Exploring Seasonality in Mobile Cultural Heritage

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ABSTRACT

We present results of an investigation into the role of seasonality in mobile cultural heritage applications. 45 participants in 26 groups used one of two applications when visiting the Finnish recreational island of Seurasaari. Each provided summer and winter content, but varied in how this was presented. We uncovered how users consider seasonality in content, seasonal preferences, as well as how different media becomes more or less interesting if shown in or out of season. We present design considerations for future researchers to consider seasonality in cultural heritage applications.

Author Keywords

Cultural Heritage; Seasonality; Location-Based Interaction; Mixed Reality; Outdoor Heritage Site; Open-Air Museum

ACM Classification Keywords

H.5.1 Multimedia Information Systems: Artificial, augmented, and virtual realities; H.5.2 User Interfaces: Auditory (non-speech) feedback, Prototyping

INTRODUCTION AND BACKGROUND

Recently, there has been increasing study into the digital augmentation of outdoor cultural heritage sites. Such work focuses on communicating the lived experience - how people, their activities and events from the past can be experienced by visitors in the present. Although research has focused on a range cultural heritage sites [7, 8, 6, 11, 12, 1], work often uses similar techniques, with digital content geo-located in specific areas of a site, and accessed *in-situ* via a device the user carries or wears (such as a smartphone [7]) [10, 15, 2].

Commonality in solutions is largely due to the identified importance of fitting digital content into the environmental context [3, 4]. As noted by Smith [14]: *"heritage is not the historic monument, archaeological site, or museum artefact, but rather the activities that occur at them"*. Without considering such fit (both spatially and semantically), the relationship between digital and physical can be confusing, unconvincing or lost (e.g. GPS errors showing content in the wrong place).

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Figure 1. Left: An overview of the island, illustrating key features. Map image ©OpenStreetMap contributors. Right: The festival grounds in winter and summer, illustrating the significant seasonal variation.

Whilst work has considered how to fit content to the physical environment, there has been little consideration of how dynamic changes in that environment should affect content. For example, the environment and activities at McGookin *et al's* rural Roman hill fort [7] and Ciolfi and McLoughlins' open-air museum of 19th century life [2] would change significantly between summer and winter. However, they did not consider how digital content should change in response. Only O'Keefe *et al.* [9], in their framework on location-based storytelling, briefly discuss the 'volatility' of the environment, suggesting different stories should be used in summer and winter. However, they provide no study of this. Switching digital content to reflect seasons is a practical solution. However, such changes in a site are also part of its cultural heritage. Visitors may only visit a site once, so would gain no understanding of how it changes over a year.

There is a lack of research on how to both incorporate and reflect such seasonality to visitors. More importantly, we know nothing of how visitors would wish to consider it. Should only the current season be presented? Would visitors want to access out of season content, and if so, how? We take a first step in this by studying a seasonally enabled cultural heritage application for the Finnish island of Seurasaari.

SEURASAARI ISLAND

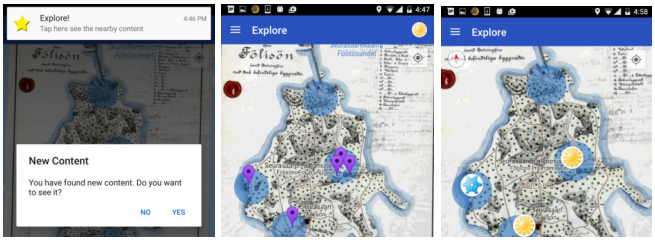
Located in central Helsinki, Finland, Seurasaari Island was founded as a recreational park in the 1800's. It is permanently open and free. It is significant in both natural and cultural heritage, mostly forested, and a habitat for a wide range of wildlife. The park has significant cultural heritage itself, with buildings dating from its founding as a park that house a cafe and restaurant, as well as the boathouse used by visitors to reach the island by steamboat before a bridge was built in the 1970's. In addition, the island contains an open-air museum, with traditional buildings (such as a farm, church) relocated from other parts of Finland. Whilst the museum grounds are part of the park, entering the buildings requires an entrance fee. The island is popular with both locals and tourists, and has significant seasonal variation. Temperatures usually vary between -20 to +20 °C between winter and summer, and daylight can vary by a maximum of 12 hours. Activities taking place in summer (such as numerous folk dancing and music events, and the major midsummer celebrations) are very different in winter (with fewer events and a generally quieter feel) (see Figure 1). The impact of seasonality is also found in the cultural history of the island. For example, steamboats to ferry passengers to the island couldn't run in winter, so a bridge across the frozen sea was laid.

EXPLORE

We worked with Seurasaarisäätiö [5] - who manage the island - to develop a mobile Android 'app' to support understanding Seurasaari's cultural heritage during a visit. During discussions, the importance of seasonality was highlighted, as was the 'app' avoiding distraction from the environment, and supporting free exploration of the island, rather than constraining visitors to a tour route (e.g. [6]).

Our final design, called Explore, primarily augmented 6 areas (see Figure 1) - although some content was placed outside these. Images and videos from the foundation's archive (both with text descriptions), as well as audio vignets describing something about the activities of a place, were geo-located at relevant locations in each area. Each content item was triggered as a user walked within 10-30m (determined via GPS). A standard Android notification (using a custom sound, vibration and icon) was presented (so the device screen did not need to be on). A dialog was also presented when the screen was turned on (see Figure 2 (A)). Responding to the notification presented the content, which was also marked on a map for later access (Figure 2 (B and C)).

To explore seasonality two sets of content were created. One represented a summer perspective (current season - since the study was run in summer), and another that represented a winter perspective (other season). Two variants of Explore were created to present these. Explore Switchable (ES) allowed participants to explicitly select between content sets via an icon on the app's toolbar (see Figure 2 (B)). Only content in the selected season could be discovered or viewed, but users could switch between the two at any time. The default was set to summer. Explore Combined (EC) made both winter and summer content available at all times. I.e. both content sets were treated as one. Different icons and notification sounds



(A) (B) (C)

Figure 2. Cropped screenshots illustrating both variants of Explore. A: A notification and dialog were presented when new content was found. B: The map view for Explore Switchable, note the icon in the toolbar to change seasons. C: The map view for Explore Combined. Note the different icons used to indicate seen winter and summer content.

were used to indicate which season content was from (see Figure 2 (C)). Our objective with both Explore versions was to encourage participants to consider how they would wish to consider seasonality, rather than designing one as a 'best' option. Explore Switchable (closest to the proposal of O'Keefe *et al.* [9]), allows users to focus on only one season (including the current one), whilst Explore Combined illustrates the differences between the seasons as a primary feature.

STUDY DESIGN

Our study ran over 5 days in June 2016. 45 participants (aged 15-79, mean 44.7 years, 24 female) in 26 groups (10 individuals, 11 groups of two, 4 groups of three and 1 group of four) took part. 10 groups were composed of locals, 15 were composed of tourists (either Finnish or Foreign), 1 was a mixture. Each participant received a movie ticket or Moomin mug (∼11 Euro) as compensation. We recruited groups as they arrived on the island via the bridge (see Figure 1). Participants completed a consent form and questionnaire. Each group was given an Android smartphone running one version of Explore. 11 used Explore Combined and 16 Explore Switchable (further discussed in Explicit Seasonal Changes). As participants often focus on the screen if the device is carried in the hand [10], each had a lanyard so it could be worn around the neck. Groups could use Explore as much or little as they wanted. Devices were collected as each group left the island at the end of their visit, and an interview conducted.

RESULTS

Group interviews were transcribed and coded using a framework approach [13], with differences between the two versions and views on season content used as initial codes. These were supplemented with on-device interaction logs.

Overall Use

Visit length was similar in both versions but varied widely between participants, reflecting the different purposes and time constraints of their visit (Explore Switchable (ES) M=108min S.D.=78min, Explore Combined (EC) M=107min, S.D.=53min). Tourists focused on the open-air museum area, either leaving afterwards but more often exploring another part of the island. Locals mostly came for a particular purpose (e.g. to walk around the coast). Whilst they walked through the open-air museum grounds (as it lies on the main path) they did not visit the buildings.

Groups stated they visited areas they already intended to visit. Explore did not change those plans, rather it helped inform participants of interesting content in those areas. The majority of groups used the lanyard, and participants only interacted with the device as a result of notifications. On average there was one interaction per group that was not the result of a notification. Most notifications were responded to ((ES) M=74.2%, (EC) M=87.6%). Common reasons for not responding included talking to someone else in the group or being engaged in another activity. Participants agreed that they felt their focus was on the environment (ES M=2.4 S.D.=1.3, EC M=2.9 S.D.=1.5, 7-point Likert), and were neutral to slightly disagree that the device distracted them from the environment (ES M=4.7 S.D.=1.6, EC M=4.4 S.D.=1.8). Whilst participants often did respond to notifications, they did not feel under pressure to do so.

Explicit Seasonal Changes

The first 12 Explore Switchable groups had summer as the default season (ESs). However, interaction logs showed only 2 groups changed season, so most saw no winter content. To investigate why we ran the final 4 groups with winter as the default season (ESw) (which is why the number of ES and EC groups is different). Only 6 of the 16 Explore Switchable groups changed season (a total of 10 season change events), 4 of these to summer from a winter default. Two main reasons for participants not switching seasons were identified.

Firstly, participants forgot about the ability to switch seasons. As interaction was driven by the notifications, it was easy to miss the opportunity to switch. However, participants often regretted not having done so. PG8 (ESs): *"I completely forgot about it and that was a pity because I thought I would have enjoyed it"*. PG4 (ESs): *"To be honest, I completely forgot. In retrospect, it bothers me. I should have looked at the winter photos too."*.

Secondly, was the preference for the content of a particular season. Overall this was for summer, as this best fitted the current environment: PG9 (ESs):*"no, we kept it on summer because we figured that was where we were"*. Two groups using the summer default versions tried winter for a short time but soon switched back, whilst 3 of the 4 groups who started with a default of winter either immediately changed or ended in summer. PG25 (ESw):*"I changed it to summer because it is summer"*. The overall view of these participants was that content should be season appropriate. PG9 (ESs): *"the idea was to keep it on summer because that's where we were and that people came in winter would put on winter."*. Although a minority, the opposite view was also expressed, where participants changed to winter because it was different. PG1 (ESs): *"I think that the more interesting thing is that it is different so it is winter. For me"*.

Related to this were perceived issues that trying to view more than one season would cause, encouraging a preference. For example, PG5 (ESs) felt he did not have enough time to view winter as well: *"If I would have much more time, why not."*, and wanted to avoid having too much content to view *"not too overflowing with all the information at once, so I just do summer"*. PG21 (ESs) noted they avoided switching as they didn't want interaction with the device to distract from the environment: *"we just want more to experience the nature, we don't want to play with the phone all the time"*.

Explore Combined Use

In comparison to Explore Switchable, Explore Combined raised relatively few comments. The majority of participants had no issue in distinguishing between summer and winter content, even though these were mixed. The variation in notification sounds was found to be effective. PG2 (ES): *"You almost heard it already from the sounds. Once you got the notification.... It became obvious through that."*. Other participants didn't need to rely on the notification sounds, finding that the content itself was obvious once viewed. PG19 (ES): *"when we realised that the images are -...- different, what plays during winter and summer"*. However, a small number did find mixing seasonal content confusing. PG3 (ES): *"It was actually a bit confusing. I was wondering why it shows winter... until (daughter's name) said that maybe its nice for some tourists to know how it looks like in the winter."*.

Some participants found notifications to be too frequent, in comparison to Explore Switchable participants who did not raise the issue. Due to all content being available, Explore Combined participants received more notifications (EC M=42.9, S.D.=17, ES M=31.3, S.D.=15). However, the impact of this is disproportionate, as some areas have a high amount of both winter and summer content (e.g. the open-air museum area - see Figure 1), whilst others (such as the festival grounds - see Figure 1) have more summer than winter content. This meant that in some places combining content led to a small increase in notifications, where in other areas combining seasons led to a significant increase. For some participants this resulted in the device requiring too much attention. PG3 (EC) *"maybe since the places the app played had something to show, they were quite concentrated... ... now it was maybe a bit too much info at the same time"*.

Viewing Out of Season Content

As Explore Switchable participants often didn't switch seasons, the majority of out of season viewing came from using Explore Combined. Such content often enhanced participants' understanding of the island. One member of PG14 (EC), who were tourists, noted how his assumptions about winter had been changed by Explore: *"when it is weather like today you can't even imagine, oh in winter it's cold and nobody on the island. It was interesting that people come in winter here to walk through the island. I thought it's closed and nobody is here."*. This view also extended to locals. PG12 (EC): *"I found it interesting because I don't usually visit Seurasaari, and when I do it's usually summer. So I don't get to see the place during winter."*. Visitors found this new perspective enhanced their visit, and to some extent supported the feeling of exploring in winter. PG23 (ESw), with two tourists, used the Switchable version in winter mode: *P1: "We saw winter the whole time.. ... It was fascinating. I mean we liked the photos, it was nice to - again, that's where it said this is 20 to 30 degrees below in winter." Interviewer: "did it make you feel somehow, help you to feel like winter or -". P2: "Yeah". P1:"Definitely"*. In this way out of season content

supported some understanding of how the island changed for participants that could not visit in multiple seasons.

Impact of Media Type

The type of media presented also impacted the value of out of season content. In particular, images that showed the current scene participants could see, but from a winter perspective, were always highlighted as interesting, showing the difference between the seasons. PG7 (EC): *"I was by these buildings that were used to store hay, I think, and the image showed that in the winter people would attach straw to the roofs so birds could eat it. I thought that helped me understand the role of the building better"*. In contrast, images of the current scene participants could see, but from a summer perspective, were often uninteresting. PG7 (EC):*"If I'm looking at something in the summer I probably don't need to see a picture of it in the summer as well"*. This perspective on images was in contrast to audio recordings, where the summer recordings often enhanced the current view of participants, where winter recordings could jar. For example, a person describing taking part in a winter activity, and what it was like, was seen as odd in comparison to a similar recording of a summer activity.

Seasonal Preferences

In considering their preference between winter and summer content, responses were evenly split between two alternatives: current season and opposite season. Current season participants wanted content that fitted the current environment. PG19 (EC):*"probably the summer would have been more interesting since it's the summer now."*. However, participants did not want to exclude winter content altogether, rather limit it to a few key aspects to highlight variations. PG16 (EC): *"more of the summer things but yeah. Picture or two of winter it's not bad ..... 'cause it's like now and I'm visiting the island now"*. This adds to the discussion by Explore Switchable participants on why they stayed in summer, and reflects the importance of a close integration between the physical environment and digital content from prior work [3, 4].

Conversely, opposite season participants wanted more winter content as this was different to the current season. PG12 (EC): *"Maybe winter, because winter I don't get to see it at all."*. There were more comments from Explore Combined than Explore Switchable participants towards opposite seasons. As Explore Switchable participants often didn't switch seasons this is not surprising. But it may be that until visitors view out of season content, they don't see a value in it. The one group PG23 (ESw) who did use the Switchable version in winter noted their preference as: *"it was nice to have winter. Cause it added a different dimension. If we were here in winter it'd be nice to know about the summer."*.

DISCUSSION

We have uncovered new insight into how visitors consider seasonality in outdoor cultural heritage applications. Our discussion focuses around a set of design considerations that should be considered when incorporating seasonality.

There is value in showing out of season content. The importance of congruency between digital content and the environment, highlighted from prior work [3, 4], would argue content should reflect the current season. Yet, participants found out of season content often to be more engaging and interesting, offering new insight and deeper understanding to the heritage of the island. Some Explore Combined participants would have preferred out of season content to be the default option. However, out of season content may be most useful when it highlights the difference between the seasons. Whilst content relevant to the current season is a valuable default, relevant out of season content should also be presented. Though this should avoid overloading users with content.

Participants might need to be provoked to view out of season content. Explore Switchable participants only viewed summer (current) season content, even when winter was set as default season. Without being exposed to out of season content (as Explore Combined participants were) they failed to see value in viewing it, with a clear preference Explore should reflect the current season. Participants may therefore need to be provoked to view out of season content before seeing its value. How best to do this remains an open question.

Content should be tailored based on being in or out of season. Images of summer scenes that participants could currently see were often described as uninteresting, whilst winter images from the same perspective were discussed as being most interesting. Similarly, audio media that described activities in winter jarred with participants when presented in summer. We would expect a similar issue with such content presented in winter. Content needs to be tailored differently when it is presented in, and out of, season.

FUTURE WORK AND CONCLUSIONS

Although there is a lack of work considering seasonality in cultural heritage, that work argues content should fit to the current season [9]. However we found how visitors value and interpret seasonality is much richer. Both versions of Explore supported visitors to think about seasonality, yet neither can be considered as a good final solution. Our goal was primarily to understand how users thought about seasonality using a relatively well understood existing technique to augment cultural heritage sites, rather than try to design without that understanding. As our study was run in summer, we do not know if the preference for current season content would be the same if we ran the study in winter. Would participants want to 'escape' to a summer perspective? More widely, how different should seasons be before it is valuable to incorporate that difference? Our variation was more defined than many sites, and in some ways more predictable (summer is usually warm, and winter is usually cold), supporting a fairly low fidelity (two season) representation. However sites may also change more dynamically or less predictably. By incorporating our findings into new approaches to combine winter and summer content, and studying these in places with different seasonal variations, we will further explore and inspire the use of seasonality in outdoor cultural heritage applications.

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