback



combining modules
to recreate the
haptics experience
in VE



follow the users
when they are
moving





**3D Games and
Entertainment Award**
@Laval Virtual 2018



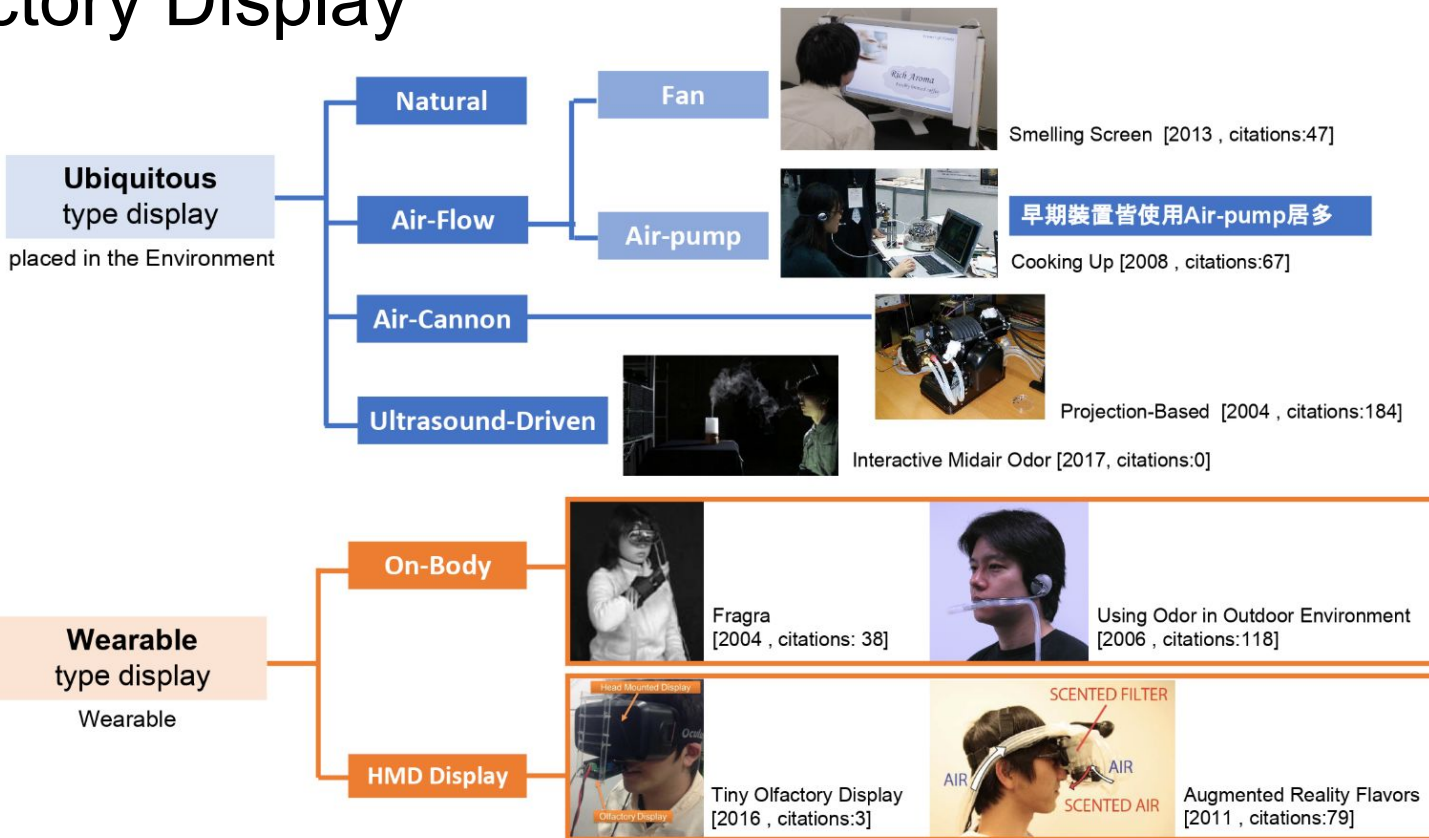
(回台灣後依然勤奮努力, 因為事情堆積了很多)

直到某一天...

我們打開了擺放三個月的箱子...

(你猜猜我們發現了甚麼?)

Olfactory Display



Lotus :

Enhancing the Immersive Experience in Virtual Environment with Mist-based Olfactory Display

Yang-Sheng Chen¹, Ping-Hsuan Han^{1,2}, Kong-Chang Lee³,
Chiao-En Hsieh¹, Jui-Chun Hsiao¹, Che-Ju Hsu³,
Kuan-Wen Chen⁴, Chien-Hsing Chou³, Yi-Ping Hung^{1,5}

¹ National Taiwan University, ² National Taipei University of Technology,
³ Tamkang University, ⁴ National Chiao Tung University,
⁵ Tainan National University of the Art



A photograph showing a dense canopy of pink cherry blossoms against a clear blue sky. The branches are dark and intricate, creating a complex web of pink flowers. The image is used as a background for a text overlay.

However, without olfactory display, user cannot perceive chemical information from the environment, which is also important for recreating the VE.

How many limitations and challenges
did you saw in those works?
你看到了多少個**限制與挑戰**？

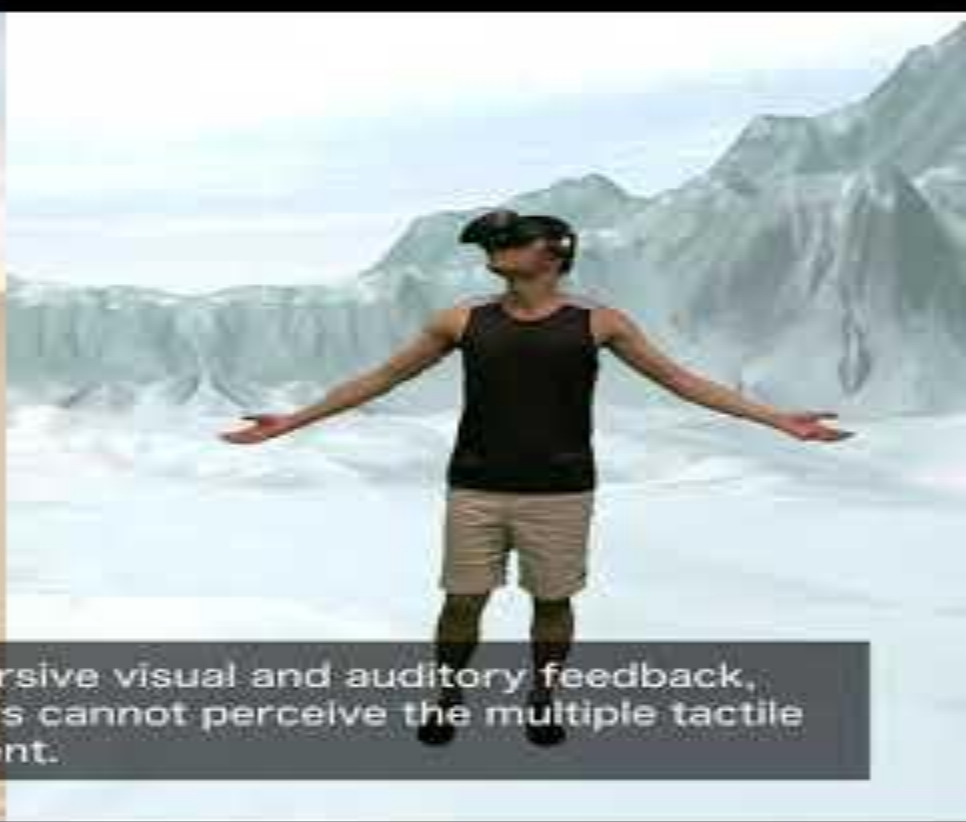


Hapmosphere :

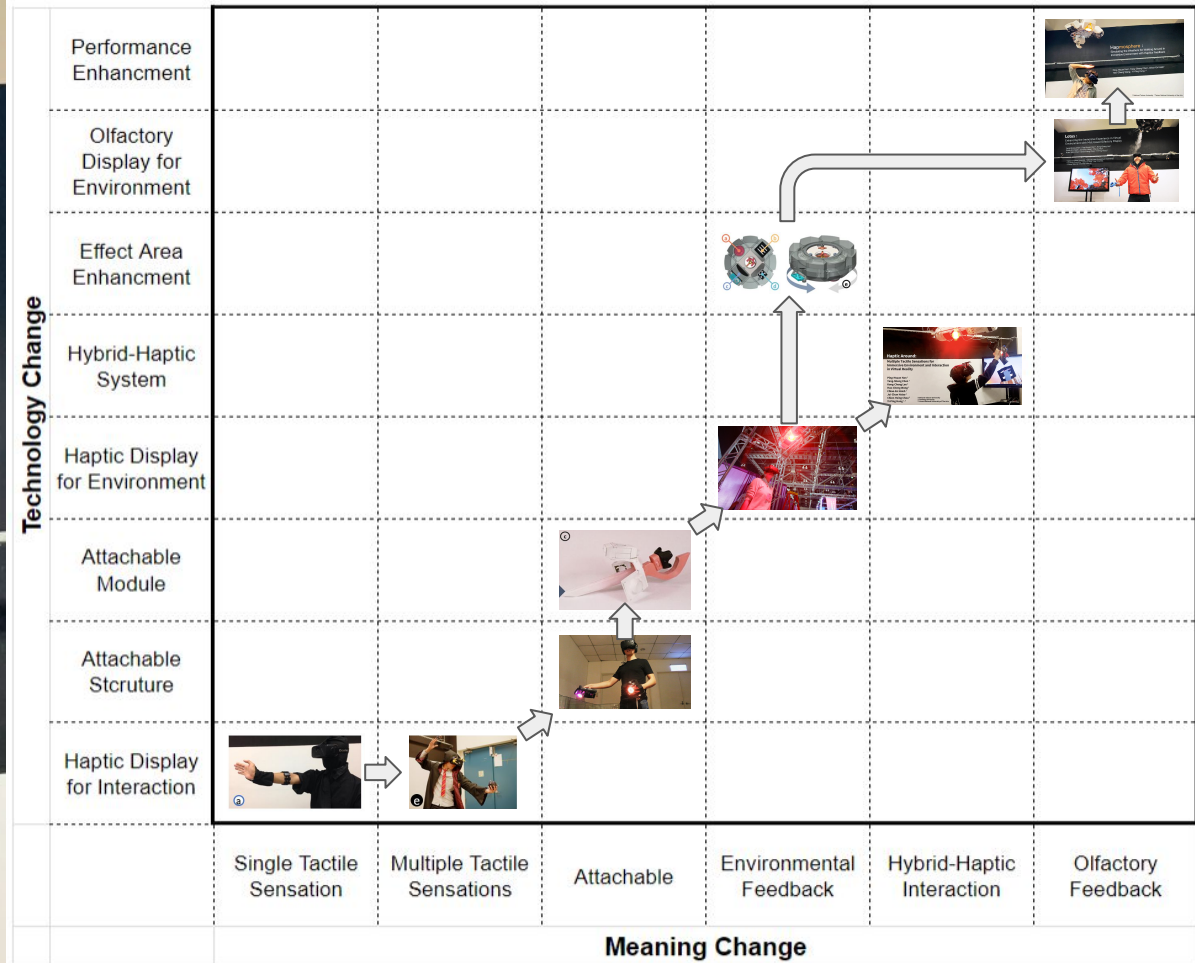
Simulating the Weathers for Walking Around in
Immersive Environment with Haptics Feedback

Ping-Hsuan Han*, Yang-Sheng Chen*, Chiao-En Hsieh*
Hao-Cheng Wang*, Yi-Ping Hung*,#





Although VR-HMD can provide immersive visual and auditory feedback, without haptic technologies, the users cannot perceive the multiple tactile sensation from the virtual environment.



X-Men The Last Stand (Danger Room) 2006



Emerging Experience

新穎體驗

專題生：老師，我和...

我：一定要寫程式才能創新？

我：那你什麼比較厲害？

學生：視覺美術、3D列印。

我：那你喜歡什麼？

學生：吃。

Edible Interaction



Digital Lollipop, 2016



Arm-A-Dine, 2018



You Better Eat to Survive! 2017



Controlling Saltiness without Salt, 2013



TransFork, 2018



iScream, 2019



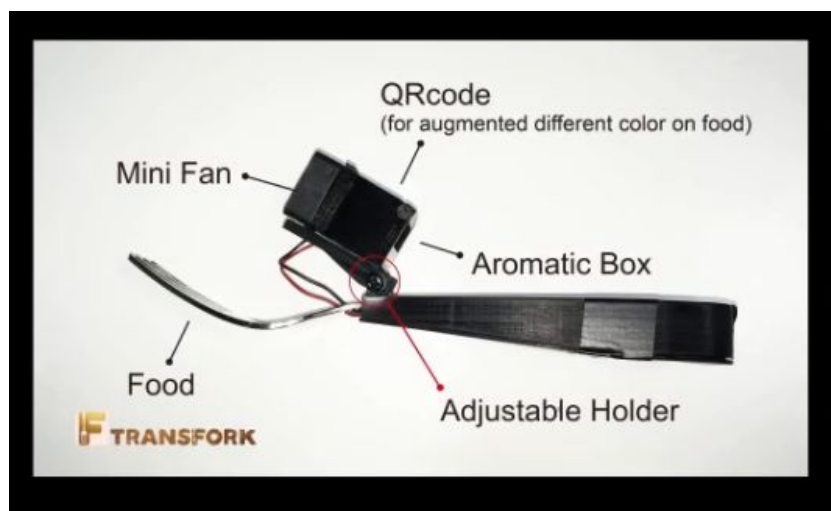
Meta Cookie, 2010



Food simulator, 2004

- 虛擬味覺刺激
- 真實進食回饋
- 真實味覺改變
- 味覺應用研究
- 進食觸覺模擬
- 心理描述味覺
- 飲食輸入
- 攝入傳感器
- 提供飲食建議的工具
- 可以吃的QR Code
- 增加飲食體驗

Human Food Interaction - Edible Interaction



dible

有了這些回饋裝置後... 那廚師怎麼用?

A person with dark hair, wearing a VR headset and a dark grey long-sleeved shirt, is shown in profile, drinking from a clear glass. They are sitting at a white table outdoors in a park-like setting with green grass and trees in the background. A red object is on the table in front of them. A semi-transparent text box is overlaid on the lower part of the image.

Drinking Water (or Sparkling Water)
to Clean the Oral Cavity

台北科技大學 第二屆互動設計系
畢業製作作品 TransFork翻轉叉子

榮獲 ACM VRST
Best Demo



設計團隊 林映里 周采儀 廖佑誠 黃郁晴
指導教師 韓秉軒

TransFork 是一款附加於餐具上的嗅覺回饋裝置
搭配頭戴式顯示器來轉換或擴增味覺的體驗
並使用味覺轉換食譜
輔助改變體驗者大腦對於口中所吃食物的認知
創造有別於一般的食物饗宴

TRANSFORK



實作能力, 限制了設計學生的想像。

「新穎科技」往往伴隨著「新穎體驗」, 而「新穎體驗」不見得是「新穎科技」...

學生：所以實作能力不重要？

我：重要。

學生：那到底要學多少才夠？

我：為了在有限時間內達成我們的目標，需要什麼學什麼。

Case Not Closed
這不是一件個案...



Rapidly Pototyping

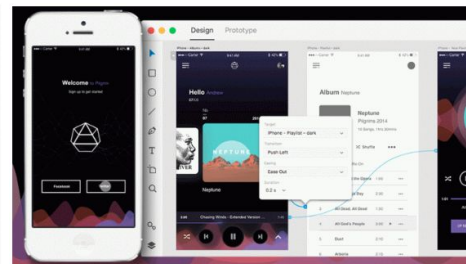
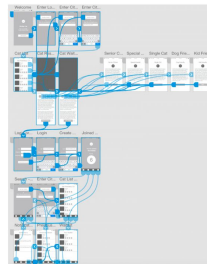
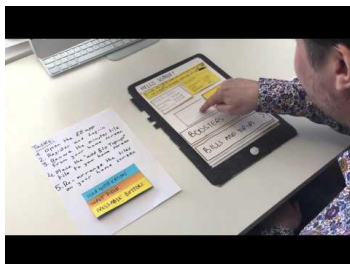
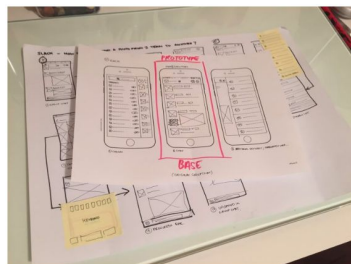
快速原型製作

Rapidly Pototyping

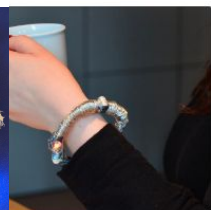
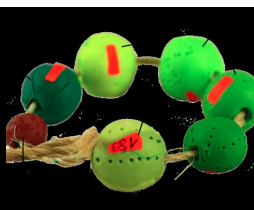
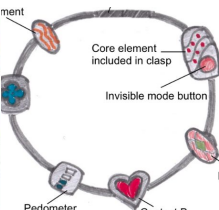
Lo-Fi Prototype 低保(擬)真度原型



Hi-Fi Prototype 高保(擬)真度原型



<https://theblog.adobe.com/prototyping-difference-low-fidelity-high-fidelity-prototypes-use/>



Fortmann, Jutta, et al. "Tangible apps bracelet: Designing modular wrist-worn digital jewellery for multiple purposes." *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*. 2016.



Tilt Brush
by Google



VR
Prototype
快速原型製作

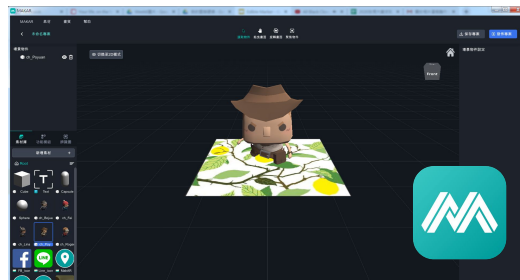
課程名稱: **擴增實境應用與設計**

授課老師: **韓秉軒&盧俊彥**

課程內容: 本課程主要的目標為從應用與設計的角度, 切入擴增實境產業的各種可能性。從教育應用、設計工具以及擴增實境遊戲設計、擴增實境互動式 內容製作等, 進行探討。



利用MAKAR製作可食AR互動



使用MAKAR, 創建AR專案



洗手, 將有AR辨識圖的可食用貼紙貼在食物



用手機MAKAR App掃描圖案,
手機會出現AR內容出來



Hi-Fi Prototype 高保(擬)真 度原型



5. 拿出手機 開啟MAKAR! 掃描吐司



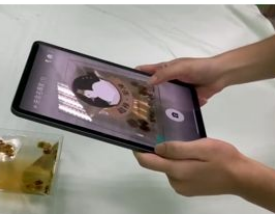
在調理包上提供額外資訊

- 營養標示
- 建議使用量
- 添加量對口感的變化



操作過程

1. 掃描果凍並觀看教學



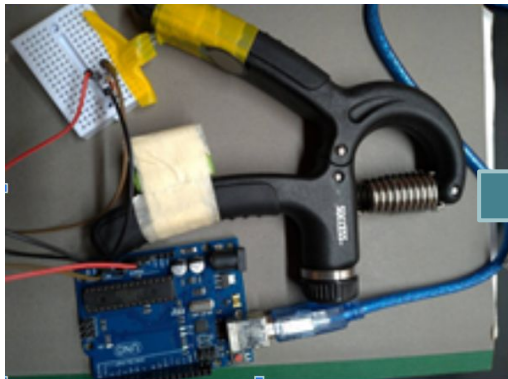
科技能突破限制，但也帶來了心限制與新挑戰。

(如果你說了不可能，那就沒機會討論可能性)



IoT Service Hub - Case: **Grab&Count** Rehabilitation Training System

PoC



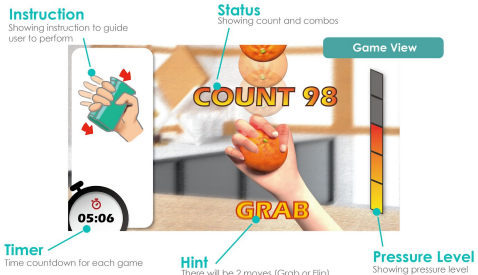
Prototype



使用流程



運算壓力指數



GRAB & COUNT

Accompanying and Persuasive Your Effort
for Performing Fistula Exercise





Motivation



Performing fistula exercise:

Performing fistula exercise is a repetitive activity after hemodialysis surgery. The exercise required a rubber ball, nerf-ball, or other soft ball you can hold comfortably in your hand. Then, the patient needs to grab and hold the ball for five seconds and release it. This gesture should repeat 15 mins around 3-4 trials for a day, which could help the patients to maintain normal blood flow in the arteriovenous fistula.

However, the exercise is boring, the patients would find it hard to know if their performance is good or bad, and the doctor would not know whether the patient does it obediently.

Pain Points

Expectation



What we expect

Reality



Cannot remember



Boring...



Dr. never know the situation

Design Consideration



Pressure sensing



Movement detection



Counting

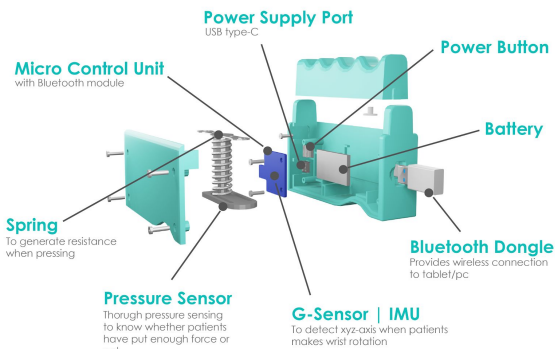


Wireless device

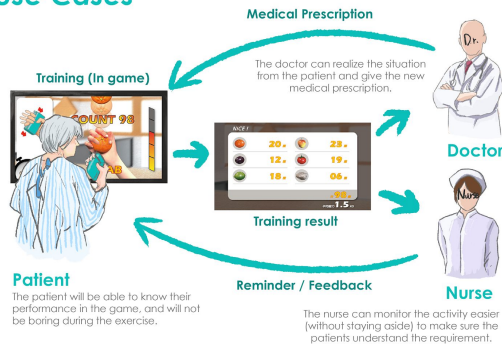


Recording

Device Overview



Use Cases



User Interface

Instruction

Showing instruction to guide user to perform

Status

Showing count and combos

Timer

Time countdown for each game

Hint

There will be 2 moves (Grab or Flip)

Pressure Level

Showing pressure level

Controlling the game by patient's Grab and Count. In the game scene, when fruit falls into the hand. Patient will grab and hold the device until reaching specified pounds to squeeze the fruit. If rock falls, the patient should turn his wrist to let the rock fall down, and continue to the next stage.



Average pressure
Results in average kg for recording

Billboard for Doctors and Nurses





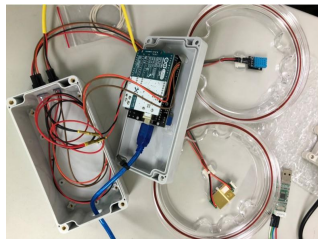
智造基地其他成功案例：



O-take虛擬實境控制手套
瑞意創科股份有限公司



整合台灣IC、軟硬整合、設計、產製專業能量，O-take正式呈產



智能種苗培育設備
邁森科技股份有限公司



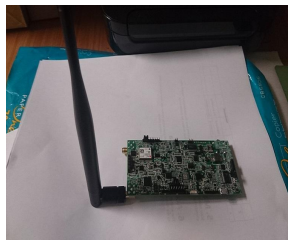
優化種苗培育環控系統，建立高經濟作物培育機制



工具機機況讀取棒
雨辰科技實業社



工具機機況讀取棒之輔導後硬體規格



登山救命器
行翼網通有限公司



SKYNET 多點超距警示裝置





「物聯網智造基地」可量產雛型智造機制



Interpretation

詮釋

英文 ▼



中文 ▼

Interpretation



解釋

Jiěshì



「interpretation」的翻譯

名詞

解釋

explanation, interpretation, construction, understanding, exposition, rationale

翻譯

translation, interpretation, rendering, rendition, version, decipherment

解答

answer, solution, explanation, response, reply, respond

詮釋

值域: 0.0~1.0

價值 = (設計 + 技術 + 用心 + ...) x 詮釋

Value = (Design+Technique+Working Attentively+...) x Interpretation

說多做少, 對觀感不好!
說少做多, 對自己不好!

沒有人比作者自己們，還要懂自己做的東西！

如何利用新穎科技\體驗來**詮釋**你的產品？



-Design Space-
在這世界中, 你做了甚麼?



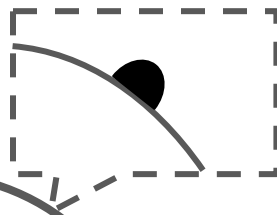
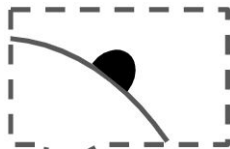
-Design Consideration-
你多考量了甚麼?



-Design Driven Innovation (Pototyping)-
所以設計並實作了不一樣的東西。



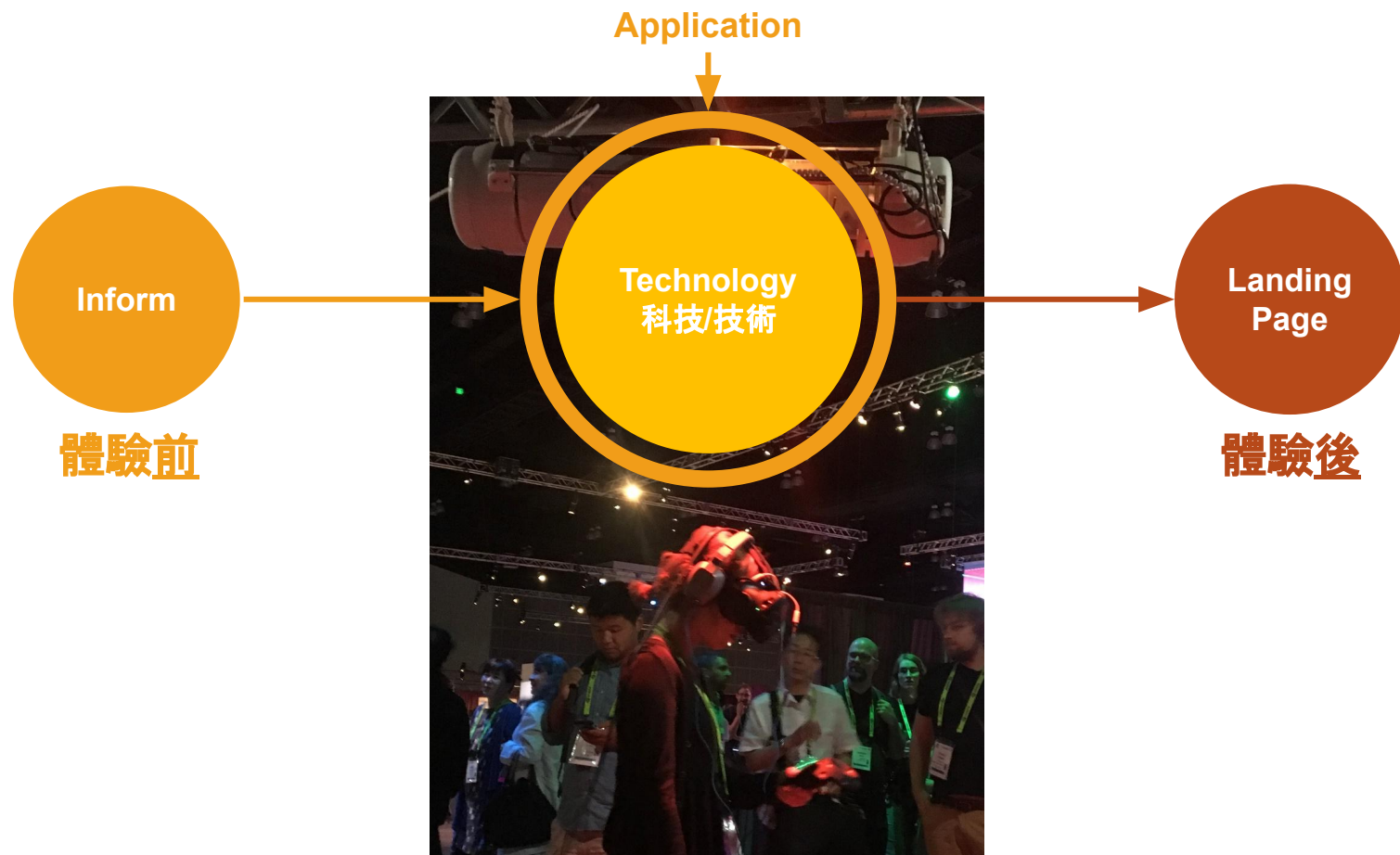
-Evaluation (User Study)-
你怎麼證明這是更有潛力的?



已知世界

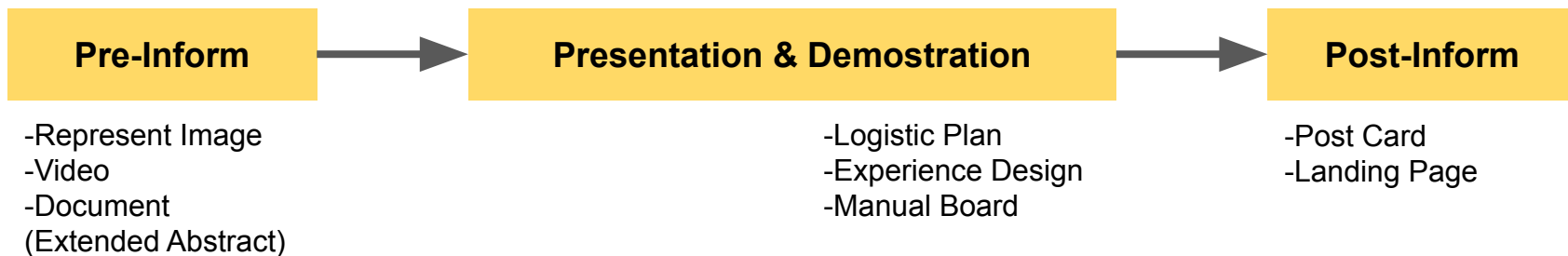
-Interpretation-
請展示&表達出來!!





具體而言包含甚麼？

Preparation



Pre-Inform



Represent Image



Video



Document (Extended Abstract)

Represent Image





Video

Document Extended Abstract)

FoodBender: Activating Daily Prop for Playing in the Immersive Game with Attachable Haptic

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National Taipei University of Technology

Xiang-Wen Huang
National Taipei University of Technology

Yu-Chia Chen
National Taipei University of Technology

Yu-Yu Hsu
National Taipei University of Technology

Shu-Yu Chang
National Taipei University of Technology

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Figure 1: We introduce FoodBender, an immersive VR game with multisensory feedback, which utilizes daily prop and attachable haptics to play as a chef in the magic world. The gameplay of the cooking is as follows (a) received the order, (b) summon the monster, (c) prepare the weapon, (d) fighting with the monster, and (e) clean the weapon to respawn the monster.

ABSTRACT
Users can experience sufficient visual and auditory feedback with a current head-mounted display and interact with objects in the virtual environment with controllers. Still, current controllers only provide vibration feedback besides location tracking. In order to improve haptic feedback during manipulation, the research focuses on utilizing prop, wearable device, or retrofit of the VR controller. Nevertheless, prop only provide the shape and texture; the wearable device cannot simulate the texture's tactile feedback; the VR controller cannot simulate the shape of the object. However, the wearable device and VR controller can provide other tactile sensations, such as vibration, wind, and thermal. Therefore, we present FoodBender, an immersive VR game with multisensory feedback, which utilizes an attachable haptic device to activate daily prop for playing in the immersive game. Users can use the daily prop to simulate virtual objects' shape and texture and add virtual vibrations, wind, thermal feedback by the attachable device. In our game, users can use physical kitchenware to simulate virtual weapons with various haptic feedback in the virtual environment.

1. INTRODUCTION
Utilizing multisensory tactile sensations is a useful approach to enhance the immersive experience (Han et al. 2018). However, it is not easy to provide various haptic feedback on a controller during the manipulation. Substantial Reality (Simone et al. 2015) utilizes physical prop to simulate the similar shape of the virtual object. The virtual objects which have the same texture can also be simulated. Turkle (Cheng et al. 2015) has used large prop delivered by labors to simulate the physical environment. To enhance the prop-based haptic, Hsu (Cheng et al. 2017) and Haptic-Gear Around (Hsu et al. 2020) utilize interactive technique to move or reuse the static prop with the hardware mechanism. Although they have shown the concept of activating daily prop and successfully provide an enhanced player experience, it required an environment configuration. To provide multiple tactile sensations, Self (Chen et al. 2014) and Bo (Han et al. 2017) have shown the attachable structure can improve the current VR controller or tracker, but the attachable structure cannot be used for the daily prop. In this work, we utilize the concept of attachable haptic to activate the daily prop with a long handle. The daily prop can provide the shape and texture feedback, and the attachable device can provide the activity of the object in VR, which included vibration, wind, thermal feedback. Moreover, based on our device, we design and develop an immersive action game called FoodBender, a story about the chef in the magic world who use his element kitchenware to fight with the food material.

2. DESIGN AND IMPLEMENTATION
To activate daily prop for playing in the immersive game, we design an attachable haptic device (Figure 2) for our game. The main structure in this device is a C-clamp, which can firmly fix the device on the daily prop with a long handle even if the users wear firmly in the immersive experience. The case of the device 3D printed by PLA material, and we use soft materials at the contact surface with prop to increase friction, ensuring the overall device more stable. The appearance is designed in the hilt and cross-guard of a sword, a LinkIt 7697, a mini L298N, and a battery installed on one side of cross-guard in the device, which we use Bluetooth to communicate with VR computer. Moreover, the other side is a hilt fan and a vibrator module. The thermal patch is on the outside

SA '20, November 17–20, 2020, EASO, Daejeon, South Korea



Figure 2: Hardware design: (a) 1/4" Screw, (b) c-clamp, (c) heater, (d) fan, (e) mini L298N, (f) LinkIt 7697 with Robot Shield and battery, (g) vibrator, (h) prop, and (i) Vive tracker.



Figure 3: Interaction design: (a) Weapon Transformation, (b) Enemy Attack, (c) Wind Sword, and (d) Fire Sword.

of the holder. Vive Tracker is installed on the hilt's front side for adequately receiving the light from Vive LightHouse. We utilize Vive Pro as our VR HMD, and the VR game developed by Unity. In our game, the player will experience the gameplay as Figure 1(a) to (f). The haptic feedback will activate in Figure (e) when the player transforms their weapon to different elements by touching the related object, such as thermal feedback will be produced when touching the stove to receive the fire element. The wind feedback will be produced when touching the salt, or the spices. The vibration module will be triggered to simulate the impact when users are attacked. All haptic modules were controlled by the PWM signal to change the strength in the game.

3. GAMEPLAY AND EXPERIENCE
To show our concept of activating daily prop for playing in the immersive game with attachable haptics, we design a VR action game with the kitchen environment. Before experiencing FoodBender, we need a daily prop with long handle shapes. Here we take a knife as an example. The knife will transform into fantasy weapons with similar shapes and materials for cooking or fighting in the game during the seasoning process. The game's goal is to complete a Taiwanese cuisine "Oyster Omelet" so the user needs to beat the monsters that are transformed from four necessary ingredients during cooking. For more detail, please refer to our video.

4. SUMMARY
In this project, we have shown the potential gameplay of activating daily prop with attachable haptic, which provide an enhanced experience in our immersive game.

REFERENCES
Chen, Xiang-Wen, Ping-Huan Han, Jui-Chen Hsu, Keng-Chang Lee, Chao-Fu Hsu, Kuan-Yu Lin, Chen-Hong Chen, and Yu-Feng Huang. 2018. *Soft Attachable Augmented Reality on Gaming Controller for Immersive Interaction: the Prototype of the 20th Annual Symposium on User Interface Software and Technology (UIST 2018) Extended Abstracts for Computing Hardware*. New York, NY, USA, 17–18.

Cheng, Ping-Huan, Keng-Chang Lee, Kuan-Yu Lin, and Chao-Fu Hsu. 2015. *LinkIt 7697: A Low-Cost, High-Performance, and Portable Development Platform for Immersive Interaction*. In *Proceedings of the 2015 ACM Conference on Human Factors in Computing Systems*. ACM, 17–18.

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Cheng, Ping-Huan, Keng-Chang Lee, Kuan-Yu Lin, and Chao-Fu Hsu. 2020. *LinkIt 7697: A Low-Cost, High-Performance, and Portable Development Platform for Immersive Interaction*. In *Proceedings of the 2020 ACM Conference on Human Factors in Computing Systems*. ACM, 17–18.

Cheng, Ping-Huan, Keng-Chang Lee, Kuan-Yu Lin, and Chao-Fu Hsu. 2021. *LinkIt 7697: A Low-Cost, High-Performance, and Portable Development Platform for Immersive Interaction*. In *Proceedings of the 2021 ACM Conference on Human Factors in Computing Systems*. ACM, 17–18.



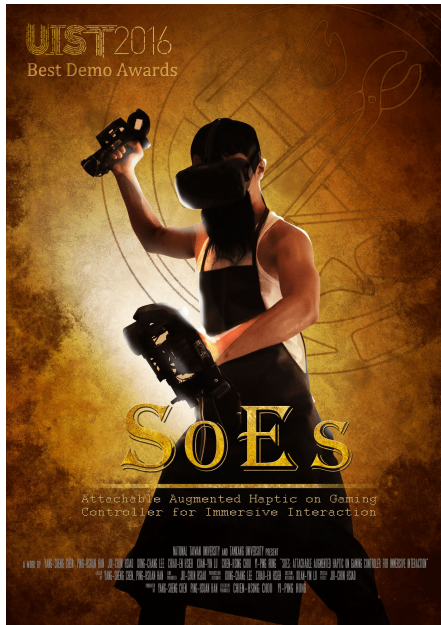
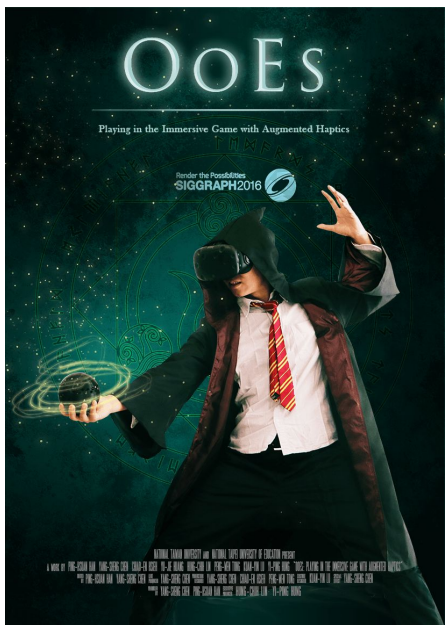
Figure 2: Hardware design: (a) 1/4" Screw, (b) c-clamp, (c) heater, (d) fan, (e) mini L298N, (f) LinkIt 7697 with Robot Shield and battery, (g) vibrator, (h) prop, and (i) Vive tracker.



Figure 3: Interaction design: (a) Weapon Transformation, (b) Enemy Attack, (c) Wind Sword, and (d) Fire Sword.

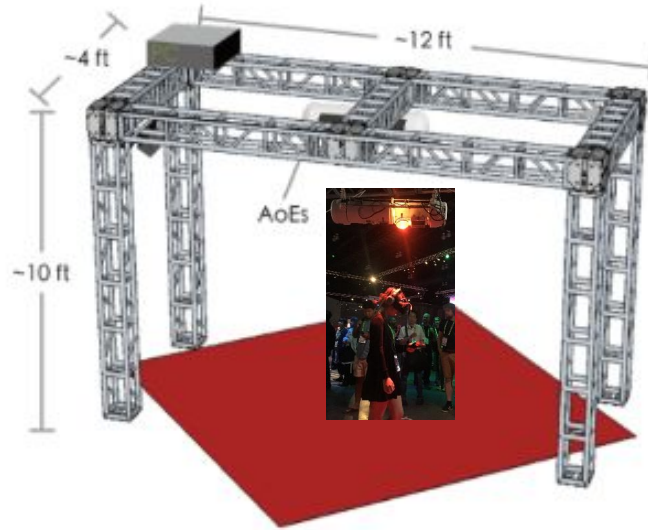
照片？
螢幕截圖？
示意圖？

Presentation and Demostration



核心價值
一場獨特的新體驗

你有去過 迪士尼 或 環球影城 嗎？
(從開始到結束到再開始...)



排隊與拍照

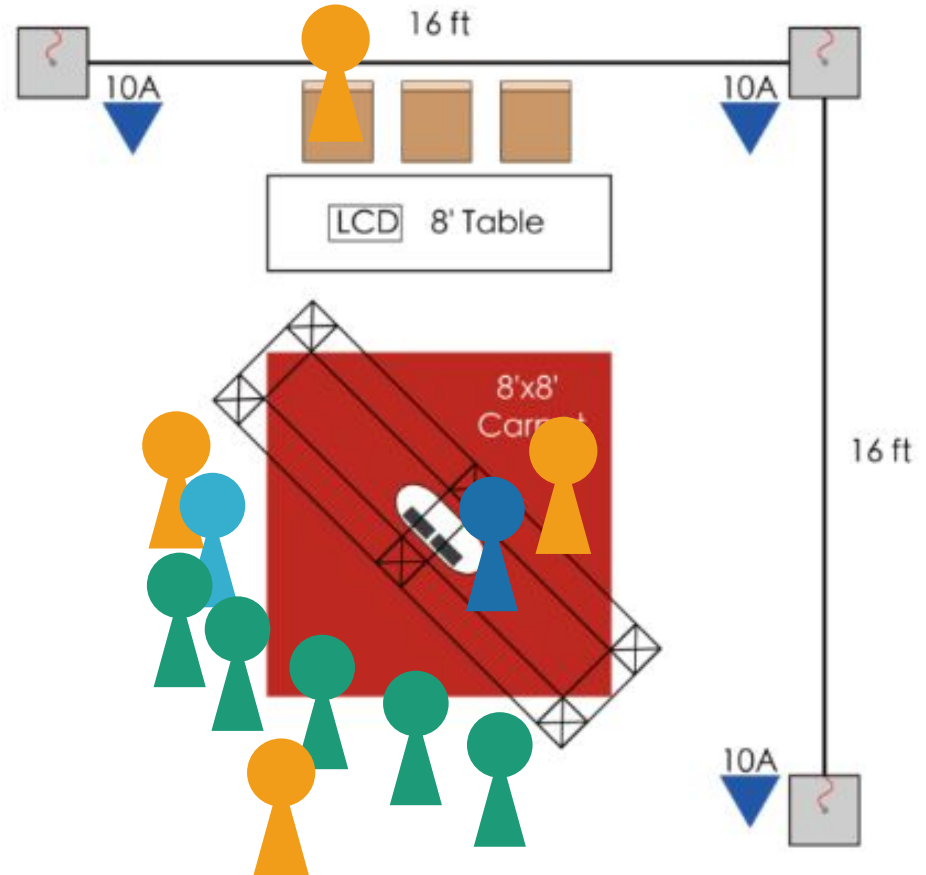
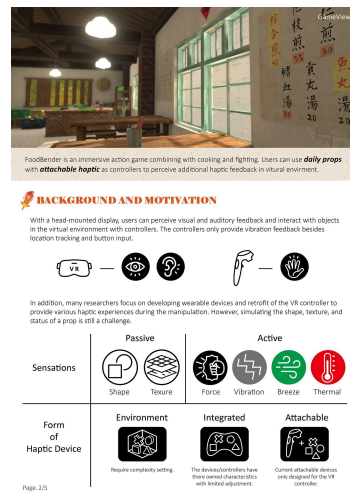
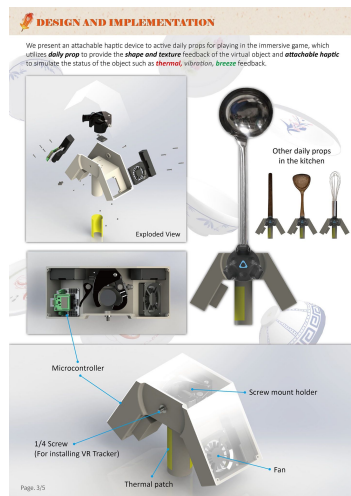


Figure 1: Floor plan A

Manual Board



通常現場準備這一張(正反面)

有空也可以準備其他輔助說明的

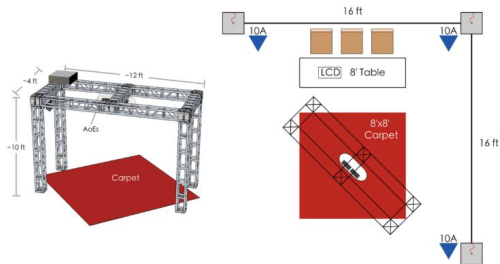
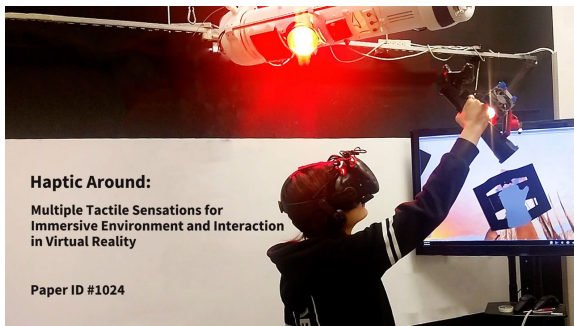


Figure 1: Floor plan A

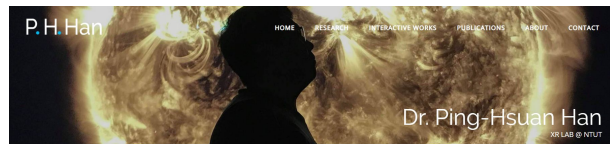
體驗前

其實細節比你想的還要多...



體驗中

體驗後



Selected Works



Lotus | ACM SIGGRAPH ASIA 2018
Best VR/AR Technology Award 3rd



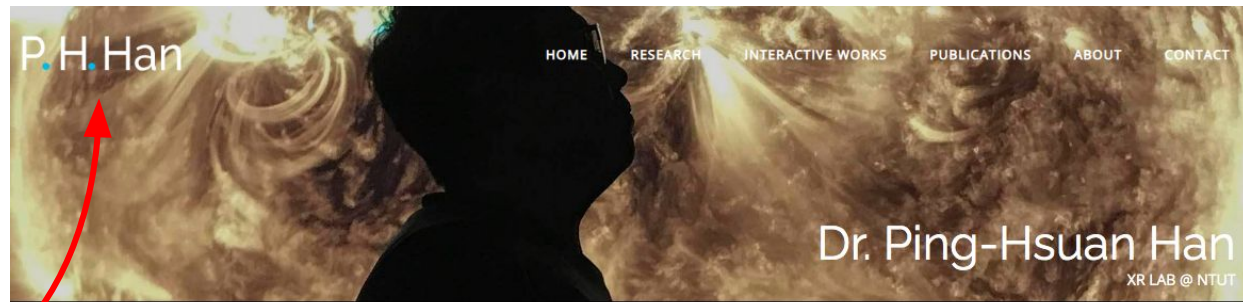
Haptic Around | ACM VRST 2018



AoEs+ | LAVAL VIRTUAL 2018
The Award of 3D Games & Entertainment



Post-Inform



Selected Works



Lotus | ACM SIGGRAPH ASIA 2018
Best VR/AR Technology Award 3rd



Haptic Around | ACM VRST 2018



AoEs+ | LAVAL VIRTUAL 2018
The Award of 3D Games & Entertainment



(Human-Computer Interaction)

Human-Metaverse Interaction

人元互動

這一刻



下一刻

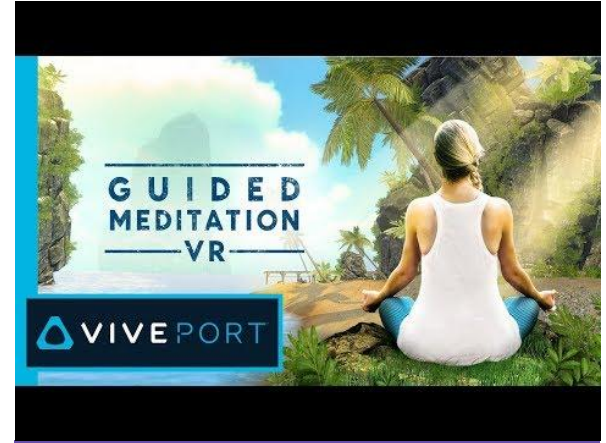
未來



ADHD Kid's Talk in VR

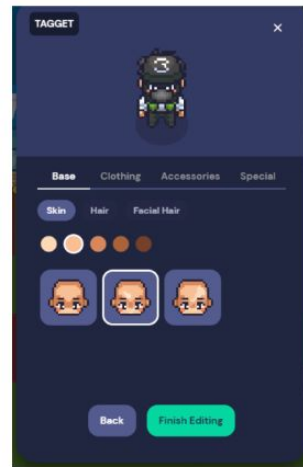


International Conversation



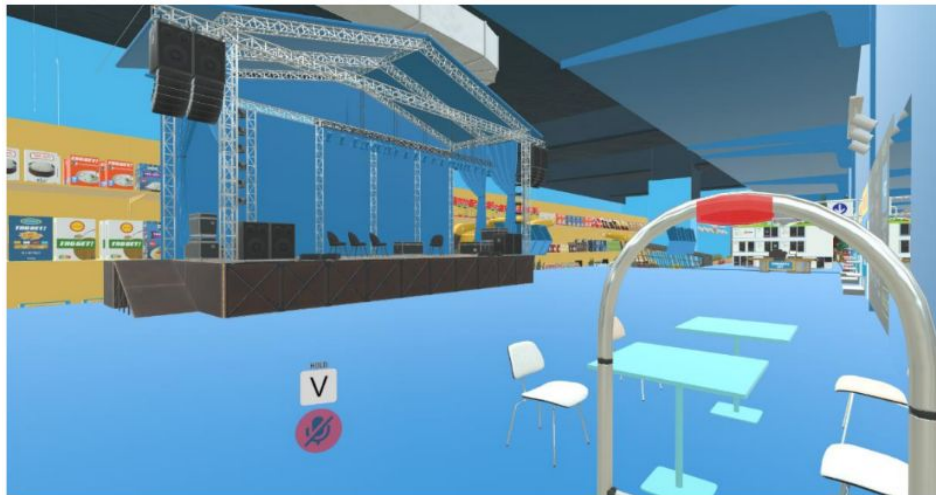
Relaxation

Applications/Story in Metaverse



 Gather

VR CHAT





TAG GET IxD NTUT

The memory of our creation and exhibition.

Wallet: [tz1Re..ogZ3s](#)
akaDAO: 52.552





Top creators (72 hours)

1

CHEN-YI
254.05 xtz

5

Infrapunk666
90 xtz

2

Tez Dozen
251 xtz

6

mido
38.04 xtz

3

TAG GET IxD NTUT
111.921 xtz

7

Rona
372 xtz

4

newyellow
105 xtz

8

oxspeter NEW
285 xtz

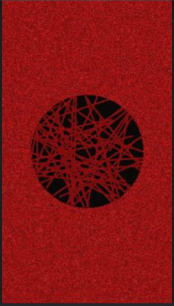
AKAS

title, creator, tokenID...

Curations | Metaverse | Create | About | EN v | Connect Wallet


TAG GET #08 臺灣 (Type-A)
akaSwap
Offer
Price
6.03 xtz


TAG GET #03 沐浴森林 (Type-A)
akaSwap
Offer
Price
6.07 xtz

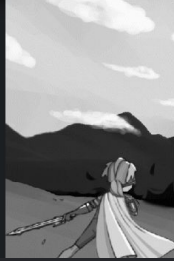

TAG GET #02 亦值空間 (Type-A)
akaSwap
Offer
Price
12 xtz

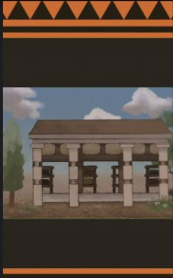

TAG GET #20 光明之下 (Type-A)
akaSwap
Offer
Price
125 xtz


TAG GET #18 DeFi最大冒險 (Type-A)
akaSwap
Offer
Price
6.05 xtz

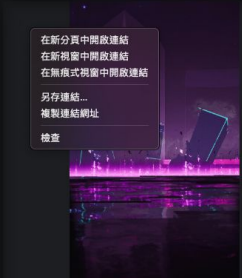

TAG GET #16 純真小吃部 (Type-A)
akaSwap
Offer
Price
-


TAG GET #12 Machina Mutiny (Type-A)
akaSwap
Offer
Price
6.07 xtz

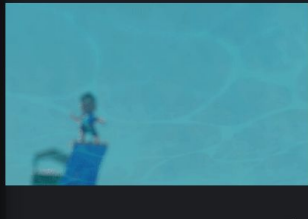

TAG GET #11 Golden Quest (Type-A)
akaSwap
Offer
Price
3 xtz







在新分頁中開啟連結
在新視窗中開啟連結
在無痕式視窗中開啟連結
另存連結...
複製連結網址
檢查

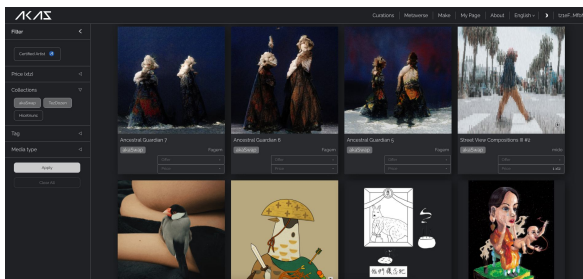


精神時光屋 (七龍珠)



Time Sensation

NFT (AkaSwap)



Money Sensation

Avatar (Meta)



虛擬化身

Exploring the Possibility in Metaverse

Summary

1. HCI的原型設計與實作是為了理解限制與挑戰。

(如果你說了不可能, 那就沒機會討論可能性)

2. 享受當下, 試著做點不一樣的事情。

(YOLO, You only live once)

3. 不試不會怎樣, 試了很不一樣。

(改編自<<純喫茶>>廣告)



For more info please visit
<http://pinghsuan.info>

Q&A

Thank you for your attention. ☺

中華開放教育平台
 OPEN EDUCATION PLATFORM

首頁 課程查詢 語言 (Language) 登入

【110-1】互動程式設計

課程簡介

本門課在本系課程地圖中扮演多媒體軟體製作之相關課程，著重在將多媒體內容製作與多媒體軟體開發進行整合與實現。在修課前之先備能力為已具有基礎程式語言撰寫之知識與技能；本系之先備課程為「程式設計入門」。

課程目標

本課程之教學目標在於培養學生下列能力：(1)多媒體軟體系統之規劃能力、(2)多媒體軟體系統之變形製作能力、(3)多媒體軟體系統之整合能力、(4)多媒體軟體系統開發之溝通能力。其中多媒體軟體系統之規劃能力指的是將人文議題進行數位轉譯之能力，而開發過程中包含了多媒體軟體系統之製作與內容整合，及其團隊合作與溝通之能力。期望藉由課程中的學習來培養學生成為一名懂得跟多媒體工程師合作的互動設計師 (Interaction Designer) 或是有貢獻者。 (Interaction Designer) 或是有貢獻者 (Contributor)。

適用對象

具備可運行 Unity2020 以上版本之例。

課程特色

應用數位工具/技術：C#語言、Unity。

課程進度

註冊課程

課程分級：資訊工程

上課語言：中文

字幕語言：無字幕

修課費用：免費

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Taiwanese Association of Computer Human Interaction



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