Surprise Trips: A System to Augment the Natural Experience of Exploration

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ABSTRACT
Little treasures in nature often go unnoticed by visitors when roaming about in a national park. Ubiquitous technology with its less intrusive character may be apt to enhance this natural experience of exploration. In this paper, we report on a system that augments this experience. It builds on the theme of surprises as well as utilizing physical icons both as representation of users' interests and as notification tokens to alert users when they are within proximity of a surprise. We developed mock-up prototypes and a video prototype to do brief evaluations with target users. The evaluation shows that the concept is viable and deserves further development. Additionally, our focus on the users' interests and what they may consider to be of value to them is noteworthy and deserves further attention when designing ubiquitous technology for outdoor experiences.

Author Keywords Outdoor experience, natural exploration, physical icons, ubiquitous computing, human values.

ACM Classification Keywords H5.2. [Information interfaces and presentation]: User Interfaces.

General Terms Design, Experimentation, Human Factors.

INTRODUCTION

Enjoying nature is a popular activity for many in Denmark. Yet, for others venturing in nature alone as a form of entertainment or pastime may seem unattractive – especially for the younger generations. They may even find it boring. Likewise, current nature lovers may miss out on opportunities to experience the little joys of nature – little treasures hidden behind a tree or around the corner behind a hill go unnoticed. Our aim is therefore to (1) enhance the nature experience of the people already going to national parks, (2) focus on their interests and what they may consider to be of value to them, and (3) to attract more people through the interactive offerings we propose. With the latter we especially focus on targeting teenagers and young families as potential new visitors of national parks.

The newly formed Danish national parks are an interesting application domain for our design as they are in very active development and have attracted media attention due to the start-up phase they are in. Furthermore, the national park situation in Denmark is quite unique as they are less restrictive and more open by also being a place to live.

The design of "Surprise Trips" draws heavily from existing practices we observed and experienced at guided tours in the Mols Bjerge national park in Denmark. We draw specifically from the fact that finding little treasures (e.g. flowers) along the path and telling stories (e.g. folk tales) at interesting locations of the tour was a common and well-received diversion from the rest of the tour. We build on the observation of finding things by chance and try to imitate and enhance this kind of experience with our design.

Furthermore, we introduce the element of surprise. Attractions and adventures shall not always be known in advance, but can take form along a planned or unplanned tour through a national park. Our design is thus guided by the theme: "Finding treasures without searching for them."

Ubiquitous technology, with its less intrusive character, may help to keep technology in the background and avoid distracting the users from the actual nature experience. Through this, our system exhibits a rich interaction model, which is also well integrated into the environment of use.

In the following we present the system that imitates and augments the experience of exploration in.

KEY CONCEPTS

With "Surprise Trips", users follow their own route through the national park as to their liking (planned or unplanned, guided or individual). Along the tour, they pick up one or more physical artifacts, which represent areas of interest – interests users might consider being of value to them. Along the tour, these "interests", as we coined the artifacts, notify users when a surprise is in proximity to their current location and guide users to the exact surprise location. The concept consists of the following two key elements.

Discovering Surprises within Proximity

In order to build on the theme of discovering surprises by chance rather than knowing them in advance, we use a notification mechanism. Users carrying the "interests" get notified through audio, visual and/or tactile feedback (e.g. beeping, buzzing, flashing or vibration) when a surprise is within a radius of 100 meters of the user's current location. To guide the user to the location of the surprise, we use the audio, visual and/or tactile signaling, which will get stronger or weaker (e.g. louder, faster or brighter and vice versa) as the user moves into the direction of the surprise. Here, we aim at an interaction inspired by a compass and a dowsing rod, which people might be familiar with. As the user reaches the location of the surprise the signaling stops,

suggesting that the user is at the destination. The user should then be able to see the surprise but has to find and identify it on his or her own from there. Take note that this interaction technique has some learning effort involved.

The surprises themselves are points of interest (POIs) categorized into or tagged with areas of interest. They are not accessible by any user as a whole (e.g. visualized on a map). A surprise can be comprised of as little as a geographical location and an interest category attached to it. At the surprise location the user would find some kind of treasure. The treasure could be some interesting natural feature (e.g. an interesting plant, an animal habitat), an interesting story, a nice view, an interactive game, multimedia content and/or historical/cultural information about that location. The actual content delivery (e.g. of professional content) is outside the scope of the initial concept, but could be realized via fixed devices in the physical environment, via the users' mobile phones or the "interests" themselves (e.g. a talking princess doll). The location of surprises, and the treasure to be found there, can either be contributed by other users through a system for tagging interesting places or created professionally by the national park administration or other stakeholders in the park. Similarly, surprises can be both ephemeral (only available for a short time period) and long-lasting.

"Interests": Physical Artifacts with Digital Properties

Interests are physical artifacts users pick up at some starting point of their tour and attach to their backpack, hold in their hand or put around their wrist or neck. Through their strong symbolic characteristics, they represent categories of interest for the user such as orchids and flowers, rare birds and other animals, history, stories and fairy tales, romantic places, scenery, adventures, sportive and playful activities and so on. Yet, the user does not know the concrete category an interest represents. The user thus also does not know the kinds of surprises that are waiting for her or him. Interests can for example have the shape and appearance of a princess doll, a football, a flower, a stuffed bird and so on.

ARCHITECTURE AND IMPLEMENTATION

For implementation, we propose a system design that consists of two parts: a platform for content creation and delivery and the "interests" as user notification tokens (see Figure 1).

Content Delivery Platform

The content delivery platform (CDP) is mainly responsible for content creation and delivery and consists of a surprise database (S-DB) and a location-tagging application (LTA).

At the point of sale, the CDP pushes a local snapshot of the S-DB filtered by the user's current geographic area and the interest category (e.g. flowers, birds, history) to the "interest" to initialize it with relevant surprises in the area (e.g. via Bluetooth). Furthermore, the CDP can provide (professional) content via 3G networking to capable interests, the user's mobile phone or fixed devices placed in the physical environment (e.g. public displays or terminals).
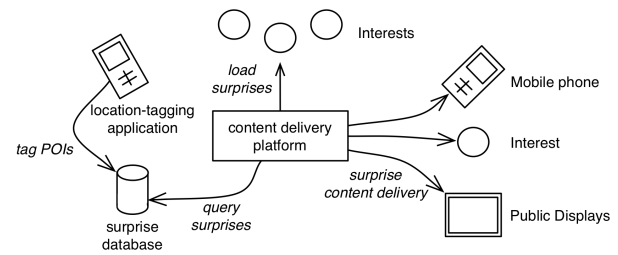

Figure 1. Surprise Trips - Architecture.

The surprises in the S-DB can either originate from professional data sources or can be user-contributed through the external LTA, where users can tag interesting places in the national park. The interest categories are identified through tags the user provides for that very place.

Interests

The "interests" are made out of wood or plastic (preferably natural material), but can also be stuffed animals or dolls. They are intended to be cheap, light, the right size to be held in hand, and attachable to backpacks and/or wrists.

Common to all interests is the technology embedded in them: a GPS module to get the current position, a digital compass to get the orientation, actuators for notification and signaling (audio, light and/or vibration), Bluetooth to receive the surprise snapshot, a controller chip, flash memory and a battery. The interest compares its current position with surprises in the database snapshot and notifies and guides the user to the surprise using GPS and compass. More capable interests may have 3G networking and a speaker or display to receive and output richer content.

DISCUSSION AND CONCLUSION

In this paper, we introduced "Surprise Trips" – a system augmenting the natural experience of exploration in national parks. We build the system on the two key concepts of discovering surprises within proximity and "interests" as physical notification tokens. While similar systems do exist such as Ambient Wood [2], which focuses on engaging children in a learning experience in outdoor environments – our approach focuses on the notion of bringing users' interests and values to national parks using ubiquitous technologies. First evaluations of the system with users were conducted using (1) a wizard of oz method [1] where a mobile phone was put inside a stuffed doll to simulate notifications and content playback as well as (2) a video prototype showing the overall interaction concept of the system. The evaluations showed that the concept in general is viable and that our focus on the users' interests and values is interesting and deserves further attention.

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