iTravel – Multimodal Smart Travel Planner

User Experience Design

Final Report

– Group 3 –

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1. Introduction

In its most basic sense, multimodal system describes experience in terms of the textual, aural, linguistic, spatial, and visual resources or modes used to compose an information. Our project study aims to develop a multimodal system which helps East-Asian undergraduates with pre-travel plan.

The information in real world usually comes as different modalities. For example, images are usually associated with sights and memories; memories contain images to more clearly express the interesting part of the sight in front of the person. Different modalities are characterized by very different statistical properties. For instance, images are usually represented as pixel intensities or outputs of feature extractors, while texts are represented as discrete word count vectors which both aspects gives the person a specified memories.

Where media are concerned, multimodality is the use of several modes (mostly media usage) to create a single artifact. The collection of these modes, or elements, contributes to how multimodality affects different rhetorical situations, or opportunities for increasing an audience's reception of an idea or concept. Everything from the placement of images to the organization of the content creates meaning. This is the result of a shift from isolated text being relied on as the primary source of communication, to the image being utilized more frequently in the digital age. While multimodality as an area of academic study did not gain traction until the twentieth century, all communication, literacy, and composing practices are and always have been multimodal.

People now relates to uncomforted travel information they search on before the travel (mode of searching), thus we wanted to use more new media technology if it may more be effective. Multisensory integration, also known as multimodal integration, is the study of how information from the different sensory modalities, such as sight, sound, touch, smell, self-motion and taste, may be integrated by the nervous system, and by stimulating the senses, the memory the person get is different. VR has the strength over other technologies at building immersive senses of sight and hearing and thus we proceeded the research.

2. Literature Review

2.1 Rapid Tourism Development

In recent years, tourism develops rapidly and plays an important role in around world. According the tourism destination of people, we can divide tourism into city tourism and rural tourism.

City tourism, also known as urban tourism, is defined by NUWTO (United Nations World Tourism Organization) as follows: “Trips taken by travelers to cities or places of

high population density". In the whole world, more than half people live in cities, and the population density of city especially famous city is quite high. According to Euromonitor International, world's 100 leading cities in total travelers' destination has increased 5.1% in 2013. On the other hand, the data from cities like arrivals in hotel also shows the rapid growth. Take Berlin for example, the arrivals in all accommodation in city area have increased from 2.8 million in 1990 to 11.3 million in 2013. In Kerstin Bock's view, there are several reasons which lead to this rising popularity. Firstly, people who live in cities are more likely to choose city as their destination. Secondly, increasingly number of low cost carriers generate major impact on city tourism, making flights to all kinds of cities more affordable to the masses. Thirdly, more and more short-term holiday rather than one main holiday makes the tendency of increasing number of travelling. Fourthly, the development of IT has given a big hand to people when they try to get some information about cities. In the past, ICT (information and communication technology) has already give consumers great power via the mass information. Nowadays, the crazy growth of mobile channel and smartphones has opened up a new stage in this industry. Several years ago, people collect lots of information only when they're preparing the travel, while in the present people can get information whenever and wherever during the travelling.

Although the scale of rural tourism cannot match that of city tourism, the countryside in worldwide is now being challenged as never before. Rural tourism begins to appear in China in the early 1980s. The potential commercial opportunities brought from rural tourism had been seen and explored by more and more tourism investors, as well as the government. At that time, the PAT (poverty alleviation through tourism) policy was firstly launched, and more and more developers began to invest this area from now on. After decades of development, many forms of rural tourism have come into being one after another. For instance, agritainment is a new way that famers provided for townsman to go back to nature and enjoy the spirit of relaxation and pleasure. Now, more and more citizens choose countryside as their travel destination.

2.2 Existing Multimodal Travel Systems

The multimodal travel system requires for information input from multi-sensory ways and can provide a sense of immersion help to enhance people's enjoyment in sites. Before a formal multimodal system is created, there is already some multi-sensory travel sites. Italian Frosinone sensory park is one of the multi-sensory sites. The inspiration of the design comes from the five senses of human beings. The material and plants used is varied to show a recombination of human and nature. The park is filled with music and fragrance of plants to provide a better experience. It's a simple example of multimodal travel system, however, it focuses more on the information input of travelers ignoring a feedback of human's multi-sensory output then failing to create a sense of immersion. So although this kind of sites differs from traditional ones, it's still not what we expected to meet travellers' expectation. Apart from that, there has been some multimodal systems create a sense of immersion better, but they are not used in travel projects design. A typical one is HOMERE, short for Haptic and audiO

Multimodality to Explore and Recognize the Environment, which focus on helping visually impaired people to explore and navigate in a virtual environment. The system mainly achieves three applications which are preparation for the site, training of tool using and explore the virtual worlds. It uses a new kind of VR interface mixed of haptic interfaces and auditory ones creating a multimodal immersion of users. Some parts of Multimodal Travel Systems have been put in to use. A tour guide robot has been studied. This kind of robot solves a key issue of speech-based interaction using Bayesian network approach to combine and integration information collected. Besides, some multimodal interaction can be achieved with a wearable augmented reality system. The wearable equipment helps to build the experience in a mobile environment. So a mature multimodal travel system is technically available. Using the present technology to help us to build a multimodal travel system is more of a system design job.

2.3 Existing Problems in Multimodal Traveling

Apart from all good researches and existing multimodal traveling system, there are some side faculties that both researchers and users to suffer during the travel. For many years, people did try to use and relocate the use of 5 senses into traveling without actually going, most of the research is concentrated to the visual sense of human demand, and other sense considerations are being ignored by a large means. People tend to be more interested to have the trial or the will to buy related to Virtual Reality (VR), Augmented Reality (AR) only. However, even the VR, ARs have problems, VR can show the users the place they want to go, with 360 VR camera it's been improving fast. However, the users cannot move around the space, since the 360 VR camera is only a set figure, to make it possible, the camera should move as the user move, which is not so easy to be worked on because of different people's sight height and eye movement, use of 3D can improve the difficulty, but then the visual gets less real, so it is not negotiable. 3D space recognition of the system also gives feedback along with the visual distance recognition, which gives the user dizziness along the procedure. The visual sites however, are showing improvements by every way in programming. AR are mostly researched on navigating path systems, where not much to talk about since it is yet very hard to use for people, and using map or personal smartphones are much easier and mobile than the equipment that user should carry (Currently, only on cars are being used).

Other features of course are shown to multimodal traveling to support the travel, such as traveling guide robots. However, a land-robot is not suitable for diverse landscaped places, which a lot of traveling areas are, and thus the researchers are looking forward to drones to be the guide. However, in some countries like England and Norway, drones are banned to use only in specific areas because of the law of privacy, soundscape and citizen danger etc. It is not that is lost its all hope since EU also holds traveling law that is: Through the Connecting Europe Facility the Commission will support different technical requirements established within this Regulation through a program support action, notably the establishment of the national access point, the conversion to prescribed data exchange standards and the use of

common minimum profiles within national access points and the linkage of travel information services where relevant.

Information of traveling is also being improved by seconds. Different governments and traveling sites provide different information, but in order to support the provision of Union-wide multimodal travel information services, both centralized approaches based on data provisions and de-centralized approaches based on data and service provisions can be used. Therefore, this Regulation should include requirements for both data and service provision to support those two approaches. In order to facilitate the easy exchange and re-use of these data for the provision of comprehensive travel information services, transport authorities, transport operators, infrastructure managers or transport on demand service providers as appropriate should make the static data, corresponding metadata and information on the quality of the data accessible to users through a national or common access point. The access point may take various forms, such as a database, data warehouse, data marketplace, repository, and register, web portal or similar depending on the type of data. Member States should consider regrouping the existing public and private access points in a single point enabling access to all the types of relevant available data that fall within the scope of these specifications

Traveling is one of the people's most preferred activities, and there will always be improvement in various related figures for traveling. Changes of feedbacks will always pump up the traveling systems to better used tool, helping life more rich and comfortable.

3. User Requirement Analysis

3.1 Methodology of User Requirement Analysis

In this requirement analysis, we first use questionnaire to collect some overall information like the destination-choosing and the service they want. Then we use the result of questionnaire to help us form some questions we think helpful. Then each of our group member had a deep interview with some subjects to help us specifically understand how user perceive the travel matters.

3.2 Questionnaire Study

We first get overall distribution of our participants.

选项	小计	比例
大四	22	27.16%
大三	21	25.93%
大一	17	20.99%
大二	11	13.58%
研究生阶段	6	7.41%
博士阶段	4	4.94%
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Table 1. Overview of the participants.

The participants are mainly east Asian undergraduates, with only a few graduate students. Then we got results about participants' preferences of travel companions and destinations.

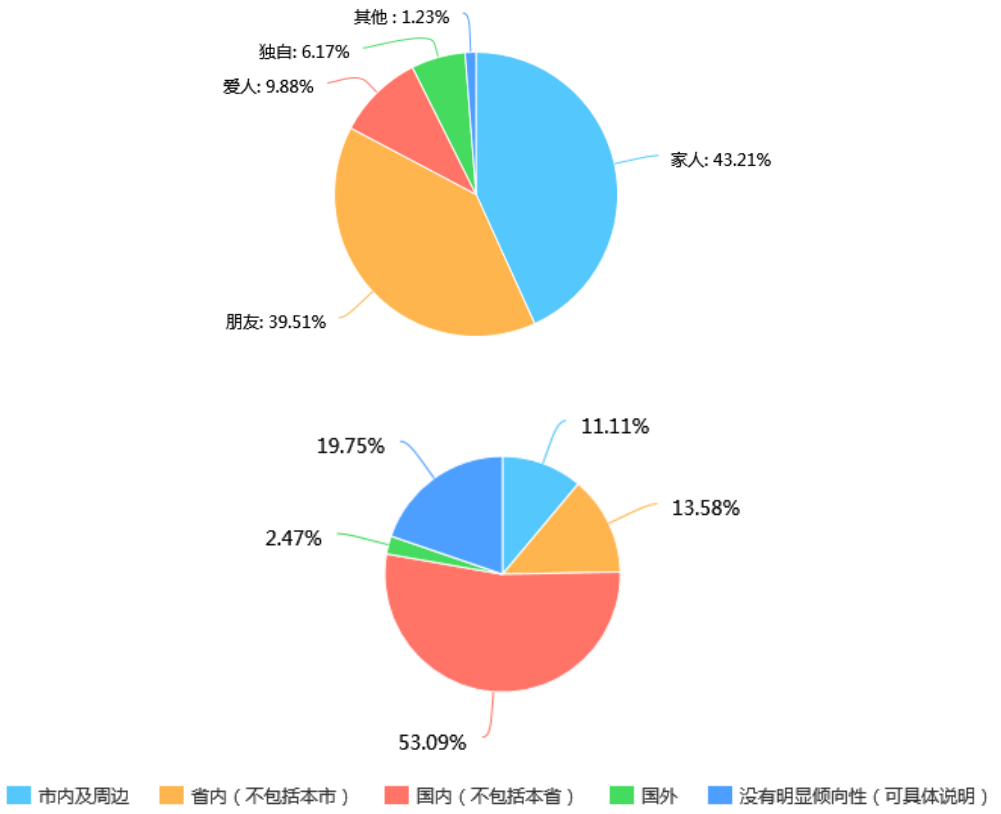

Figure 1. Preference of travel companions and destinations.

From the results we can get that mainly companions are friends and family, which fits our common sense. And the students mainly choose to travel home instead of

abroad. Then we got results about participants' ratings of some focused issues during travelling.

选项	平均综合得分
风景	6.19
食物	4.91
价格预算	4.49
安全性	4.27
文化	4.15
娱乐性	3.9
交通便利程度	3.58
其他	0.1

Table 2. Ratings of some focused issues during travelling.

The most focused issue is the scenery of the sites, and the other focused issues is related to human's basic demand.

选项	小计	比例
食物信息及排行推荐	65	80.25%
旅游景点信息	61	75.31%
各种住宿信息	66	81.48%
及时可以和某个小助手取得需要的沟通及联系	24	29.63%
在旅游过程中体验 VR, AR 等新型技术	5	6.17%
当地特色历史文化艺术介绍	34	41.98%
各种交通信息与路线规划	54	66.67%
其他	1	1.23%
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Table 3. Ratings of travelers' needed functions.

The results showed that the travelers still only wanted the basic demand of travel to be offered, but the experience related to new technology is not so popular.

Therefore, with the result of questionnaire, we can get some basic conclusions:

- Requirement can be divided into two categories: Sightseeing needs and Basic living needs.
- The differences in basic living needs like between food and shelter is not so obvious.
- New technology is not so attractive in travel alone but utilization of them in sightseeing and basic living needs is worth investigating.

3.3 Case Study

Subjects of our case study consists of 3 Chinese undergraduates, 1 Korean undergraduate and 1 Canadian master. The main feature of each participant is shown below:

1) Nationality: Canadian
   Sex: Male
   Age: 25
   Features:
   - Expenses are covered by himself
   - Mostly travel alone sometimes with girlfriends
   - Travel when free time is available and along the way home
   - Never use travel app and travel agents
   - Not plan so detailed, but careful about money
   - Value entertainment along the trip
2) Nationality: Korean (South)
   Sex: Female
   Age: 22
   Features:
   - Expenses from parents and part-time jobs
   - Choose destination with friends living there
   - Travel mostly with friends and few times with family
   - Value safety very much
   - Value entertainment along the trip
   - Never use travel app
   - Plan in detail
   - Use travel agents when with family
3) Nationality: Chinese
   Sex: Male
   Age: 22
   Features:
   - Value the travel companion
   - Not willing to get help if not convenient
   - Rely highly on map app
   - Search information in each period in travel
4) Nationality: Chinese
   Sex: Female

Age: 21

Features:

- Expenses from parents but not too much
- Value budget and entertainment along the trip
- Search the internet in advance to make arrangement
- Plan in detail and has little tolerance in change of plan except for weather and other hard reason
- Specially designed pamphlet will be read
- AR and VR with high quality information will be preferred

5) Nationality: Chinese

Sex: Female

Age: 20

Features:

- Expenses are sufficient from parents for basic consumption
- Value living condition and good arrangement along the trip
- Plan in detail but can accept modification of the trip
- Prefer a tight arrangement and has no tolerance in doing nothing
- Shopping is critical in travel mostly on clothes
- AR and VR with high quality information and not high cost will be preferred
- Prefer city with moderate prosperity and not too heavy population

From the specific interviews with participants, we can get some conclusions.

- Advanced plan plays an important role in the travel.
- Entertainment is highly valued.
- High technology experience alone is not attractive, preference depends on the quality of information and cost.
- Use of app and travel agents should be study separately according to type of users.

3.4 User Requirement Analysis Conclusion

From the above study, the interesting thing we noticed is the importance of advanced plan. The plan process can decide the following travel arrangement. So if we want our users to get access to the product or experience we design, we have to consider how can we caught their when they plan a travel.

Apart from that, the use of recent technology should be used in a right way. High quality information and resources are preferred. So we need to study what information and how to use them in multimodal travel to attract users.

The use of app and internet should be considered for product advertising. The target users and their preferred advertising form are worth study.

4. Prototype Design

A prototype is basically defined as a simulation or sample version of a final product, which is used for testing prior to launch. The goal of a prototype is to test products and product ideas before sinking lots of time and money into the final product. Making prototype can help resolving usability issues before launch, and also reveal areas that need improvement. After prior literature research and user study, we want to design a multimodal travel-plan system which can enhance user experience. The most straightforward way to test our system's performance is to watch users work with it.

There are many types of prototypes, for example:

- Single page vs. multipage with enough menus, screens, and click targets that the user can completely finish a task
- Realistic and detailed vs. hand-sketched on a piece of paper
- Interactive (clickable) vs. static (requiring a person to manipulate different pages and act as a "computer")

The fidelity of the prototype refers to how closely it matches the look-and-feel of the final system. Fidelity can vary in the areas of:

- Interactivity
- Visuals
- Content and commands

There is one general prototyping process: first Low-fidelity Prototyping, then High-fidelity Prototyping, and at last visualization by real coding and implementation. A Low-fidelity prototype brings core ideas and tests basic crucial elements early on. This means feedback can be incorporated before it gets too hard to make changes. Next, the High-fidelity prototype provides detailed feedback on something more closely resembling the final product.

4.1 Low-fidelity Prototype Construction

Based on our user study result, we construct our product aiming at helping university students to make their travel plans in advance. We noticed that our users value time and cost saving a lot. Besides, they usually do not expect extra and unnecessary interruptions during their travel. All of these make our pre-travel information presentation pretty important to them.

According to our questionnaire and case study results, we decide to focus on providing the following information-exploring functions to our users: tourist attractions and local food recommendation, routes planning, transportation and accommodation information, cultural and recreational introduction.

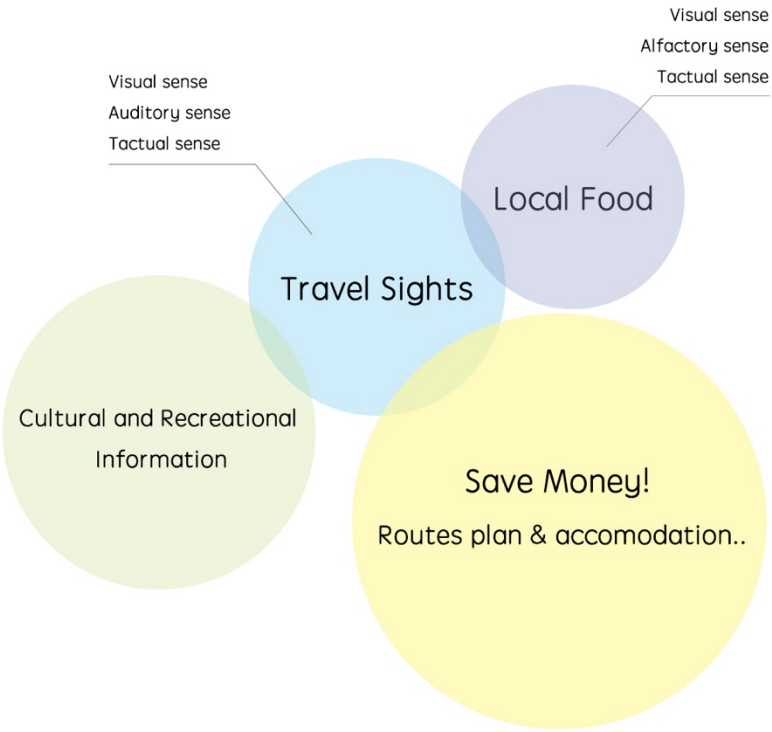

Figure 2. Lo-Fi prototype conception structure.

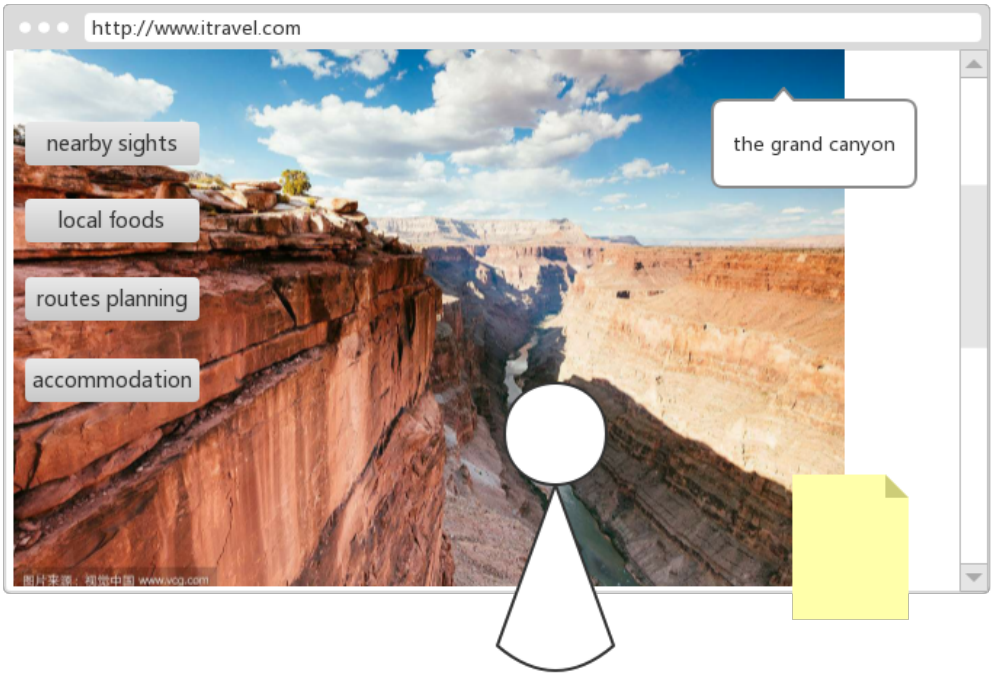

Figure 3. Lo-Fi prototype demonstration.

We also noticed a cultural difference in user preferences. In later prototype construction, we will consider providing differentiating services according to their nationalities or pre-surveying their travel preferences.

4.2 High-fidelity Prototype

4.2.1 Hi-Fi Prototype Plan

We will use Unity Platform to aid our AR design. As for multimodal senses that is hard for us to code in Unity, we will try to present them using real-world materials.

- Firstly, we will collect related materials (including words, pictures, food smells, sounds, and maybe the tactile surfaces of some objects) and design the basic information layout interfaces.
- Secondly, we will develop our AR project in Unity and visualize the integration of our multimodal senses.
- Thirdly, iteratively refine our project until it turns into a High-fidelity Prototype, and we can continue to conduct user study. We will probably make a demo video.

4.2.2 Methodology Elaboration and Environment Setup

First, before we started to prototype, we reconsidered Virtual Reality vs. Augmented Reality implementation.

a. VR has these features:

- Provide more immersion.
- Better at “creating” environment, and this is actually what we want here in our system design.
- Allow for distant cooperation, which is good for travel companions that are not together currently.

b. AR has these features:

- Augment the reality, which is better to use in scenes already exist, for example, during travel.
- Probably does not allow virtual cooperation.
- Limited Region of View.
- Natural language interaction is currently unsuccessful and embarrassing sometimes.

Considering all of the above, we chose to realize our system in VR. And we have our system environment set up in Unity as demonstrated below.

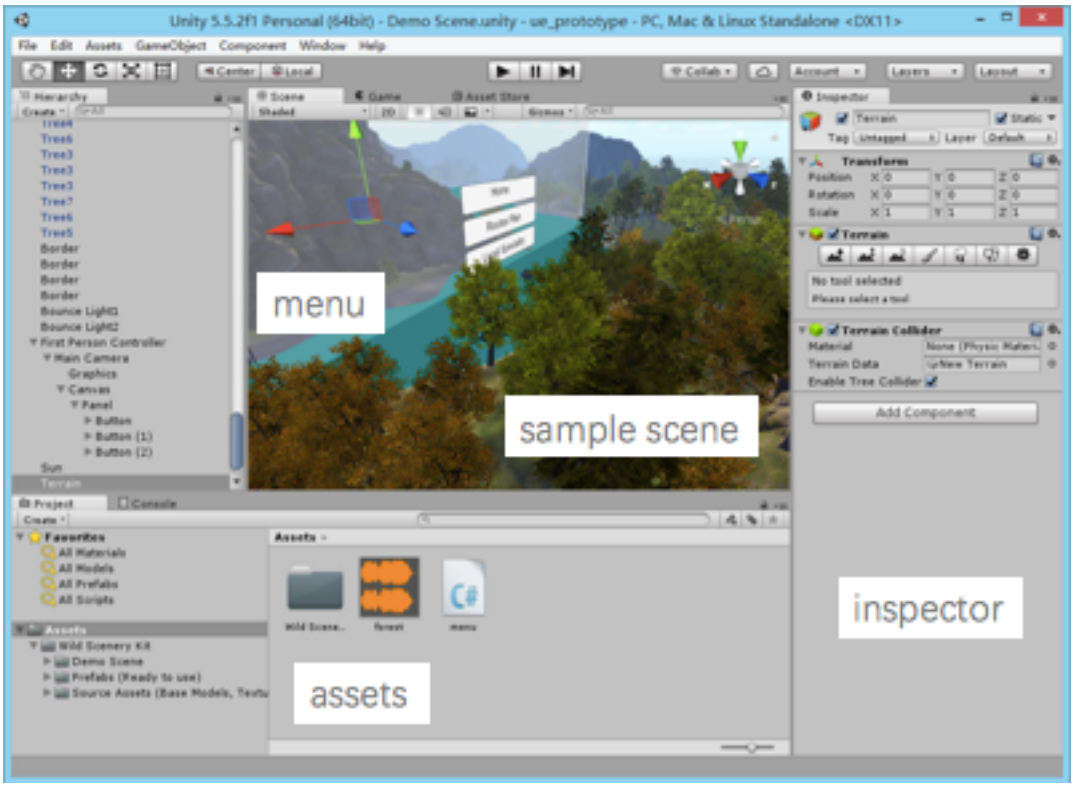

Figure 4. Environmental set-up in Unity.

4.2.3 Hi-Fi Prototype

We decided to realize our system with consideration of these sense channels: vision, hearing, olfactory and tactile. Our prototype is settled in a national park situation. Here we introduce birds singing and light music to provide listening experience, and use fragrance to simulate olfactory experience, and use hand controller to provide tactile sense to our participants.

Figure 5. System overview.

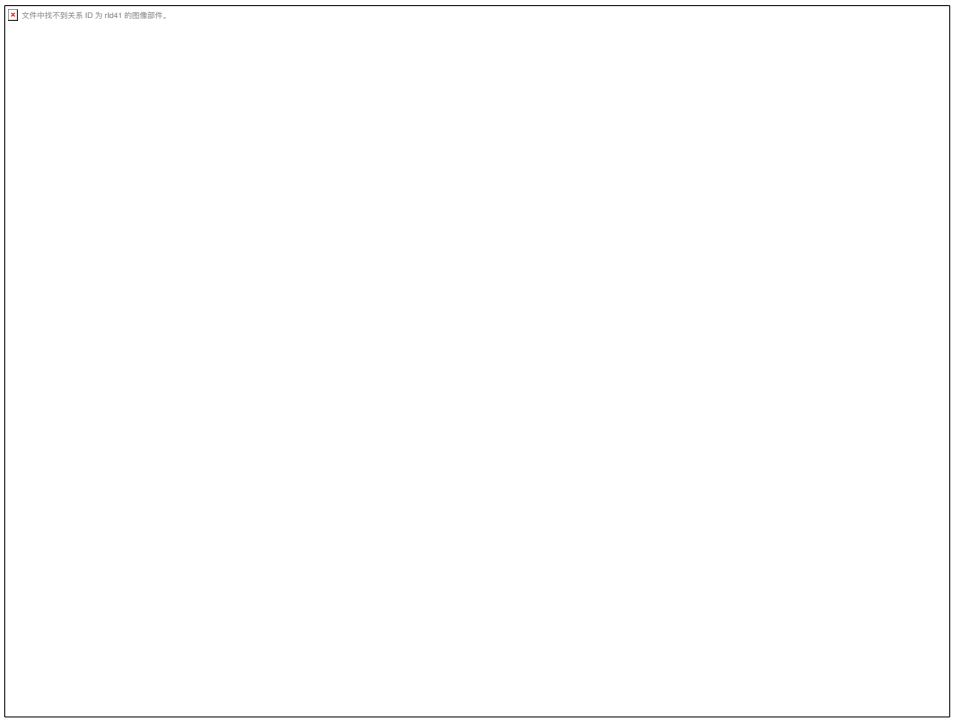

Figure 6. Snapshot of the prototype demo video.

5. User Test

Multi-sensory interaction system is different from other systems, and the biggest characteristic lies in its emphasis on the sensory involvement and integration. This requires that evaluating the system should fully consider the user subjective feelings and the being of sensory integration process of the user or not. Whether the effect of the information fusion is reached and whether the expected multisensory interactive experience is reached needs to be surveyed by subjectively feelings of the users who use the system.

5.1 Test Methodology

From the user's subjective experience, we can directly see the real experience brought about by the using of the system, so it is necessary to design a reasonable scale. In our study, we use the Self-reported Likert Scale to evaluate the UE during the experiment.

5.2 Scale Design

This UE Scale is designed based on the Likert Scale, which is a score-plus-total scale. For each statement, user can response in 5 types: “Very disagree”, “Disagree”, “Common”, “Agree”, “Very agree”. The detailed information of this scale is shown as follows:

ID	Statement/Question
1	Multi-sensory interaction system gives me a very comfortable experience.
2	I feel very real about the travel scene generated by Multi-sensory interactive system.
3	Multi-sensory interaction system is very interactive.
4	I feel natural when using the multi-sensory interaction system.
5	What multi-sensory interaction system feedbacks to me is very rich.
6	I smell fragrant when seeing the flowers.
7	I hear tweedle when seeing the birds.
8	You wish to get help from this system when planning a trip.
9	What other suggestion you have for this system?

Table 4. UE Scale.

5.3 Test Process

5.3.1 Subjects

4 male students and 4 female students, all of them are East Asian undergraduates.

5.3.2 Device

HTC Vive.

5.3.3 Task

Tasks are mainly exploratory task, in which users wear the device and experience the multi-sensory virtual scene. When they see the trees, the cloud, the rivers and the birds, they can hear the birds singing. And when they are closed to flowers, they can smell the fragrant provided by experimenter using perfume. The whole experience lasts about 10 minutes. After that, they are required to complete the UE scale and then finish this experiment.

5.4 Test Results

5.4.1 One-sample T Test

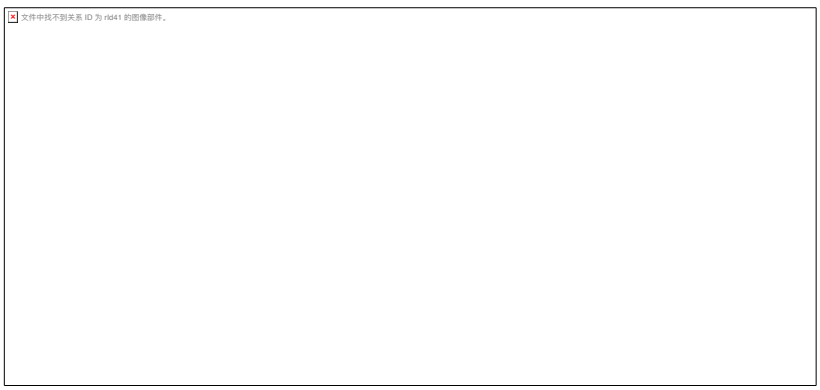

Table 5. One-sample T Test results.

5.4.2 Linear Regression

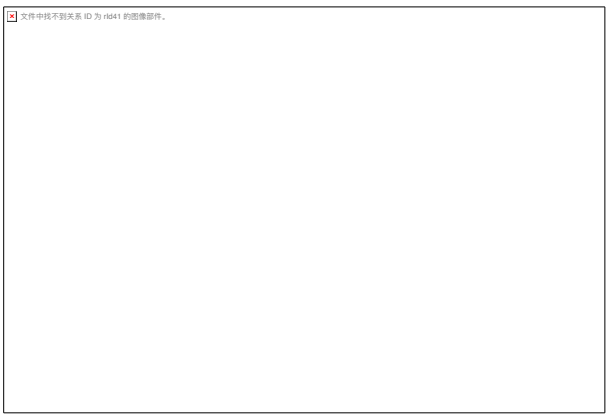

Table 6. Linear Regression results.

5.4.3 Conclusion

(1) From Table 5 we can see that the mean points of interaction and natural feelings are a little low, thus these two aspects should be improved firstly.

(2) From Table 6 we can see that preference of the product mainly depends on the feeling of reality, comfort and consistence of multi senses. So, when we design a real product, these aspects should be emphasized.

5.5 Comments of Users

5.5.1 Limitation

(1) Use of perfume to simulate flower scent does harm to the immersion. In this experiment we simply replace the floral scent by perfume, however, this can take a strange feeling to subjects. The fragrance of perfume is too concentrated and pure. It's a different feeling compared to natural flower scent. To tell the truth, it's a big problem for us to simulate the natural smells via artificial things. On the other hand, how to bring these smells into real product is also a problem.

(2) Lack of tactile feedback of material and temperature. Tactile feedback of material and temperature helps to build a better immersion feeling and to better understand the surrounding. However, in this experiment, the only tactile feedback is the haptic of the controller considering equipment and space, which has many limitations. It's impossible for users to touch a tree or feel the cool of a stream.

5.5.2 Situations to use this system

(1) Pick a destination through overall sight. Users express a desire to use this system when they are choosing the destination of a travel. Via this system, they can easily get an overall sight of this tourist pot and then decide whether to go here.

(2) Plan routes ahead to avoid getting lost. When we come to a new place, we're not familiar to it and is easy to get lost, which may influence our mood. After using this system, users not only can know more about the place in advance, but can also plan the route to view more interesting things.

6. Discussion & Conclusion

6.1 Discussion

Our project study aims to develop a multimodal system which helps East-Asian undergraduates with pre-travel plan. In order to create an immersion environment which is better to serve our purpose, we choose VR among so many multimodal technologies. VR has the strength over other technologies at building immersive feelings. AR is also one of our consideration when we design our project. But AR relies heavily on the real surroundings, and this feature prevents the our ideal further function, distant cooperation of travel companions exploring together. So we finally choose VR to help us develop our system.

From our user test result, we can find there's some points of our VR system we need to improve. The interaction and natural feelings need to be modified. These factors have a negative effect on immersion feelings of our system. This is because we didn't design the tactile feedback and changing of environment according to user's behavior which makes our scene more of a display or show than a real immersive environment. Apart from that, use of perfume to simulate fragrance is another debuff of immersive feeling. This is caused because perfume is concentrated which is not possible in the real natural environment.

Apart from the potential modifications of our VR system, feedback from users of situation to use this product is also inspiring. The primary purpose we design this product is to help target travelers to have an overall insight of the alternative sites then to learn about the style and other information of alternatives. The understanding is quite useful when picking one or some choices from all the alternatives. This is verified by users comments that they are willing to use our product to help with their pre-travel plan. What is surprised is that some users mentioned that they always encounter one kind of problem which might be solved with our product. Imagine the situation when you exit a subway station, face a crossroad or arrive near the destination, you may get confused which way or which direction to go. Users expect to use our system to preview surroundings of above mentioned situations, therefore, knowing what to do, where to go and so on. This preview can help them save plenty of time especially for those with weak sense of direction and lower the probability of getting lost. To distinguish these two kinds of preview, we refer the first kind to 'Sight Preview' with the second to 'Functional Preview'.

In the future, we can focus on two directions. Firstly, we still has plenty of work to do with our VR system. The interaction and senses like tactile and smelling still need to be developed for a better immersive feeling. Secondly, the functional preview is now only a concept with scene-building and user test to be execute. We need to study users' preferences in this use situation before finally release an usable product.

6.2 Conclusion

After the system building, user test and further discussion, we can conclude that the primary purpose of our design can be satisfied by our system. Our system has its

strength in pre-travel plan to help travelers obtain an overall impression of alternative destinations then helps with their decision-making. But certain aspects of our VR system still need to be improved to gain a product with better user experience. The interaction and senses of tactile and smelling will be targeted in our next step.

Our product shows a potential in the situation of functional preview. To help travelers know some relative direction and position information before getting to the real place can save travel time and lower the chance of getting lost. Further system details and experiments can be designed based on this theory in the future.

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8. Appendix

Questionnaire 1

大学生旅游习惯偏好调查

第 1 题　你的年级是　[单选题]

选项	小计	比例
大一	18	21.95%
大二	11	13.41%
大三	21	25.61%
大四	22	26.83%
研究生阶段	6	7.32%
博士阶段	4	4.88%
本题有效填写人次	82	

第 2 题　你平均一年会旅游几次？　[单选题]

选项	小计	比例
一次	25	30.49%
两次	39	47.56%
三次	8	9.76%
四次及以上	10	12.2%
本题有效填写人次	82	

第 3 题　你一般跟谁去旅游？　[单选题]

选项	小计	比例
家人	36	43.9%
朋友	32	39.02%

爱人	8	9.76%
独自	5	6.1%
其他	1	1.22%
本题有效填写人次	82	

第 4 题　你最经常选择哪种旅游地点？　[单选题]

选项	小计	比例
市内及周边	9	10.98%
省内（不包括本市）	11	13.41%
国内（不包括本省）	44	53.66%
国外	2	2.44%
没有明显倾向性（可具体说明）	16	19.51%
本题有效填写人次	82	

第 5 题　你在选择旅游景点时会重视哪些方面？请根据重要程度排序。　[排序题]

选项	平均综合得分	
风景	6.21	
食物	4.85	
价格预算	4.5	
安全性	4.3	
文化	4.1	
娱乐性	3.93	
交通便利程度	3.54	
其他	0.1	

第 6 题　你会经常使用穷游等旅游 app 吗？　[单选题]

选项	小计	比例
会	27	32.93%
不会	55	67.07%
本题有效填写人次	82	

第 7 题　如果经常使用，你会在旅游的哪些阶段使用 app 呢？　[多选题]

选项	小计	比例
行程开始前	26	96.3%
旅游过程中	21	77.78%
结束旅行后	2	7.41%
平时不旅游时也会不定期看一看	8	29.63%
本题有效填写人次	27	

第 8 题　如果不使用旅行 app，你倾向从什么渠道得到旅游信息？　[多选题]

选项	小计	比例
听别人介绍	29	52.73%
网页搜索	37	67.27%
线下宣传册	1	1.82%
我就是任性喜欢说走就走的旅行	21	38.18%
其他	3	5.45%
本题有效填写人次	55	

第 9 题　如果邀请你参加定制化旅行服务，你会期待从哪些方面提供服务？　[多选题]

选项	小计	比例
食物信息及排行推荐	65	79.27%

旅游景点信息	62	75.61%
各种住宿信息	67	81.71%
及时可以和某个小助手取得需要的沟通及联系	24	29.27%
在旅游过程中体验 VR, AR 等新型技术	6	7.32%
当地特色历史文化艺术介绍	34	41.46%
各种交通信息与路线规划	55	67.07%
其他	1	1.22%
本题有效填写人次	82	

Questionnaire 2

基于里克特量表的多感官交互用户体验问卷

问卷说明：本卷基于里克特量表（一种评分加总式量表）设计而成，每种陈述有“非常同意”“同意”“不一定”“不同意”“非常不同意”五种回答，分别记为 5、4、3、2、1 分，经过相同主题题目的总分之和，可以表明被试在该问题上持有一种什么样的态度、这种态度的强度有多少。

问卷内容：

1. 多感官交互系统给我很舒服的体验。
2. 多感官交互系统生成的旅游场景我感觉很真实。
3. 多感官交互系统的交互性很强。
4. 我使用多感官交互系统感觉很自然。
5. 多感官交互系统反馈给我的内容很丰富。
6. 我看到***的时候同时闻到了***香。
7. 我看到***的时候同时听到了***声。
8. 你希望在进行旅游规划时能够得到这种系统的帮助。
9. （选答，填空题）对于此系统，你还有什么建议？

（***代表根据实验内容具体确定）

Data Table is as below:

Experience	Reality	Interaction	Natural	Content	Frag_Consis	Sou_Consis	Prefer
3	4	1	2	4	5	5	5
4	4	3	4	3	4	5	3
5	4	3	4	5	5	5	5
4	3	4	3	3	5	5	4
4	4	2	3	4	5	5	5
4	3	3	3	4	5	5	5
4	4	3	4	4	5	5	5
4	3	2	3	3	4	5	4