

Automics: Souvenir Generating Photoware for Theme Parks

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ABSTRACT

Automics is a photo-souvenir service which utilises mobile devices to support the capture, sharing and annotation of digital images amongst groups of visitors to theme parks. The prototype service mixes individual and group photo-capture with existing in-park, on-ride photo services, to allow users to create printed photo-stories. Herein we discuss initial fieldwork in theme parks that grounded the design of Automics, our development of the service prototype, and its real-world evaluation with theme park visitors. We relate our findings on user experience of the service to a literature on mobile photoware, finding implications for the design of souvenir services.

Author Keywords

Souvenir, photoware, theme park, tourism

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI)

General Terms

Design, Human Factors.

INTRODUCTION

Digital media and photographs in particular have been of interest to the HCI community for a number of years [6]. Photography has been traditionally understood as a means for creating an impression of a moment in time and integral to practices of memory and reflection [20]. The affordances of digital media along with developments in capture and display technology [20] invite new research questions about the relationship that everyday consumers may have towards photos and photoware [1, 21] and open up interesting avenues for interaction design research.

A related area of interest within the field is in leisure practices and touristic visiting, two activities that connect to photography [2]. A recent line of inquiry considers new developments in mobile technology and their potential support for leisure and visiting. HCI researchers have considered the development and use of mobile photoware [1, 18], exploring how photo-capture and sharing enhances group experiences in mobile contexts [3, 17]. This has been

seen for example in city visiting [13], rally spectating [7, 17], and, with regards mobile-*videoware*, nightclub visiting and VJing [5]. Prototype systems such as Mobiphos [13] and mGroup [17] allow the instant mobile sharing of images within a defined group. The mGroup system further enables the creation of Media Stories. These combine photo-related media and user-generated annotations in narrative threads. The authors of the two systems report ways in which they enhance the co-present social experience of visiting, with mGroup's Stories being made available afterwards as 'albums'. However, the way in which the two systems serve to support souvenir generation from visiting was not the analytical focus of the studies; and the significance that users placed on the souvenir-function was arguably under-explored.

Souvenir creation in theme parks

Our current research investigates souvenir creation in the context of visiting a theme park. Theme park settings have been little considered in the HCI literature (cf. [14, 19]), and we aim to contribute a novel set of insights in this respect whilst building on extant work on photo-related technology support for leisure and visiting. Underpinning our studies is a rationale that souvenir-making is often integral to the concept of media capture [9] and the theme park is a prominent leisure destination in which digital photography comes to the fore as a souvenir mechanism. Theme parks are also particularly intriguing to us as a 'photo-ecology', that is, a specific context in which photography is accomplished [11]. Many theme parks partner with third-party companies to provide on-ride photo (and video) capture, affording visitors access to otherwise inaccessible photo opportunities. However, given the rise in mobile photoware [1], increasing numbers of theme park visitors are to be found carrying their own media capture devices. This makes for a rich mix of digital media capture technologies in the park that is both personal and park-provided. To date, there has been no consideration in HCI or related literatures of how these diverse capture systems, *personal* and *professional*, may be meaningfully integrated in the making and delivery of souvenir products.

Theme parks are of further interest because of the social practices that they invoke. The first visit to a theme park or first 'big-ticket' ride is, for many people, a rite-of-passage event [8] and an experience that visitors want to mark for posterity with a souvenir. Theme parks are not just sites of isolated experience, they are commonly visited by groups [4]. Previous HCI studies of visiting have shown that the

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group dynamics of visiting shape how people wish to 'capture' and reflect on their visit [13, 17]. Further to this, recent studies on digital photography (building on a legacy of earlier research [6, 12]) elaborate complex roles played by photographers and their audiences during photo sharing and display [21]. But the negotiation of group concerns pertaining to other aspects of 'photowork' [10] (including triaging, editing and storing) remains relatively under-explored. It is evident that much photo practice is shaped by the context or 'photo-ecology' in which it occurs [11]. Indeed, the particular socio-technological features of a theme park setting present scope for extending reported understandings on a broad set of photowork concerns.

In this paper, we provide an exploration of souvenir generation in theme parks. Our research combines social scientific and technology design orientations. We begin with an ethnographically-informed account of visitor experiences relating to souvenirs. We then discuss how this study informed the design and development of a prototype 'souvenir service' (a set of integrated, supportive mechanisms) called Automics, which was based on the concept of creating and delivering photo-souvenirs combining personal and park-generated media. We then describe an 'in-the-wild' deployment and evaluation of the prototype. Our empirical work aimed to explore a new form of souvenir service but also contribute to the literatures outlined above, advancing understanding of social practices in relation to photos. As such, we illuminate the theme park as a photo-ecology and explore the intersection of digital media and group activities of capture and representation.

UNDERSTANDING CURRENT SOUVENIR PRACTICES

We began with a study of visitors' current photo practices at Alton Towers, a major UK theme park that is well known for its 'thrill rides' set among extensive gardens. Of particular relevance here is the presence of two professional 'souvenir services' at the park. The Picsolve system takes photographs during a ride and offers these for sale as mounted prints at a kiosk at the ride exit. The system is optimised to take a high quality image 'that no one else can capture' and to make it available, packaged with ride branding, within minutes – it is not possible to buy the picture later on. The YourDay system captures video from major rides, mixing this with stock footage to compile a personal DVD for purchase (RFID wristbands track visitors through the rides). Neither system covers the many smaller rides and other attractions around the park.

We recruited three groups of friends or families with varied ages and intra-group social relations. *Group One* comprised friends and family gathered by Linda (47 years): her son Sam (9) and his friend Sally (10), Linda's co-facilitator at Cub Scouts Daniel (16), her work colleague Anne (40), and Anne's daughter Mel (6). Linda, Anne and Daniel had visited the park before, but it was the first time for the others. *Group Two* comprised two work colleagues Tom (36) and Lucy (25), friends Chris (21) and Mary (25), and Mary's friend Jo (28). All except Tom visited Alton

Towers at least once a year. *Group Three* was an extended family, with parents Maggie and Rob (36), their children Jim (10) and Beth (7), and grandparents Alf (57) and Helen (58). Maggie described her nuclear family as annual park visitors, whereas Alf and Helen visited infrequently.

We observed these groups visiting the park on separate days during Autumn 2009. Our fieldworker travelled with them to the park, issued free day passes on arrival, and filmed them engaging in various activities throughout the day. We followed up with semi-structured interviews two weeks later, at Linda and Maggie's homes and at the workplace of Group Two, where participants were prompted to draw upon souvenirs in the course of recounting their day. We now summarise our observations.

Rites of passage

Finding the courage to take on major thrill rides was a significant feature of the day for many of our visitors and strongly reflected in their photo and souvenir practices. Sam had never been to Alton Towers before and Jim had not previously been on any of the major rides (with the exception of one), so the experiences of these younger visitors became a significant focus for their respective groups. Footage from the field captures Jim approaching Nemesis, his initial reluctance to ride, his grandparents' encouragement for him to join them on the ride, his excitement and elation on alighting, and his subsequent purchase and proud display of a souvenir medal bearing the legend 'I survived Nemesis'. Such 'rites of passage' emerged as a significant theme of the day and an overarching narrative for photo and video souvenirs. Group One labelled their YourDay DVD 'No Fear Sam' whilst Group Three labelled theirs 'Jim's First Big Rides'.

Rites of passage were important to adults too as they confronted their own fears. At interview, Linda referred to a souvenir photo of her on a Log Flume ride from a different theme park: "I went on that ride about sixteen million times to overcome a fear of going on Log Flumes, so that one was personal to me." Moreover, having to chaperone children "forced" (in Linda's own words) adults into "doing rides they wouldn't normally do".

We found examples of how the Picsolve photographs and YourDay videos supported visitors in subsequently recounting these rites of passage to others. Stock footage of rides was useful in this regard, and both Jim and Sam "loved" being able to show others the ride from a rider's perspective. However, this official documentation was not without its problems. Maggie commented on the marked difference in quality between stock footage and personal video of riders, in which it could be difficult to see faces and where people had their backs to the camera: "all you can see is the figures". The lack of control over one's own appearance in official photos and videos also proved to be controversial, as we now discuss.

Looking scared

The record of Jim's Nemesis ride, delivered by the automated souvenir systems, conflicted with the story that

he wanted to promote; the photos appeared to show him looking scared. He offered alternative explanations for this, including the physical force of the ride making it hard to smile, and not knowing where the camera was located.

Jim: that was only on the picture with the force of the thing - it was that powerful it wouldn't let you smile! ... On Rita, I don't know how I managed it but I knew where the camera was so I ended up smiling.

Maggie: [Chuckles.]

Jim: Erm, so when it does come on you just look terrified and you can hardly smile. So I don't think I really like that one.

Unfortunately for Jim, his family did not choose to buy the 'smiling' photograph from the Rita ride. Neither, however, did they purchase the Nemesis photo, due to Jim's protestations, although it was clear that they wanted to precisely because he appeared to be scared. Indeed, Maggie described her highlight of the day as being: "probably Jim coming off Nemesis, looking terrified". Jim responded immediately to Maggie's comment by saying that the photos that his father took on the day would "prove her wrong". Jim's 'terrified look' became a talking point as the day progressed and as other Picsolve cameras captured similar expressions. The 'look' became a source of entertainment, especially because the cameras captured other members looking elated. In footage of queuing for the ride Spinball Whizzer, Rob teased Jim, inviting him to "smile for the cameras, this time". The Air ride provided a further example with Jim explaining his expression on the photo (which was purchased in this case) as: "Nanny (Helen) were pushing me out of the way and I saw her hand and I was wondering 'What the heck is she doing?' ... (a)nd I thought all like getting dead worried". Therefore, the official photographic record of the day became a significant resource for the visitors to justify and even dispute their own accounts of an experience.

To buy or not to buy?

These examples also reveal how visitors struggled to decide whether or not to buy on-ride photos upon alighting, and we saw several examples of them regretting not doing so. This challenge was exacerbated by what they considered to be the relatively high cost of the printed, packaged photos as borne out at interview.

Maggie: I think they're good but then you think 'I'd like that one, but we want to see what the next one's like' and then you think 'Well, maybe that one would be better'. Yeah, cause we were constantly saying we could go on later and get another photo, if we didn't like that one.

Rob: Yeah. Whereas if you got something that saved all your photos till the end of the day - so that one's better than that one

This challenge was especially acute for families on a tight budget who wished to capture as many members as possible together, made even more complex by having to consider the inclusion of friends' children. Opinions were divided as to the merits of digital versus printed images, with people wanting access to digital copies while emphasising the long-term value of the printed versions that were displayed around their homes.

The spectator as photographer

As Jim's reference to his father suggests, visitors also took their own photos. Indeed, taking photos and recording video were significant and pleasurable aspects of the day. As it was forbidden for riders to use cameras, the task of photographing rides was taken on by spectators, or members of the party who elected not to ride but rather to wait for others riding. Taking photos could help relieve the boredom of waiting and became a central feature of the day for some. Footage from the field shows both Tom and Jo absorbed in photographing their peers on Submission and Ripsaw, two rides in which the riders remain in the view of spectators, gesturing to the riders and reviewing what had been captured. Tom, who considered himself as a hobbyist photographer, described the challenges of photographing larger coasters. He pointed to technical issues such as looking up into the light, but also not knowing when your riders would flash past after a long wait. Spectators were also involved in arranging and taking posed photos of returning riders in front of the rides, especially ones that showed them celebrating rites of passage.

'Candid Camera'

Visitors also enjoyed taking more candid images. Lucy anticipated that she could capture photos to "embarrass people with later". At interview, she talked about photos she took of her friends: "I think I probably took this one just because Jo was quite apprehensive about going on the first ride" and "this is Tom apprehensive about the first ride, cause he was really scared". 'Candid Camera' photos weren't only about being scared however.

Lucy: I want to capture funny things, that's what I do. So, when I saw him [Tom] standing there yawning, I'd take a secret photo so it looked like he was really bored. Anything that was ..

Tom: It wasn't secret - I saw you take it.

Lucy: I'm not as stealthy as I like to think [laughs]. For me it was the fun things, the amusing moments, mundane things, fun things.

This playfulness extended after the visit with Lucy, Tom, Jo and Mary all creating Facebook albums dedicated to the visit and with various members enjoying tagging images and entering teasing comments.

Capturing the whole day

There was far more to documenting a day in the park than the rides. The spaces between the rides, the gardens and other attractions, were all deliberately themed to be part of the overall experience, and provided a backdrop for many other photos. Indeed, the park provided various sculptures and landscaped props to support this, as we saw when Group Two posed around a coffin and related Halloween props during an excursion into the Gloomy Wood. Again, visitors revealed their individual interests in this broader documentation: Jim used his camera to photograph birds and other wildlife, a personal interest, whilst the rest of his family ate lunch. Rob and Maggie commented on this.

Rob: It's different, i'nt it, how kids see the day.

Maggie: Yeah, cause you think we'd walk round and go 'Oh, it's a dog', whereas kids go 'Oh it's *a dog!* Let's go feed the dogs!'. It's a completely different day for kids.

This dialogue demonstrates the importance of including more than just the staged, high thrill moments on rides; more prosaic experiences of the day were often deemed to be as significant within the record that was later consumed.

A PROTOTYPE PHOTO-STORY SYSTEM

Following our initial study at Alton Towers, we embarked on an iterative process to design and build a new kind of theme park souvenir service. This involved a workshop, followed by prototyping sessions and a series of site visits to test different versions of the prototype as it evolved.

Design Rationale

The study findings led us to identify an initial set of requirements for the design of photo-souvenir systems.

- **Combine professional and personal photos:** We have seen that both professional and personal systems have distinct and useful roles to play in souvenir making. Both approaches could be productively integrated.
- **Enable the playful sharing of photos.** The group-oriented nature of visiting, including taking photos, is essential to the experience. We saw how this included the playful taking and commenting of candid photos.
- **Support personal narratives.** Rather than just capturing ‘in the moment’ views of experience, souvenirs should embody more structured narratives, for example juxtaposing before, during and after shots to show how fears were overcome during ‘rites of passage’. Moreover, it is important that individuals within the group can articulate their own, possibly divergent, accounts of the experience.
- **Involve spectators.** It is important to support spectators in being active documenters, including relieving boredom while waiting for others or even queuing.
- **Provide physical and digital forms.** Souvenirs should be appropriate for display and sharing in various physical and digital forms, from permanent objects around the home to postings on social network sites.

An approach based on photo-stories

The core idea that emerged from our design process, and that lies at the heart of our service, was to create souvenirs in the form of photo-stories – sequences of images, annotated with speech and thought bubbles and other textual captions that tell a story. Previous research has explored the potential of photo-stories, or, more broadly, ‘sequential art’, as a way of documenting and sharing experience. For example, the Comeks mobile phone application enabled individuals to capture, annotate and sequence photos into photo-stories and then exchange these with others as MMS messages [16], whilst [15] describes the use of photo-stories to document school lessons and, of particular relevance here, a rollercoaster ride.

The novelty of our work lies in extending these approaches to explore new forms of collective photowork to support visiting. Our prototype incorporates mobile application, features that distinguish it from previous prototypes [13, 16, 17]. This design has implications for the nature of our inquiry: it supports the creation of souvenirs by both

groups and *individuals*, and their delivery to meet the interests of both; and it functions in conjunction with the existing professional mechanisms residing in Alton Towers. As such, our design utilises the resident systems and services to co-create highly personalised mementoes.

We were drawn to the photo-story approach because we felt it offered the potential to address our high-level design requirements. Photo-stories involve multiple images and so have the potential to *combine professional and personal photos* in a single souvenir. They can also enable *playful sharing* through capturing candid views of others, but also in captioning and annotating these. Photo-stories clearly *support narratives* – they are stories – and there is the potential to generate a unique *personal* story for each individual within a group - even when drawing on a common pool of materials. The work of capturing - but especially captioning and selecting - photos might be done during moments of ‘downtime’, for example when queuing for a ride or when watching and waiting for others to complete a ride. Finally, whilst photo-stories have traditionally been rendered to the *physical* printed page as comic books, there is currently a growing interest in more interactive *digital* forms, including browsing comics frame-by-frame on mobile devices [15, 16]. In short, we reasoned that our photo-story approach to design would enable us to explore how groups of individuals may collaborate to make souvenirs whilst also allowing for the integration of their content with on-ride photos generated by the park.

Automics functionality

Our design, ‘Automics’, is implemented with an application for Android smart-phones that enables users to capture, annotate and share photos. It also invites them to *combine* these images with Picsolve on-ride photos to produce photo-story ride souvenirs. The application was coupled with service features to deliver printed souvenirs. Automics’ functionality and interface evolved over a series of three iterations of field trials. The following briefly summarises the key features of the final version.

Capture and share: A user may take a photo with the phone’s inbuilt camera at anytime whereupon they are asked if they would like to save the image. Discarded images are deleted, but retained ones are immediately and anonymously distributed to other members of the users’ group and also stored in a *shared pool* for the group to access via a central server in chronological order of creation (after [1]). Any images of the members captured by the Picsolve capture system are also shared and stored in the pool. Scanning and loading the Picsolve images is a manual process in the current prototype, but could be automated in a production service. Users are manually assigned to their group at the start of their visit.

Annotate and share again: The Automics application invites users to annotate any of the photos in the pool, be they user or Picsolve generated, by adding speech and thought bubbles, and captions. The smart-phone touch-screen is used to crop images to a required aspect ratio to fit

a photo-story template (see below) and to enable users to place graphical elements appropriately. When completed, the annotated photo is also anonymously distributed and stored in the pool. Annotated photos can be edited many times and saved alongside the content already there, with all levels of revision being available for further editing.

Select before, on-ride and after shots: For each ride, the application asks users to select three photos that best represent their experience of ‘before the ride’, ‘on the ride’ and ‘after the ride’. The ‘before’ and ‘after’ images are chosen from the group’s shared pool, whilst the on-ride image is chosen from the pool of Picsolve-sourced images. Each user therefore chooses three favourite images out of all the group’s captured and annotated images.

Template image created in advance using stock material



‘Before’ and ‘after’ images taken by group members

‘On ride’ image from official capture system

Figure 1: an Automic created by Group Three.

Construct a ride souvenir: the Automics system then automatically creates a one-page photo-story souvenir for each combination of ride and rider. The software composites the selected photos with a stock template, which includes other stock images and branding, to complete the souvenir image (Fig. 1). It should be noted that although the system prompts the user for ‘before’ and ‘after’ selections to be made, the only actual restriction

actually enforced was the inclusion of an on-ride photo from Picsolve and they are free to choose any images that, to then, best represent ‘before’ and ‘after’ in the story they wish to tell. Three Automic templates were designed, one each for three selected flagship rides at the park. Towards the end of their visit, users are able to preview all the Automics they have co-created and given the option to choose one to receive as a tangible souvenir of their day. The finished Automic is printed on A4 glossy photo paper (Canon iP1900) and framed behind glass (also a manual process in the current prototype).

Notifications and prompts

The Automics system uses various notifications and prompts to try and engage users in different stages of this process. Users receive an audio-tactile notification each time a member of their group has captured or annotated a photo. We also implemented location-based prompts using to actively encourage users to engage in annotation and selection work while in the queues for rides or to take photo when near to key props around the park.

EVALUATING THE PROTOTYPE IN THE WILD

We returned to the theme park to evaluate the Automics prototype being used by groups of visitors ‘in the wild’, using the same ethnographic methods that we had in our initial sensitising study. Three existing social groups were recruited to use the prototype during a day-long park visit. Between them, the groups exhibited intergenerational family relations; peer relations; and differing technical proficiencies with smart-phones. All participants were frequent visitors to Alton Towers and keen to visit again. Two of the three groups responded to a snowballed advertisement, while a third was approached directly because its members had taken part in our previous study and we were interested to connect their experience of Automics to our previous findings. Group One comprised members of a nuclear family group, Gary (51) and his three children Jenny (20), Paul (19) and Daisy (14). Group Two comprised colleagues and friends: James (28), Mike (30), Martha (26) and Kate (28). Group Three comprised members of Group C (from the previous study), Jim (now 11), Beth (8) and grandparents, Alf (58) and Helen (59).

The groups were met at the park entrance on separate days and provided with complementary tickets. Before engaging with the attractions, they were taken to a room to be briefed and each person was given a smart-phone to use. The smart-phone functionality and the Automics application were explained to them, including showing an example photo-story. They were then invited to use the devices freely in the park. One researcher accompanied them for the first hour to assist with any technical queries. Another accompanied them intermittently during the day to observe. Towards the end of the day participants were invited back to discuss their experiences. Each individual was shown all of their Automics and asked to choose one to be framed and taken away as their souvenir. A final interview was then conducted at a large table with all of the media (including all iterations of annotated photos) present as

paper prints. At this point each group was asked to carry out a simple triaging task in which they had to agree the best 12 images, then the best six, and finally the best one, that represented their collective day. They were also asked to lay these out in a suitable format describing why that had been chosen. The following summarises our observations.

Automatic sharing of photos

The automatic sharing of photos upon capture was a distinctive feature of Automics, and impacted considerably upon social interactions in the park, enhancing them in some instances but provoking problems in others. The capture and share function was valued for enabling people to ‘do photography’ together in a novel way. Gary appreciated acquiring photos from capture events that he may have missed: “I think it’s really good”; “I quite like the idea of being able to share all the photos ‘cause so often you’ve missed the shot but someone else has got it, or someone’s just done something better”. Gary said that this was good for allowing in-group flexibility about adopting the ‘role’ of Photographer: “there are times for example when you don’t want to be taking photos cause you want to see the action, but if you know there’s gonna be some other sucker that’s gonna be taking it [laughs] you can actually concentrate on being there as opposed to taking all the photos”. This worked well for non-riders who could take photos on behalf of others, such as Jim: “it was good to get other people’s photos ‘cause me and Grandad went on the rides so we could hardly get any photos in so Nanny took a load”. All participants said that they appreciated the automatic group sharing feature. James of Group Two speculated about its potential application: “something like this would work for concerts, or a football game”; to which Martha added: “anywhere that’s a group thing”.

However, continual notification about the generation of content was a key problem that was echoed across groups to the point where participants became increasingly frustrated by the notifications and eventually ignored them. In Martha’s words: “because one of us at any point in time was taking pictures and uploading them, it was just constant noise and vibrating”. Kate added: “it would’ve been more useful if it wasn’t ringing and vibrating every time someone uploaded a picture”. Gary and Jenny of Group One said they could intuit when photos would be uploaded, not least because of being collocated and seeing each other using the application. Jenny observed that: “if I pulled it [the phone] out all of the time it would seem anti-social”. She then suggested that the notifications would have greater value as part of remote communication, helping to coordinate the activities of sub-groups: “If we’d split up we could’ve just taken a picture of something and of course it would’ve just gone to everyone else and ‘Oh! Okay they’re by so and so ride’ and just gone over there. So it’s quite handy like that actually.”

Captioning photos

All of our participants valued the captioning feature for enabling them to personalise content created by others. At

interview, Jim, Alf and Helen discussed how a photo that Helen took of Jim alighting from Nemesis was retrieved from the shared pool and captioned by Jim:

Helen: I took the photo and then passed it from my phone to Jim’s phone and then he captioned it.

Jim: Yeah!

Helen: Which is great because I didn’t know that he’d done that caption and he’s caught it perfectly.

Participants conveyed the social value in captioning each other’s photos ‘on the fly’. For Kate, captioned media resonated with contextual significance: “It was a nice way to remember what we were talking about and what made us laugh at the time”. Also, the ability to caption during the day meant people could entertain each other whilst queuing by captioning whilst reading each others’ captions.

Captioning was often playful, as Mike conveyed: “it was engaging, it was fun to do it... got you thinking about slapstick comments”. The anonymity of contributions supported the candid: “I kinda like it when nobody notices”, said Martha. This playful aspect was sometimes connected to a sense of thrill or fear. Mike referred to a photo that Martha took and he captioned and that was eventually chosen as his group’s favourite: “there’s a keen sense of wit when you’re terrified”; “I was trying to make a joke to calm myself down”. Whilst recognising how it epitomised him “being scared” in contrast to his friends, Mike observed the potential negative effect of such playful captioning: someone “more sensitive” could react badly to being made “a laughing stock”.

Working to a template

Participants enjoyed co-creating souvenirs with the system, guided by prompts and an activity structure. For Helen, the panel template “focused the mind”, “reminding you that at the end there was an end product”. James elaborated: “It was quite nice that you’d get something at the end of the day, ... it gave us a reason to put the funny comments on”.

Later in the interview, participants were invited to compare the ‘Make a Panel’ feature and resultant ride Automatic to existing on-ride capture systems and associated products. They unanimously expressed that the detail and context afforded by the photo-story feature was appreciated and led to a bespoke souvenir. Automics was also preferred because it afforded visitors greater authorial control over how their souvenirs were fashioned: “I like that one better for the simple reason that we’ve got more control over it”, said Helen. This included use of content authored by family or friends and, as Mike noted, “it comes from a real person rather than some machine”. But this feature was not without issues: the branding of Automics and the incorporation of stock footage received mixed responses. Moreover, even though an example Automatic had been shown prior to the activity, groups found it hard to conceptualise how their images would fit within a photo-story without seeing the actual templates.

Also, fitting content to a template could feel like work (running counter to the intentions of a leisure experience).

James and Martha described feeling ‘forced’ to create a story with a specified structure when the task didn’t fit with what they were doing or how they wanted to represent their day. The triaging task at interview revealed that ‘summing up’ the visit did not necessarily follow a narrative structure. Some representations of the visit as-a-whole were more *thematic*. For example, for Group Two, the day was defined by ‘Mike being scared’. When accounting for their triaged selections, no rite of passage or transformation was described; with the 12-print photo-story, Kate tapped sequentially on several prints saying “Mike being scared; Mike being scared; Mike being scared”.

Participants described that, after using the application for a while, they composed photos with captions in mind. But the need to compose panels meant having no option but to crop photos after capture and change this composition. Jenny found this constraining: “a lot of the time I didn’t want to (crop), which is quite annoying if you’ve just managed to get a picture of someone and they’re in one place but you’ve got to crop”. Daisy agreed: “The cropping bit was really frustrating at times”. Cropping was one of many compulsory ‘production tasks’ that presented a barrier to photography. James said that such tasks “did really slow down the spontaneity of things”; “if you could just instantly take another photo then that might be better”. Mike added: “you just want to snap and forget about it”.

Automics as souvenirs of a day in the park

Although official on-ride photos were pivotal in accounts and included in the triaged collections, participants liked how Automics represented ‘other aspects’ of their visit, including what others were doing. At interview, all the participants showed great interest in each other’s Automics, and they also saw potential in the concept of a souvenir that represented the group rather than individuals. Kate conveyed this well: “I wouldn’t pay seven pounds for a picture of myself to frame and put on the wall”; “I’d rather buy a photo of the group doing something than me doing something on my own”.

There was a reported benefit to the final triaging process as Helen highlighted: “actually having a look at what’s going on I think that adds to the day, sitting down, choosing, having conversations – everybody joins in”. Helen felt that doing this task *before the end of the visit* was part of the shared experience of being at the park. Triaging was made difficult by the large numbers of photos produced by each group – 72, 151 and 146 photos for the three groups respectively, and the need for better filters emerged. The amount of attention given to photos through captioning was understood to indicate their overall value, as Mike voiced: “I started looking for photos that had annotations on them, ‘cause I thought them are the ones that are going to be best to look at, ‘cause somebody has taken the time to tag it, so maybe they’re the most favourite”.

All participants assumed that the “raw content” would be made available to individuals alongside edited content. Having said that, the monetary cost of this content would

be a determining factor in its acquisition, as Helen said: “I’d want to have all the photos but I wouldn’t want to pay for them all”. Helen suggested that further triaging would influence her choosing to have a digital or physical souvenir: “I would pay to say ‘Well, we’ve got those ones, they’re for the comic, but I would really like these ones too and for those I would pay to have them digitally”.

Whilst appreciating the printed souvenirs, all participants advocated distributing Automics content to social networking sites, thus embedding it in social exchanges beyond the group, beyond the park site and beyond the visit. Gary, Paul and James suggested doing this in real time, as content was being generated. But Jenny was concerned about being mis-represented through this capacity, if not by her family then by “complete strangers”. Helen pointed out that sharing and captioning may be problematic in larger visiting groups with weak social ties: “in a large, possibly unconnected group such as a coach trip you have issues with people having other people having photographs of their children and doing things with them”.

DISCUSSION

We now discuss the implications of our findings for photo-related souvenir generation, reflecting upon some of the issues raised and relating these back to wider HCI concerns outlined in the Introduction. Although we had structured our research around evaluating Automics in use, we were struck by the extent to which the souvenir-making activities that it supported became integral to the visitors’ experiences and their social interactions in and beyond the park. To recap, our deployment aimed to explore technological support to: mobile photowork as a group concern [1, 10]; touristic and leisure visiting and its inherently social aspects [2, 4]; and the integration of professional and personal photos in the photo-ecology of the theme park.

It is important to emphasise at this point that, through designing and deploying Automics, we have additionally explored the concept of an *end-to-end souvenir service*; the design builds on our earlier insights to embrace a complex activity of souvenir production, into which cameras, photos and networked devices are embedded. Moreover, the positioning of Automics as a *service* distinguishes it from mobile photoware deployments reported elsewhere [13, 17]; its deployment has generated novel insights on souvenir generation, delivery and consumption that extend existing insights on photo-related support to visiting.

To help ground insights from our findings, we now deconstruct the souvenir generation process into a sequence of component activities: capture; annotate; triage (select); and layout and render (compose and construct a souvenir) – with ‘publish’ as a further optional activity. We explore how these ‘workflow’ elements were shaped by two fundamental tensions at play in Automics’ use. These stemmed from a distribution of agency, in terms of how ‘workflow’ was balanced between: (i) the park system and its users (i.e. the extent to which individual users had authorial control over souvenir-generation in contrast to

park control); and (ii) the in-group balancing of work (i.e. between individual visitors and their group-at-large). In the following sections, we explore how these tensions shaped visitor experience, and, by doing so, we articulate features of a theme park photo-ecology, associated socio-technical relationships, and new concerns for mobile photoware. This serves to instantiate and elaborate some of the suggested requirements raised by Ames et al [1] and extend the study of mobile tourism established by Brown and Chalmers [2].

On capture

Whereas the group creation of media content has been previously studied, a novel and valued feature of our prototype was the way in which it enabled the *role of photographer* to be shared between visitors, their friends or family, and, significantly, the photo-souvenir systems integrated into the park infrastructure. With smart-phones to hand, Automics' users were not only at liberty to capture their day as they chose, but also acquire photos of their visit captured on their behalf. Users appreciated having access to content they would not have been able to generate personally. In addition, Automics' notifications of photo opportunities were valued for promoting a more holistic representation of the day; prompts between rides shaped souvenir creation and capturing more than ride experiences.

However, the intervention of Automics in capture was not always welcome. Users voiced tensions concerning the *framing*, or *composition* of individual images. After familiarising themselves with the application, it became evident that their photos would need to be further cropped (after capture) to fit a template. They understood this active constraint as part of the workflow, and responded by framing shots with subsequent cropping in mind. But this didn't always work as intended, leading to unsatisfactory compositions. Clearly the design had not adequately foregrounded its *own* needs in terms of image standards, and in such a way that enabled users to do the fundamentals of photography, frustrating them greatly.

Aside from interaction with the service, we may consider the interplay at capture between individuals and groups of users. Evidently, there were distinct benefits to Automics facilitating capture of group activities by multiple members. 'Work' to record activities was successfully distributed within groups to ensure that, at key moments, someone was responsible for capturing events. Some felt relief to not be the sole group photographer. Beyond this, group-sharing meant that spectators to rides were afforded roles as active documenters of ride experiences, which they appreciated as did the riders they captured. This insight reflects recommendations by [1] on supporting ease of capture through 'limiting demands on attention'. Ironically though, the aforementioned interface issue over framing and cropping negatively placed demands on attention.

Users valued the automatic, real-time 'upload and share' feature (echoing [1]), with several finding this the most beneficial feature of the service. Users speculated on the potential of this feature to support sub-groupings with

remote awareness and sub-group coordination, much as has been seen with users in the mGroup trials [17] and their establishment of 'common space'.

On annotation

Photo-annotation enhanced group collaboration. Bolstering findings by [1], the use of speech in *thought bubbles and captions* as a form of annotation was valued for dynamically framing and re-framing meanings of photos between people. The interface let users attach actions and intentions to individual referents and, through incremental overlays, represent multiple expressions in a way not possible with simpler annotation tools. Real-time sharing and iteration of captioned photos, enhanced by visual layering, made this photowork integral to social interaction.

Connecting to requirements above for supporting 'being at leisure', the annotation feature supported souvenir creation *as play* within the production process, and Automics became a form of entertainment in and of itself. The anonymity of photographers and editors is a distinguishing feature not present in [13, 16, 17] and turned out to be a valued aspect of the service design – and the study design – in this respect because it led to use of captioning to extend 'Candid Camera' and the subversion of others' expressions. The potential negative values of supporting Candid Camera were explored at interview, with the possibility for social embarrassment, social exclusion, or alternatively for events to be misrepresented or reinterpreted. Such speculations underlined tensions over the authorial control of images that were raised with collective annotation mechanisms more generally. These tensions gained poignancy in the context of creating lasting mementoes, suggesting that the role of captioning to support dynamic in-group dialogue could be leveraged in future souvenir designs, subject to caveats concerning misappropriation.

Tensions also emerged over the distribution of *effort* between Automics and its users. In some instances, annotating photos felt 'like work', a feeling at odds with the leisure setting. Yet perceived work needed to be balanced with desires for authorial control. The implication here is to ensure that the balance of effort in the workflow process is adequately supported so as not to overburden the user (again resonating with [1]). Automics presented one solution to this, by leveraging opportune moments for 'pushing' authoring tasks to users, e.g. in queuing 'downtime' when engaged in sociable or playful activity.

On triage

Given the orientation of Automics towards producing a material artefact, it was essential for users to select a subset of images for inclusion - to 'Make a panel'. It was clear that opportunities for this kind of triaging were somewhat dependant on the provision of a suitable technical infrastructure. Triageing large numbers of photos on a mobile device was onerous, but as a socially engaged activity, carried out at interview, it was found to be an enjoyable element of the service. This has implications for how key elements such as triaging may be delivered in a

highly managed environment like a theme park. It also challenges the efficacy of giving users access to all content in the shared pool in certain situations. Algorithms could be used to determine which images are most interesting, limiting the problems encountered in a mobile deployment. This form of system-side support is advocated by [1] through automatic tagging and ascribing metadata. But again there is a tension in balancing how much the system controls the process and shapes the creative potential of users, a key insight to emerge from Automics in use.

Further to this, our participants actively appreciated the sociality of collective triaging when creating content for a shared, group souvenir of the day (at interview). This activity was a means by which they could socially consolidate their day's experience. Again, this foregrounds tensions in the group production of souvenirs and how best to integrate and represent individual and group experiences.

On layout and render

At the point at which users came to construct an Automic, the system coordinated activity. There was a rigid pre-defined template into which content could be placed. Here, the user had little control over how they used the template, the service constraining activity to make the production of a tangible souvenir more achievable. The template format suggested a narrative approach with pre-ride, on-ride (Picsolve generated), and post-ride images. Users chose to subvert this though, by inserting content which did not conform to a simple chronological narrative. Their choice of photo content sometimes reflected a much more thematic orientation to constructing a record of events. A tension emerged with how users responded to being shaped by the souvenir service; they wanted more control, but at the cost of creating a manageable service.

On publishing

A final element of the souvenir-making workflow concerns the wider publishing of Automics souvenirs. We did not prototype this element, but invited speculation on it by participants. The ability to publish to the web via social networking sites during the visit was seen as desirable. This includes both Automic souvenirs in a full but purely digital rendering, and also individual annotated images. But publishing online presented new challenges over group versus individual authorship: content could be shared widely, with various implications. The social nature of the groups we recruited, comprising family and friends, was seen as a ready means by which trust could be maintained in use of the shared media. We would argue that, in some respects, the capability of Automics to support publishing rests on the nature and scale of the group involved. This suggests the need for further inquiry on how such trust could be managed in ad hoc or temporary visitor groupings.

Posting material online would also offer some advantages to the service by serving as a means for individual elements of group records to be archived as individual representations, thus balancing the individual-group tension when it comes to producing a final souvenir.

Summary

In preceding sections we have explored the various stages of a souvenir generation process, reflecting on the tensions that arose in our Automics deployment. Two broad concerns cut through our analysis: the relative authorial control of Automics in souvenir co-creation; and group dynamics when using the service. Our reflections highlighted the importance of offering service users - in this case, theme park visitors - flexibility over the souvenir-making process. Users expressed desires to balance authorial control with the pursuit of leisure, and not to feel as if they were doing work. Equally, a core value of souvenirs was their function in representing sociality. Again this needed to be balanced with desires to preserve aspects of individual representations, and contributions to group endeavours. This specific set of requirements, relating to *the individual within the group* and the production of multiple personalised souvenirs from a shared media pool is emphasised, in contrast with previous studies that have explored interpersonal media messaging [16] or the creation of shared media albums [17].

DESIGN CONSIDERATIONS

We now consolidate these insights into considerations or sensitising issues for mobile photoware design, giving particular emphasis to souvenir-making activities.

Foreground technological constraints – Services that wish to shape user input need to make clear to users at an early stage the inherent constraints that may be imposed. This maximises the potential for users to creatively respond.

Exploit context – If souvenir services attend to context, opportune moments may be derived for ‘pushing’ tasks to users, thereby engaging them in ‘photowork’ but at the same time balancing the onerous nature of this against use of ‘downtime’ where other activities are less possible.

Offer souvenir defaults – Authorial control over the content and form of souvenirs should be supported, but must be balanced against a desire to not make the user feel as though they are working. If most stages of the process involve optional templates for doing photowork, this would increase authorial control whilst reducing workload, enabling the rapid generation of souvenirs.

Support rich user expression – Sequential art was successfully leveraged to enable users to express a variety of feelings and intents, and this was enhanced through supporting incremental layers of captioning.

Support group triage – The triaging task in our study demonstrated the value of group involvement in creating photo-stories *during the visit*. This suggests a need to afford space and time for collective reflection within the ‘end-to-end’ souvenir service structure. In the managed environment of theme parks, this suggests the potential to leverage situated displays and interactive digital surfaces.

Support individual and group representations – It is evident that souvenirs serve multiple representational

functions within groups. Souvenir service designs should manage these individual and group forms of representation.

Offer extensibility – The response to web publishing as an option suggests a value in offering extensibility to service users for rendering souvenirs and distributing content to others beyond the park site and the visit. Web publishing may be a vehicle for delivering individual representations as part of an otherwise group service.

Consider privacy control – The management of content in a souvenir service that incorporates photos must explicitly consider how collective trust and anonymity is supported during the visit, and how these may devolve once souvenirs move beyond the park, including how implicit social contracts are foregrounded within the park photo-ecology and how privacy controls are made manifest.

CONCLUSIONS

Theme parks are complex socio-technical environments and rich photo-ecologies. We have explored the design and deployment of Automics, a mobile photo-souvenir service that incorporates the capture, annotation and sharing of photo-media on smart-phones. This media is combined with that generated by park systems to produce novel, personalised souvenirs. The study highlights the interplay between visitors' individual and group concerns and individual and system control of souvenir generation.

In turn, we have produced design considerations that extend the HCI literature in at least two areas: we inform the study of mobile tourism [2] with respect to souvenir generation; and we respond to mobile photoware requirements, most comprehensively articulated by [1]. We conclude that our work bolsters these requirements with empirical insights supporting the notion of integrated and flexible applications for photo-ecologies in mobile interaction. This is not least because we prototyped a *service* rather than an application. Further, by studying Automics' particular functionalities in use we reveal new challenges for mobile photoware development, relating to the creative control of content in a shared workflow, and the exploitation of context in leisure and touristic visiting.

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