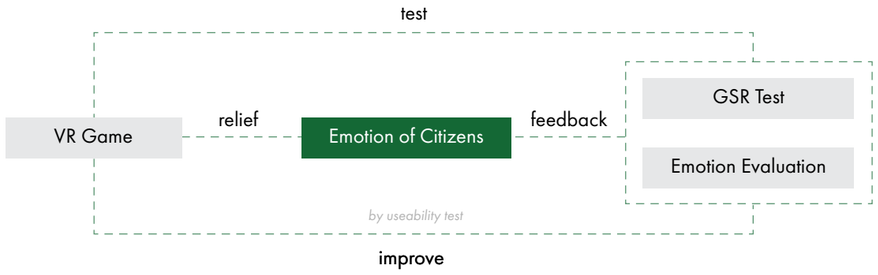
Emotion Relief in Compact City

Academic | *VR Game User Research based on GSR DATA*

[TIMELINE]	2023.07-2023.09
[LOCATION]	Hangzhou, CHN
[MENTOR]	Han Tu
[GROUP MEMBER]	Ying Zhang, Selina Feng, Yolanda Zhao
[TOOL]	Unity, Blender, Arduino, Illustrator
[MY ROLE]	Group Concept Design 50% Research Design 80% Game Mechanism Design 100% Data Analysis & Testing

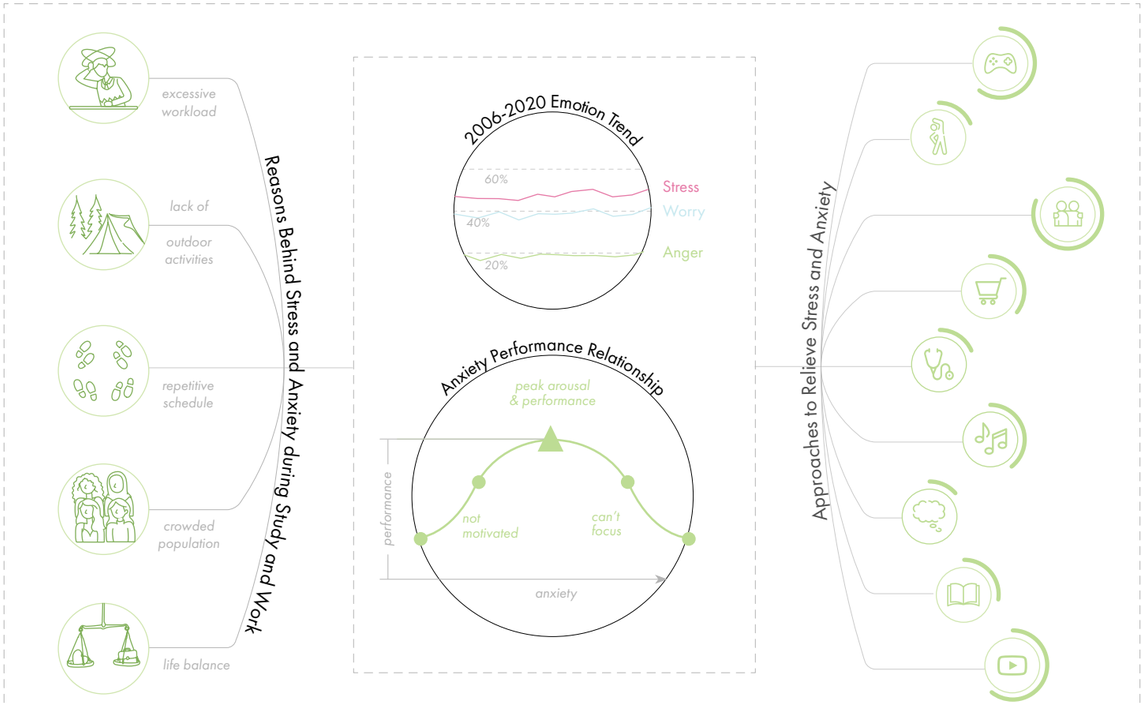
In our fast-paced world, stress has become an unavoidable part of life. The pressures of careers, social expectations, and the overwhelming influx of information create numerous stressors that impact our mental, emotional, and physical well-being. This VR game aims to transform the daily stress experienced by office workers and students in a bustling city into a serene urban garden. By navigating users through different destinations and uncovering scattered painting frames, the game encourages them to reintroduce happiness to their city in the form of flowers or other forms of plants, symbolizing a metaphor for joy and tranquility.



RESEARCH FRAMEWORK | Modern Citizens Stress

Background

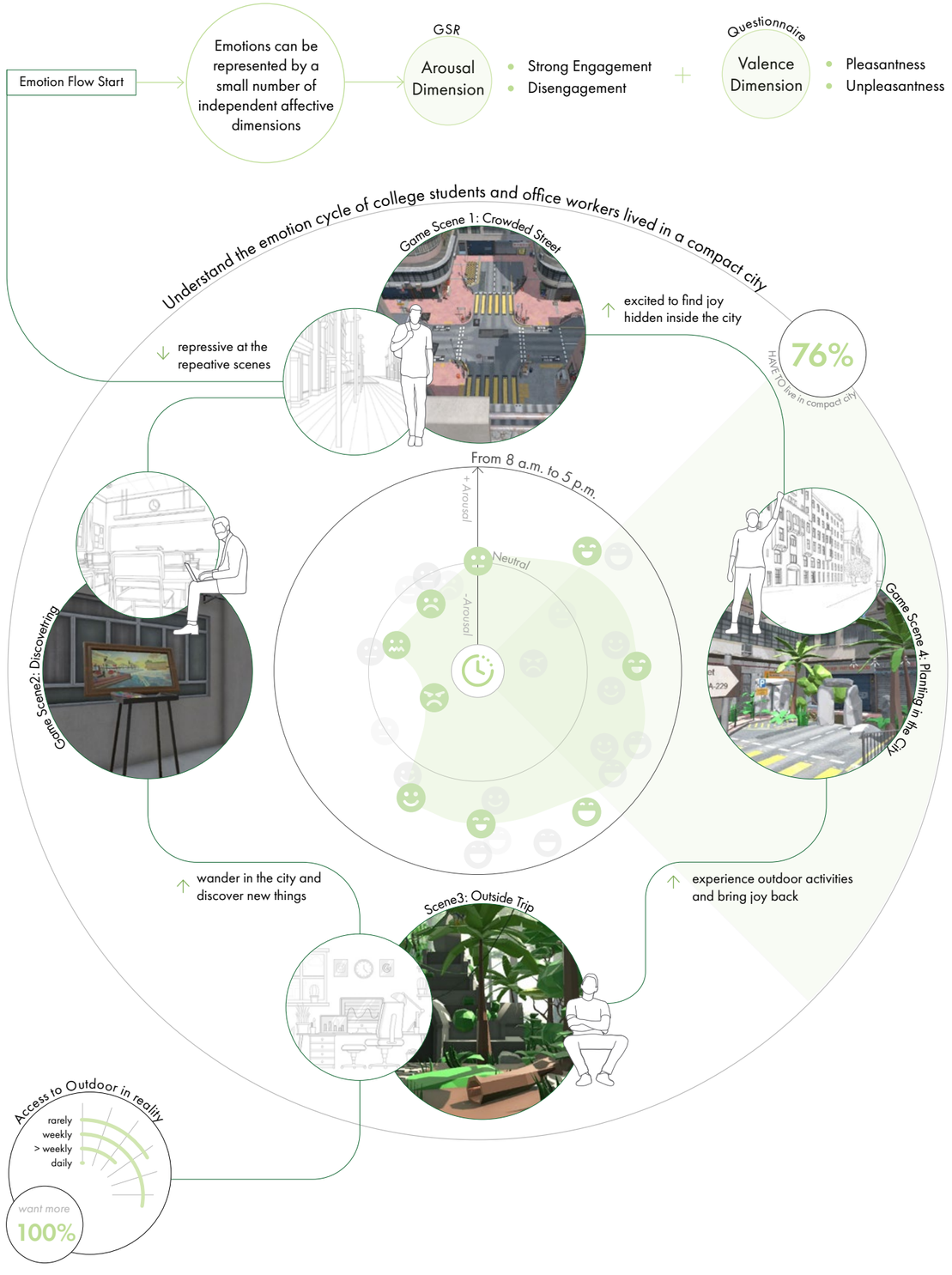
In the modern metropolis, time races and life moves at an unprecedented pace. People navigate this bustling cityscape with determination, fueled by ambition and the pursuit of progress. Amidst the whirlwind of activity, there's an undeniable blend of exhilaration and exhaustion that shapes the dynamic relationship between individuals and their rapid-paced surroundings.



Potentials and Strategies

User Need & Difficulty	Solution	Test Equipment
The Compact City Limitation *The compact city have excessive crowds and similar skyscrapers along the streets. Citizens would repeat the same life schedule everyday*	**The Collection of Pleaseness** *Citizens indicate that the collection of favored objects and the process of discovering various objects brought unexpected excitement*	**GSR Sensor** *detect changes in electrical activity from changes in sweat gland activity*
Unavailablity in Time and Distance *Citizens find difficulties in balancing work/study life and spare time mainly because of commuting time and the entrapment of city to access other places*	**Availability in Travelling** *Different destination wandering allows citizens to imagine the joy of travelling without comusming time and money*	**VR Headset Scene** *Virtual Reality game increase engagement*

Emotion Circuit



RESEARCH METHEDOLOGY | VR & GSR Test

Immersive VR-guided meditation

Paced breathing approach

Q1 How does immersive VR game help allecviate anxiety?

Q2 What features of VR game contribute to the relief of stress?

Q3 How do plants reduce stress feeling through perceived attractiveness of environment?

Theoretical Support

- Controlled slow diaphragmatic pace breathing
  - ↓ Automatic arousal ↓ HR ↑ HRV HF activity
  - ↓ Cardiovascular ↓ blood pressure
  - ↓ HPA axis activity ↓ cortisol levels
- Immersive nature-based VR guided mediation
  - ↓ Cognitive arousal ↓ worry ↓ anxiety
  - ↓ Cortical arousal ↓ EEG beta activity

Testing Process

Target User

Group:
- College students
- Office workers

Feature:
- Heavy coursework
- Lack of outdoor activites
- Bored of daily life

Pre-survey

Demographic Question

understand pressures & stress source experienced by individuals who live in compact cities

3 - 5 minutes

8 testee

7 testee

Emotion Evaluation

DASS21

GSR & Quest 2

Emotion Evaluation

DASS21

The testee take original score and use it to compare the latter score

VR Game Exploration

Game Usability Test

5- 10 minutes interview

All testees are required to complete a game usability test to match with their arousal on specific scene.

Post Survey

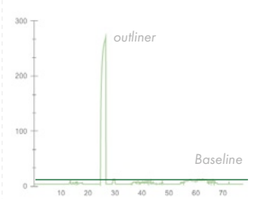
Data Analysis Process

Data Cleanup

Data Recognation

Preproccess

Define each tester's neutral baseline that recorded before the game started

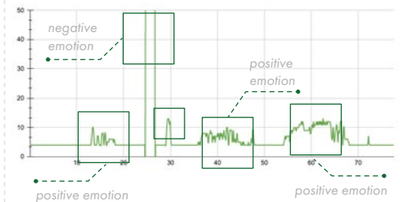


Feature Extraction

Choose and calculate statistical features from GSR signal that relevant to emotion (mean, max, min, standartd)

Data Labelling

Use the self-report collected after each scenario of the game to label either negative or postive to arousal



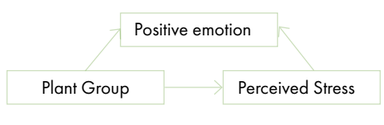
Data Cleanup

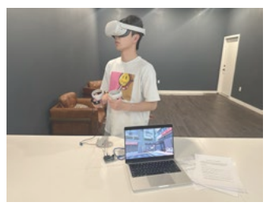
Fliter GSR data by applying a smoothing algorithm and removing noise

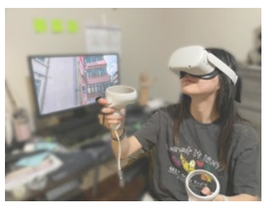
Identified calm down period between stimulus during the tests

**The calming down period should be the wondering time between scenes*

Established Model

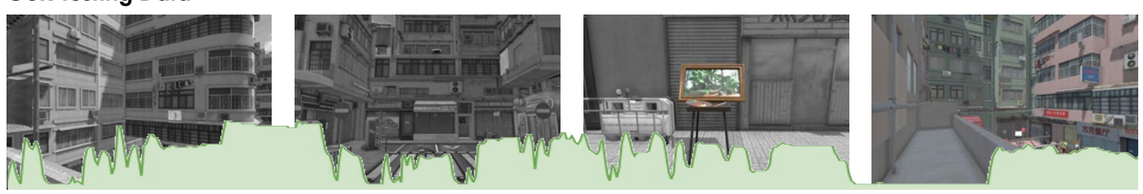


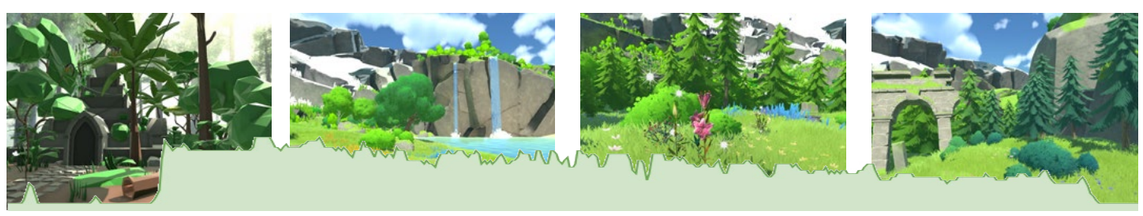




other testees

GSR Testing Data

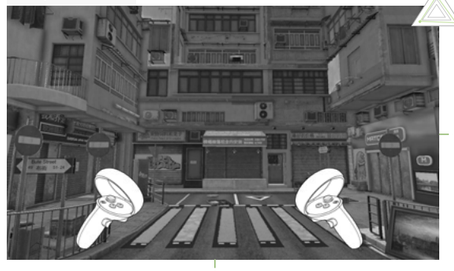




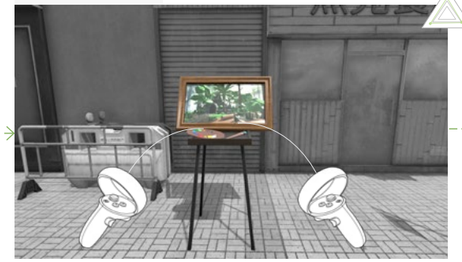
Game World | Player Routine

DEFAULT CITY WONDER TO EXPLORE

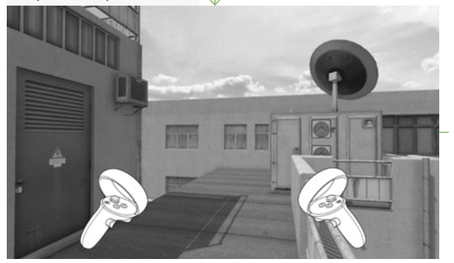
City Wander



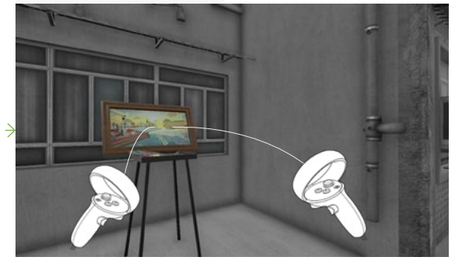
Find Art Frame



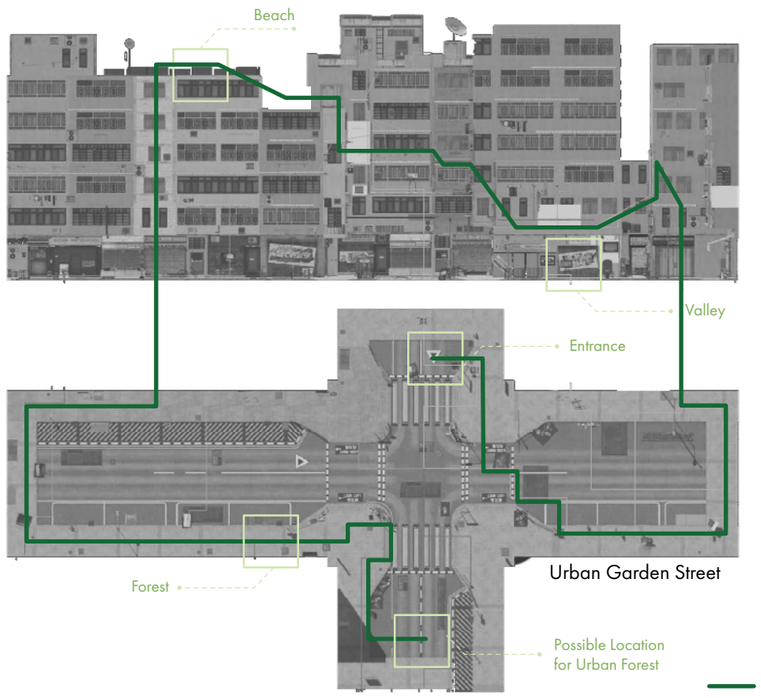
Upstair Exploration



Find More Art Frames



MAP IN THE SCENE



COLLECTING AND PLANTING IN THE OWN URBAN GARDEN

Enter Forest World

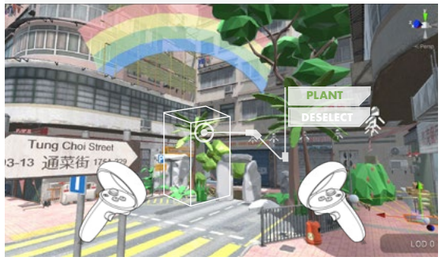
Pick Favored Plants

Travel back to the City

Open Bag and Browse

Pick Favored Plants

Plant in the Designated Area



PLANTING AND DECORATING THE URBAN GARDEN