

# HCI Design of Technological Products for Eco-tourism

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**Abstract.** With the travel industry entering the experience economy era, improving tourism experience has become more important than ever. Technology is a good tool to improve traveling in ways such as weather predicting or tour guiding. However, the environment of eco-tourism is different from the general using environment of traditional tourism. Therefore, in order to apply technological products to eco-tourism, this paper proposes some HCI design suggestion from the perspective of UX like usability, information architecture and interaction design. We define two main design target groups as ‘Normal tourists’ and ‘Narrators’. Expert system can be applied to the illustrating system for normal tourists while narrators need only a clear view of the system to make sure they find out the information of species they already know to give information to tourists.

**Keywords:** eco-tourism, expert system, the UX.

## 1 Introduction

With the advancement in technology, associated products have been gradually applied to tourism guiding, including eco-tourism. However, the using environment and requirements of eco-tourism guiding are quite different from those of normal tourism. Once we decide to apply technology products to the field of eco-tourism, the user experience (UX) about HCI like usability, information architecture, and interaction design should be re-designed to adapt to the user behavior in the particular environment of eco-tourism.

Therefore, proposing some HCI design suggestions from the perspective of UX to apply technological products (tablet computer, in the case of our research) to eco-tourism and improve traveling experience is the purpose of this research.

## 2 Tourism Trends and Technology Application

The management model of the traveling industry is inevitably modified by the revolution of technology. Technology such as GIS has been widely applied to tourism to

improve traveling experience. However, users still have to interact with technology through hardware and software interface. Thus, it is necessary to realize how and when these technological products work before we use it.

## **2.1 Tourism Trends and Eco-tourism**

Travel and tourism are among the world's fastest growing industries and are the major source of foreign exchange earnings for many developing countries. At the mean time, eco-tourism has been growing rapidly over the last decades(Wood, 2002). With the rise of individual traveling, travelers began to focus on personal feelings and travel experience, rather than simply travel. The structure of tourism, therefore, has been changed(Kelly, 1998; Yeoryios et al,2003). The term eco-tourism emerged in the late 1980s as a direct result of the world's acknowledgment and reaction to sustainable practices and global ecological practices. In these instances, the natural-based element of holiday activities together with the increased awareness to minimize the 'antagonistic' impacts of tourism on the environment (which is the boundless consumption of environmental resources) contributed to the demand for ecotourism holidays (Diamantis, 1999). This demand was also boosted by concrete evidence that consumers had shifted away from mass tourism towards experiences that were more individualistic and enriching. ( Buhalis, 2003)

Besides the growing of eco-tourism, the travel industry is entering the experience economy era. Therefore, the issue of connecting and applying technology to create a wonderful tourism experience has become significant.

## **2.2 GIS and GPS Technologies Application**

Information is the lifeblood of traveling, so the effective use of ITs(information technology) is pivotal. Unlike durable goods, intangible tourism services cannot be physically displayed or inspected at the point of sale before purchasing( Buhalis, 1998). Thus, to provide clear information before tourism and allow users to receive information they need immediately during their journey is very important for a tourism experience.

Widely applied to many fields, GIS(Graphic Information System) can be used in tourism as a decision supporting tool for sustainable tourism planning, impact assessment, visitor flow management, and tourism site selection(Rahman, 2010). In addition to GIS, GPS technology is also used in guiding. If we can apply these two technology to eco-tourism appropriately, it would become a good user experience for information searching.

## **2.3 Applications of Expert System**

Expert Systems (ESs) are designed to support users in their decision making process. One of the most important features of an ES is the capability to make automated inference and reasoning.(Finnaca etc., 2014) An expert system is divided into two sub-systems: the inference engine and the knowledge base. The knowledge base

represents facts and rules. The inference engine applies the rules to the known facts to deduce new facts. There are primarily two modes for an inference engine: forward chaining and backward chaining. The different approaches are dictated by whether the inference engine is being driven by the antecedent or the consequent of the rule (Wikipedia, 2014). For applying eco-tourism to a normal tourist, the system interface should be designed as simple as possible. The inference engine and interface design of Akinator the Genie, a popular application of smart phone, is a good example to refer to. Through a simple interface of five buttons (Yes/No/Don't know/Probably Yes/Probably not), the inference engine can lead users to the answer from asking only a few questions. If we can provide an expert system application like Akinator the Genie for self-guiding tourists of eco-tourism, chances are they can get information of species immediately once they meet that creature from describing its appearance to the system.

### 3 Methods

From the perspective of UX, this paper will investigate both human factors (usability) and user interface (information architecture and interaction design) with the 4D (Discover, Define, Develop and Deliver) service design procedure. The experiment was held in Sun-Link-Sea Natural Park in Taiwan, and divided into three stages.

During the first stage, a pair of researchers worked on participant observation for demand searching. One of them accosted tourists randomly and made conversation as a participant, and took notes of the conversation while the other one just observed and took pictures in the distance as an observer. After the process, group members shared the cases, analyzed and turned them into specific demands.

In the second stage we invited 6 participants to experience eco-tourism, and discuss the necessity of those demands we defined after they experienced in reality.

Finally by the last stage, we held a workshop, designed a prototype with focus group and proposed some HCI design suggestions.

### 4 Results

We defined two main design target groups as 'Normal tourists' and 'Narrators' according to the difference in using demands of tablet computers. From the interview with participants, we realize that on the human factors side, the portability and readability under bright light are important because the eco-tourism is an outdoor and dynamic activity. Subjects believe that 7'-8' inches screen size are best for carrying and still have enough size for visual experiences. Besides, normal tourists usually use their tablet computers on tourist sites or during way-finding only. Narrators, on the other hand need to operate their tablet computers frequently and turn it over to show information to tourists, so they prefer to have the hardware as wearable products.

## 5 Conclusions

On the operating interface side, the interaction design will be influenced by the dynamic habitation of the living creature. Upon meeting a creature, well-trained narrators are capable of identifying it, so all they need is a reasonable path to search through the system and a clear view of information sectors to make sure that they can demonstrate the information immediately(Fig. 1.). Fig. 2. shows the interaction design and visual presentation of the system. Users can look up information of species with taxonomy or define their own custom way of searching. Besides, users can go back to any sector by touching the icon or nodes of the path shown on top of the block. Information of species that users usually use can be tagged as 'favorite', those information will be in a shortcut folder which users can open it immediately. Species that may occur will list on the right side of the screen through GPS.

For normal tourists, however, it is difficult to find the information through expert system when they meet an unfamiliar creature, so we recommend an illustration system combining ES and GPS technology for better and more accurate searching behavior(Fig. 3.). The system will ask questions about species characteristic that users meet on the block in Fig. 4., users can answer them through buttons under the block. After interaction with inference engine by few questions, users will be led to information of species which they meet. Progressing bar on the right side of the block can tell how close users are from the answer(information of species). Species that may occur will also list on the right side of the screen through GPS.

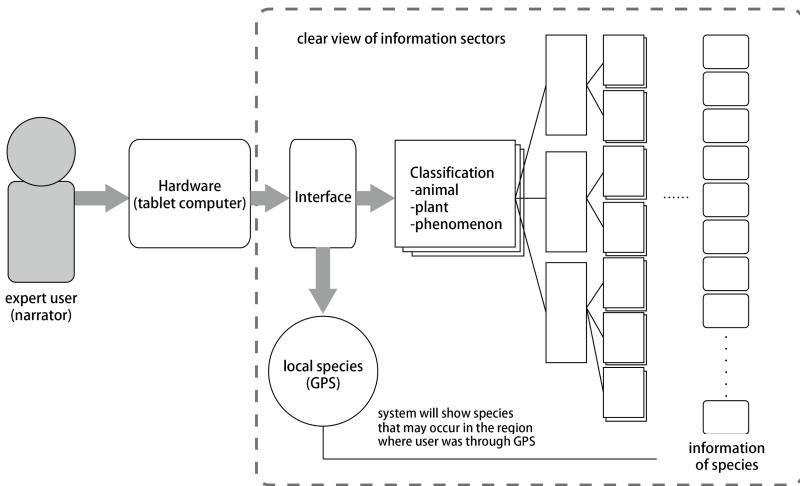
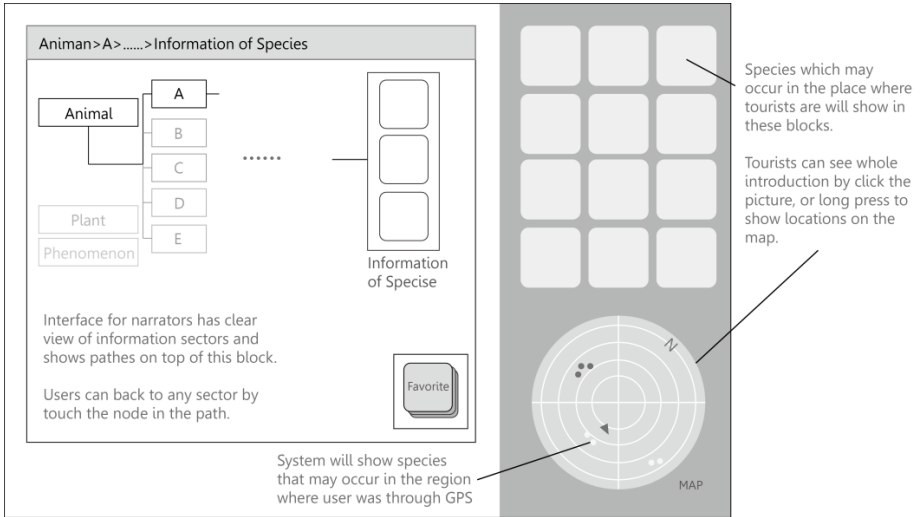
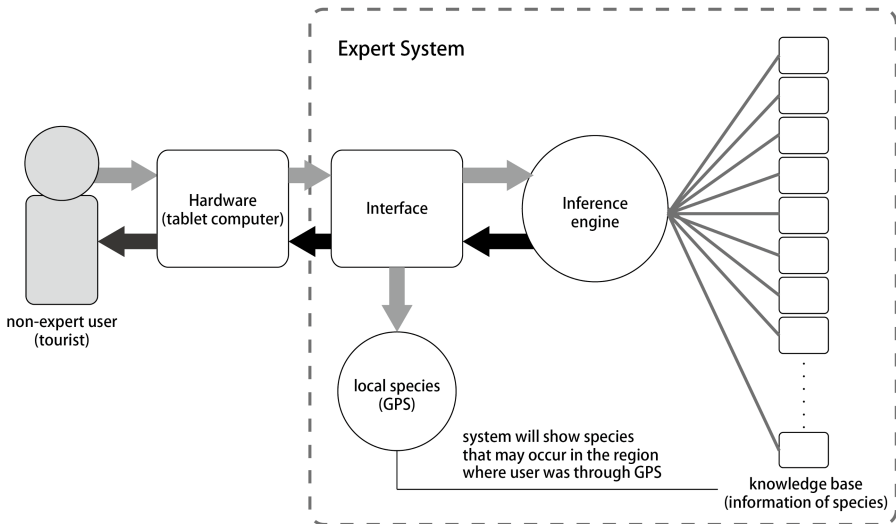


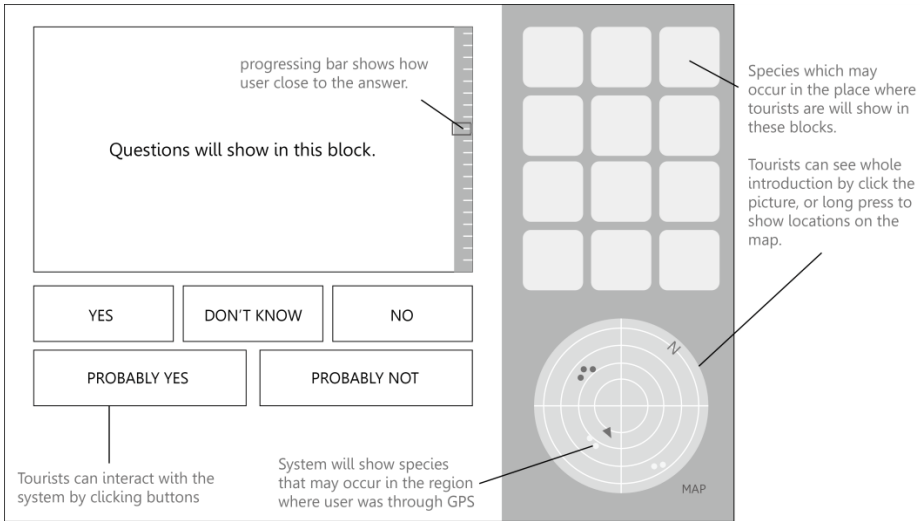
Fig. 1. Information architecture of the illustrating system for narrators



**Fig. 2.** Interaction design and visual presentation with clear view of sectors for narrators



**Fig. 3.** Information architecture of the illustrating system with ES for normal tourists



**Fig. 4.** Interaction design and visual presentation with ES for normal tourists

**Acknowledgement.** This study received financial support from the National Science Council of the Republic of China Government, under Grant No. NSC 102-2410-H-224-029.

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