

Good Times?! Playful Aspects of Location-based Experience Capture

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ABSTRACT

In this paper, we elaborate in the context of the MOCA-TOUR project how ‘fun or playfulness’ can be incorporated into our ongoing work on location-based experience capture systems. These systems allow the digital annotation of any location, where the annotation is able to reflect some aspects of a person’s experience of that location. We discuss in detail what playful experiences are, how they can be captured and measured. We conclude with three design considerations for incorporating playful aspects into experience capture systems: a) experiences can be approached as information or interaction b) incentive mechanisms can be mediators of fun and engagement, and c) measuring experiences requires a balance in testing methodology choice.

Categories and Subject Descriptors

H.5.2 [User Interfaces]: Evaluation/methodology, User-centered design; H.5.1 [Multimedia Information Systems]: Artificial, augmented, and virtual realities

General Terms

Human Factors

Keywords

Playful experiences, experience capture, location-based, fun, media content

1. INTRODUCTION

On a sunny afternoon in mid-July, Nicole and Nick are tourists shopping around Nejme Square in downtown Beirut, Lebanon. While Nick insists on seeing the cultural offerings of Saifi Village, a village completely rebuilt as a New Urbanist-style neighborhood after its destruction during the civil war, Nicole has a different notion of what is fun and enjoyable. Familiar with her interests in warm, foreign cities, Nicole’s mobile device sets her to experience ‘fun’ places nearby, suggesting several lively cafés along the Corniche, a seaside walkway with a glittering view of the Mediterranean. Skeptical about the suggestion, she makes a pre-defined gesture instructing her device to show her different media (photos, songs, videos, text) that reflect people’s experiences there. The device presents her with a dizzying nexus of visual and musical perspectives captured by people enjoying themselves, complementing each media item with



Figure 1: A mockup illustrating the photo Nicole took of the Corniche seaside and the corresponding annotations she added.

related past and future events. Leaving Nick, she makes her way toward the Corniche until she reaches a café, where she sits outdoors, happily absorbing the scorching sun rays. Wondering where Nick went, she decides to capture her current experience. She takes a photo of the clear blue sky and sea (Fig. 1), which she annotates with the song by The Cure ‘Play for Today’ and writes: “That’s New Urbanist-style culture too!!” While she awaits her hookah and drink, she scans through other people’s experiences at the café she is at, only to realize the place attracts mainly an older crowd, which is no fun at all.

The preceding scenario illustrates ongoing work within the MOCATOUR¹ (Mobile Cultural Access for Tourists) project. The aim of the project is to define computational methods that facilitate tourists with contextualized and media-based access to information while they freely explore a city. To realize the system that Nicole in the above scenario uses, we need intelligent mobile tools that are not only aware of people’s past experiences, but also the relationships between their experiences and the location they took place at. To achieve this, we utilize location-based experience capture technologies. These technologies allow people to create media expressions (photos, text, video, audio, etc.) that are anchored to a place, which can be received/perceived and interpreted by recipients by being at (approximately) the same place where the expression was made (*cf.*, Nicole’s photo portrait in the above scenario made at the café on the Corniche). The underlying assumption is that the media expressions created at a location are able to reflect aspects of a person’s experience at that location [11].

Given the above scenario, how can a system ‘know’ what

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¹<http://mocatour.wordpress.com>

fun or playful experiences² are, in general and idiosyncratically as in Nicole’s case of not enjoying older crowds? What kind of contextual elements can be automatically acquired (e.g., date, time, place) to infer playful experiences, and are these contextual elements rich enough to disambiguate the meaning of a user’s activity, with and beyond interaction with the system [4]? Should playful experiences be used as information that the system makes use of (as in Nicole’s device), or should fun be understood as an enjoyable open-ended interaction dialogue between a human and machine [2]? If the latter, what kind of mechanisms need to be in place to ensure that not only the information presented is ‘about’ fun and playful experiences, but the human-machine interaction is itself an enjoyable experience? If fun and enjoyable experiences can indeed be predicted and catered for, how can this be measured?

Below we will try to address the above questions, where the rest of this paper is structured as follows: first, we provide definitions for an experience in general and a playful experience in particular (Section 2). Next, we briefly describe our ongoing work with an experience-based prototype that allows capturing experiences into different media forms and briefly discuss the feedback responses provided by study participants (Section 3). Then, we briefly highlight common methodological problems that arise when measuring experiences of people when mobile (Section 4). Finally, we wrap up the discussion by drawing three design considerations for designing playful experiences in location-based systems (Section 5) followed by final conclusions (Section 6).

2. WHAT IS A PLAYFUL EXPERIENCE?

We distinguish between an experience as a process and an experience as a memory, where playful experiences are a subset of both. We define an experience process (based on [7]) as a sensory and perceptual process that some person undergoes (either through direct participation or observation of events and situations) that results in a change in that person. The high variability and subjective interpretation in predicting an experiential process indicates that it is useful to retrospectively capture a given experience; in other words, to consider the memory of an experience.

Based on Tulving’s definition of an episodic memory [10], we define an experience memory as the result of an experiential process, which can be manipulated and actively recalled. The memory of an experience consists of one or more actors, a spatiotemporal context, a social context, a cognitive context (that includes causal aspects), and an affective context. The experiential contexts constitute the different aspects of an experience memory, that together form a useful framework for studying experience capture.

A playful experience, when understood as a process, is characterized by amusement, risk, challenge, flow, tension, and/or negative affect [3, 8]. However, only amusement, which is an affective reaction to a ‘playful’ activity, is a sufficient condition for playful experiences. While we do not fully agree with [2] that a playful experience is non-utilitarian (as playful experiences serve a practical goal of making one feel better and real learning in kids), we do agree that playfulness is largely based on how an activity is approached, rather than an essential property of the activity itself. While this indicates that playfulness is a mental state brought forth by

²Throughout this paper, we will use the concepts of fun and playfulness interchangeably.

users to an activity, this does not mean that playful interactions cannot be anticipated for particular user groups and explicitly designed for.

Perhaps the most common elicitors of playful experiences are games (e.g., board games, video games), where most games tend to be challenging, create tension, a sense of flow, induce positive and negative affect, and elicit amusement. However, something like The World’s Deepest Bin³, a bin that makes an elongated sound to indicate depth when someone throws something in it, only elicits brief amusement. Nevertheless, interacting with the bin qualifies as a playful experience because it elicits amusement. What characteristics of playful experiences (e.g., tension, amusement) are to be elicited in users depends largely on the purpose of the system: is the system designed to carry out tasks that are useful or serious (e.g., a navigation tool, a hazardous smell detector), or is it meant to entertain (e.g., a location-based game, a virtual storyteller)? While these two types of system functionality are not mutually exclusive, they can serve as useful indicators for designing playfulness.

In the context of location-based experience capture, we make the distinction between playfulness as a post-hoc representation (*cf.*, experience memory) and playfulness as interaction (*cf.*, experience process). To illustrate, the kind of playfulness that Nicole’s mobile system affords is retrospective, where the system representation of experiences is composed of a collection of past, personal and publicized media-based experiences that have been annotated as ‘fun’. While this representational vehicle (the media presentation of experiences) subserves the subsequent experiential process that Nicole undergoes when sitting down at the seaside café, this process is no longer within the scope of Nicole’s interaction with the system [5]. This happens despite that causally, the system representation is what brought her to have the experience at the seaside café in the first place.

However, the situation changes when Nicole consults her device at the café: the system’s presentation of an older crowd, mistaken about Nicole’s notion of fun, has now interfered with and altered her current joyful experience. This unanticipated system response can be seen as a flaw when explicitly designing playful human-mobile interactions, where ‘playfulness’ is scoped only between the interaction possibilities that rest between the user and the system.

3. CAPTURING EXPERIENCES

To better understand location-based experience capture behavior, we field tested a prototype application that allows the annotation of locations using three different media types: text, drawing, and photos. A user can create a free drawing using touch-based input, typed text, or snapped photographs, where the media item is fixed at the position and orientation of the user at the time of creation. These media-based annotations create a digital memory snapshot of the user’s experience.

Anyone with the application installed on their multimedia-enabled mobile device and is at the same place where the media expression was created can view the expression. Here, a user is presented with a camera-view, where the anchored media expression appears as an Augmented Reality (AR) overlay on top of the camera view. The user is guided to

³One of several initiatives taken by Volkswagen to improve people’s behavior: <http://www.thefuntheory.com/worlds-deepest-bin-0>, last retrieved on 10 May, 2010.

wards an expression by means of an on-screen indicator arrow. The location-based aspect of anchoring an expression to a location is assumed to allow more meaningful communication of the media expression when it comes with a spatiotemporal context, where this context provides an initial contextualization of a person’s original experience.

In recent work (submitted and under review), we evaluated the prototype in a pilot study where we used an ethnographic interview method to measure users’ experience capture behavior in a natural setting. After briefly explaining what the prototype does, we let subjects (N=4) create expressions in all three supported media types (drawings, text, photo).

We found that when subjects made drawings, they were only fun digital augmentations on the physical environment. For example, one subject reported: “*Well that [‘Dancer in the Dark’ poster] is a poster that I enjoy looking at a lot when I’m drinking, and I always wondered about the frame, so I wanted to draw lines around it, but to do it freely. Doesn’t have a purpose but it looks nice.*” For the textual annotations, we found that subjects used the application to recommend items in the environment, to alert others about something, or to simply express themselves.

When subjects were later asked about their overall experience with the prototype, they all reported that it was fun and useful to share textual annotations (such as recommendations) and photos that capture people’s presence at a location to private and public networks. However, they saw doodling over the environment only fun, but not useful. This indicated that an incentive mechanism (e.g., [9]) that motivates users to use the application was needed, and to further ensure that they perceived the application as not only fun, but useful.

4. MEASURING EXPERIENCES

Finding an appropriate testing methodology to understand playful experiences that can unlock suitable interaction methods in a location-based setting poses a real challenge. This challenge is amplified by the difficulty in probing into the inner subjectivity of the cognitive and emotional lives of people while on the move. Attempts at providing quantitative and qualitative metrics of game experience have already been taken in [8], where they used biomarkers (EEG recordings, EMG recordings, etc.), behavioral indicators (button pressure responses, human postural and gait measures), and the Game Experience Questionnaire (GEQ) to measure the gaming experience. Such metrics however are difficult to generalize to a mobile environment, where the user is constantly moving. Challenges to location-based experience capture have been discussed in [6], where two of them, the risk of over-measurement and under-measurement, warrant recapitulation here. While these considerations are fairly general, we recap them here to underscore the importance of choosing the right testing methods for measuring experiences in a mobile environment.

Over-measurement can occur when a user is left to freely use an experience-based application while on the move. Without informed understanding of what *kind* of data is being collected, extraction of meaning from the continuous flux of data (e.g., interaction history logs) proceeds in an ad hoc manner, and thus risks a loss in interpretation and quality of drawn implications. Consider Nicole’s complex behavior in the introductory scenario, where she initially accepted

the seaside walkway recommendation from her device, but retracted the recommendation later in light of new information about the café she is at. Without being explicitly informed about what kinds of media she, or people like her, find enjoyable and fun, it would not be possible for a system to adequately adapt to her needs. This indicates that interaction behavior should be constrained to a small number of measurable units that provide (partial) immunity from the unpredictable nature of unsupervised human-technology interaction. Without minimal supervision exerted on testing conditions during system evaluation and early development, there should be no reason to believe that the elicited knowledge is trustworthy enough to solicit informed understanding and design of user-centered location-based behavior.

At the other end of the spectrum, rigorously controlled laboratory testing can result in ‘under-measurement’, where the main problems are: 1) testing is confined to the walls of the laboratory. This means that ‘natural’, mobile behavior is by necessity beyond the scope of the method. 2) only a handful of experiential variables can be measured. This is due to the complexity and error-proneness of developing multidimensional designs that can properly incorporate several independent variables and tease out the possible effects on the dependent variables of interest. Together, these problems make controlled laboratory testing, by itself, insufficient for measuring location-based playful experiences. In short, measuring experiences in general and playful experiences in particular requires a more holistic approach, one that is amenable to the subjective nuances of everyday human cognition and affect.

5. DESIGN CONSIDERATIONS

Given the above, we consider three design issues that should be taken into account when designing playful experiences in location-based systems:

1. Experience Information vs. Interaction: As stated in Section 2, a distinction can be made between an experience representation, which is information ‘about’ an experience, and the experience itself, which is a process emergent from an undertaken activity. This highlights the difference in focus between capturing experiences and eliciting experiences. For capturing experiences, the aim is to provide an adequate representation of any experience that took place, of which playful experiences are an instance. This requires a computational method for annotating the media-based experience representations with the right kind of information (e.g., affective information about the degree of fun had) for later intelligent retrieval (*cf.*, Nicole’s device suggesting fun places nearby given her request of fun things to do).

For eliciting experiences, the aim is to subject users to conditions that would strongly correlate to (if not cause) a desired *type* of experience (e.g., experiencing trust when interacting with a system). The concern here is not about which contextual elements are supported so as to sufficiently re-contextualize the experience of others, but rather about the scoped playful interaction between the user(s) and the system, where the user experience takes place during the interaction process itself. For example, the act of shaking a mobile device to indicate a change in preference for presented location recommendations can itself be a playful experience. One way of enhancing the playful experience would be to provide the right kind of multimodal input and

output support [1]. For example, labeling a media expression (e.g., a photo) by means of textual input (*cf.*, Sec. 3) might be more intrusive and interruptive of a playful experience, whereas a voice command of ‘fun’ that achieves the same function can occasion a more seamless interaction experience.

2. Incentive Mechanisms as Mediators of Playfulness: We mentioned in Section 3 that our pilot study subjects had reported that their interaction with the experience capture prototype for doodling was fun but not useful. This led us to consider that, at least for location-based experience capture systems, users require an incentive to interact with the system that transcends merely playful interaction. In other words, the fun things such as tension and challenge, risk and unpredictability, positive and negative affect, have to be deliberately embedded in the interaction process. However, the fun aspects should be secondary to the user task of documenting and sharing experiences. In short, system functionality and use should be treated as first-class citizens.

However, this raises an important issue of whether the user should be made aware of the real goal of the performed task (i.e., task transparency), and in what domains does it actually matter to apply such persuasive techniques. For example, implicit ambient light feedback is a useful mechanism to unobtrusively indicate excess electricity consumption during the day. One possible approach in the context of location-based experience capture is to utilize game-theoretic approaches [9] to create competitive game-like environments that persuade users to perform a given task, such as tagging or rating people’s captured experiences. This would not only motivate users to collaboratively rank the generated content, but given the competitive element, would make the experience of doing so fun and engaging.

3. Balancing Testing Methodologies when Measuring Playfulness: Measuring fun and playfulness is by now a well-known slippery endeavor [2]. As mentioned in Section 4, the difficulty arises in deciding to test users in a natural setting, where objective experiential data is hard to acquire. At the other extreme, controlled testing permits objective measurement at the cost of narrowing explanatory scope. While there is no clear prescription for the most effective approach to evaluating location-based playful experiences, it is likely that a gradual progression from unconstrained to controlled testing in the course of application design and development is an effective means to measure experience. More concretely, during early design stages, outdoor testing of mobile users can help yield design implications that help narrow down the set of observable phenomena to a few variables, which can then be experimentally teased out in a more controlled environment.

6. CONCLUSIONS

In looking at what playful experiences are, how they can be captured, elicited and measured, we have underscored problems concerning the scientific study of playful experiences in a mobile environment. As highlighted in the introductory scenario, there are a myriad of cognitive and affective factors intermixed with the system interaction that are difficult to experimentally and computationally disentangle. This makes it difficult for a system to automatically acquire the

right kind of experiential information (e.g., media tagged or rated as fun that corresponds to how fun an experience was) and to intelligently retrieve this information in the right situation (*cf.*, Nicole’s desire to experience something fun), while at the same time ensuring that interaction with and cognitive processing of this information is itself enjoyable.

Nevertheless, we have highlighted three design considerations (information versus interaction, incentive mechanisms, balancing methodologies) that together serve as general pointers for designing playful experiences in a mobile environment. To what extent it is possible to design a system that carries out the task of capturing experiences while making the experience of capture itself fun and enjoyable remains an open question.

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