

Engaging Community Members with Digitally Curated Social Media Content at an Arts Festival

A case study about leveraging crowd-sourcing for community heritage curation

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Abstract— Capturing, uploading, and presenting social media content online have become the standard way for people to share their experiences with friends, family members, and others. In this paper, we describe our effort to extract, aggregate, and visualize, in a smartphone app, real-time and historical hyperlocal social media discussions and photos created at a regional arts festival that attracted over 100,000 visitors over a period of 5 days. Participants reported that the resulting content enriched their festival experience, and that it helped to create a social scaffold encouraging them to further engage and interact with others both physically and virtually through sharing even more user-contributed content.

Index Terms—Community heritage, Digital curation, Social Media, Crowdsourcing, Human Computation, Active Spectatorship

I. INTRODUCTION

In this article, we draw upon current research in social media content management [6] to explore the possibility that social media content curated during a real-world community event can directly enhance festival experience. Since 2008, we have been engaged in developing technological infrastructure for the annual Central Pennsylvania Festival of the Arts (ArtsFest; [2]). For ArtsFest 2014, we developed a smartphone app that presented real-time and historical hyperlocal social media content such as tweets and photos mined from social media sites. Our app uses novel algorithms that have been used to accurately extract relevant events and categories from social media sites such as Twitter, Instagram, and Flickr [5][7], presenting them in visualization interfaces that most effectively engage the users in a variety of domains such as news consumption [4][11], nonprofit coordination [3][9], and crisis response [10][12]. We leveraged novel interaction mechanisms to foster awareness, engagement, and participation at the community level, and specifically to involve users as a crowdsourcing mechanism to provide content, curate data, and produce higher-order syntheses. We detail and discuss the effects of the ArtsFest app on participants' festival experience. Finally, we consider future directions for social media content management in community informatics.

II. ARTS FESTIVAL APP

The Central Pennsylvania Festival of the Arts (ArtsFest) is one of the most popular summer events in State College, Pennsylvania, a town of approximately 42,000 local residents, with about 150,000 people in surrounding Centre County. The festival takes place in mid-July, downtown and on the adjacent Pennsylvania State University campus. It is a five-day event, celebrating the arts with a sidewalk sale and juried gallery exhibition involving around 1,000 artists, as well as music, dance, theatrical performances, and several workshops and events for children. More than 100,000 people visit the festival annually.

Since 2008, we have worked with the festival, investigating challenges and opportunities to support the festival experience with mobile personal technologies, including event information and basic social sharing features such as photo uploads, commenting, and liking [2]. For ArtsFest 2014, we worked closely with festival administrators and staff during the six months prior to the festival to design content and functionality for the app, to refine information displays and user interactions, to plan dissemination and onsite support, and so on. The festival team provided us with digital content such as event descriptions, images, descriptions and links to artists, and so on. We organized this data in our database server and wrote APIs to enable communications between mobile clients and the server. The app was implemented for both native iOS and Android platforms, and it was available in the respective app stores a few days before the festival started.

In the design of the app, we first obtained social media content from prior festivals by mining photos and tweets from the popular sites Flickr, Instagram, and Twitter. We collected festival photos and tweets for the years 2005-2013 by passing parameters such as the geo-coordinates of our community and specific dates on which the festival took place as well as a set of festival related keywords such as artsfestival, artsfest, festival, etc. Through this process, we obtained photos and their meta-data (e.g., photo title, description, tags, posted date, and location) from Flickr and Instagram, and text-based tweets (e.g., description, tags, and posted date) from Twitter.

From photo title and description, and tweets, we applied an n-grams co-occurrence and TF-IDF (Term Frequency-Inverse Document Frequency) topic ranking-based detection method to integrate this festival-related content into the app. The TF-IDF value of a keyword k in a document d is positively correlated with the frequency of k within d but is negatively correlated with the frequency of d in the entire document collection [8], which shows the “importance” of keywords from all documents. We have designed the app to handle keywords up to three words. Figure 1 shows the screenshots and Fig. 2 shows the architecture diagram of the festival app.

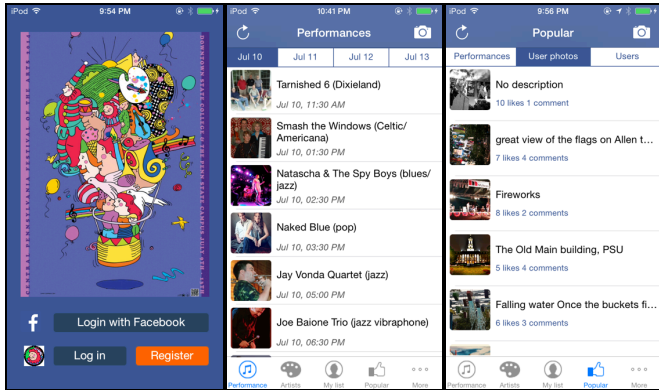


Fig. 1. Screenshots of the festival app

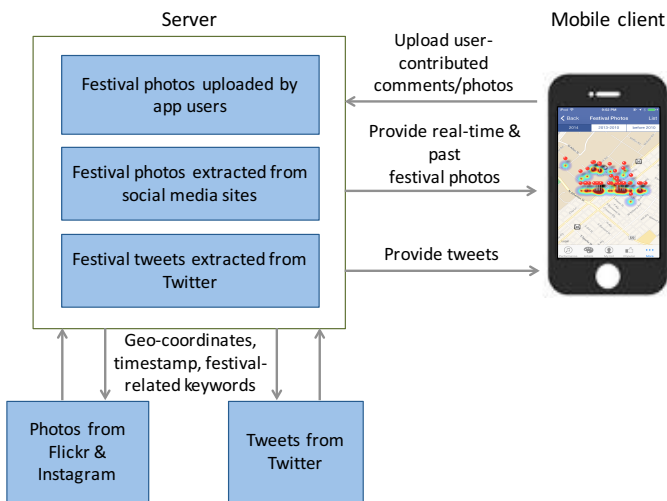


Fig. 2. Architecture diagram of the festival app

A set of extracted keywords from this method was used to collect relevant social media content. With these keywords, the server backend for the app extracts real-time photos and tweets from social media sites on an hourly basis during the 2014 festival, which provided a large volume of festival related content to users. In addition, as the server provides an API for posting and receiving festival content, users could create and share their own content as well as see and interact with the one uploaded by other festival app users. Thus, the app leverages not only social activities that many people usually do in

different online social media spaces, but also activities from the users of our festival app.

III. DATA COLLECTION

We identified a total of 315 photos from past instances of the festival on Flickr and Instagram between the years of 2005-2013, each annotated with a username, timestamp, and description. As depicted in Fig. 3 (left), the app displays photo locations with pushpins on a heatmap (also in a list; center) organized into three time ranges, 2014, 2013-2010, and before 2010. The 2014 photos are updated in the app in real-time. Users are always able to see their own locations on the map, thus they could browse through photos from locations nearby. When users click on one of the pushpins, they can see the associated photo, and can add likes and comments (Fig. 3, right; Fig. 4, left). We also collected 815 tweets from past festivals between 2005-2013, which described ones’ excitement (e.g., “I [heart] Arts Fest Weekend!”), appreciation (e.g., “Thank you for keeping everything safe and under control this Arts Fest Weekend”), information about festival events (e.g., “Saturday Night featuring DJ Gigi from 9 pm”), etc. App users could read them in a list view (Fig. 4, right). The list displays the tweets in chronological order, with the most recently posted tweets at the top.

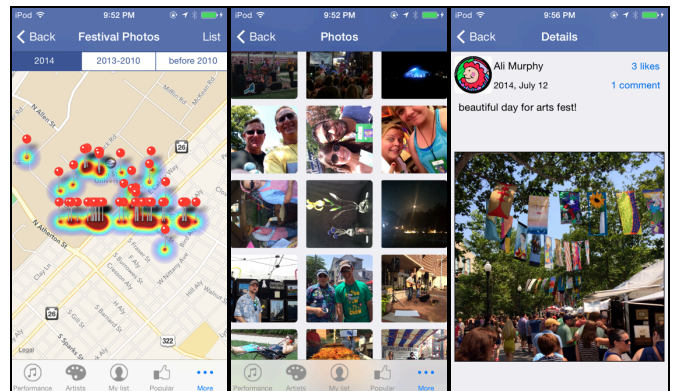


Fig. 3. Festival photos from 2010-2014

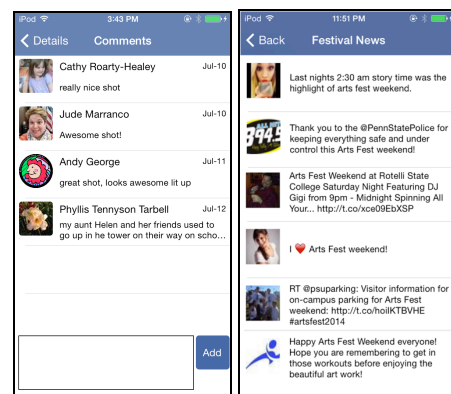


Fig. 4. Users’ comments for a 2014 festival photo (left); festival tweets from 2010-2014 (right)

In advance of ArtsFest, we utilized local news coverage, and mailing lists to advertise and make people aware of the app. At the festival, we had a booth to assist with download, installation and use. After people installed the app, they used it however they wished to: we were interested in their spontaneous and natural use of the app. After the festival, we invited all app users to participate in an online survey through emails. The post survey asked the participants about basic demographics, whether the social media content presented in the app seemed relevant to the festival experience, and how the social media content affected and influenced their festival experiences using a 5-point Likert scale and open-ended survey items. Our goal was to explore and understand how people perceived the app and measure the extent to which the app provided a space for social interactions and connected people to the festival as well as the local community.

The app received a total of 1,438 downloads from the iOS (n=1,025) and the Android (n=413) platforms. Out of all the app users, we received 271 survey responses (18.8% response rate). The survey respondents were 63% females. Their age group ranged from young adults (18-29, 31%), adults (30-49, 23%), and senior adults (older than 50, 46%). About 42% of them were from the local region, 40% from other areas in Pennsylvania, and the rest were visitors from out of the state. About 61% of them had attended the festival before. In terms of the time they spent at the festival, 62% of them indicated that they spent more than a total of 5 hours and visited 2.3 days on average at this year's festival. Saturday is the most popular day, with 90% of the respondents having attended the festival.

IV. RESULTS

Overall, the app users directly contributed 125 photos and 119 comments through the ArtsFest mobile app, and the app also extracted 85 festival-related photos, and 363 tweets from social media platforms during the 2014 arts festival. App users added a total of 195 likes to photos and comments. This in part indicates that many app users showed their interests in creating and sharing their festival experiences with others, and seeing aggregated social media content at the festival has the potential to encourage people to further engage and interact with others through sharing more user-generated content. The relatively high amount of interactions with social media content is especially positive because over two-thirds of the festival attendees are adults and senior adults who tend not to engage with social media sites as much as teens and young adults. Overall, 431 of the users (30%) used the attendance feature in the app to plan their day at the festival. Usage logs indicate that users accessed 7.65 screens per session (where one session means a user opened and closed the app) and used the app for about 5 minutes per session.

We analyzed the survey responses to understand how users perceived the app with respect to festival experiences and engagement. Overall, it is not surprising to see that people's main motivation of using the app was to check any relevant information about the festival and plan their schedule. For example, the survey respondents indicated that they used the app to find performance (M:4.31, SD: 0.94) or artists (M:3.87,

SD:1.10) information. Table I summarizes users' experiences interacting with the social media content.

According to the results, many of them indicated that past photos posted by others are highly relevant to the ArtsFest, which empirically validates our algorithm used in extracting and aggregating festival relevant photos and comments. They also answered that they became more aware and engaged, and enjoyed looking at social media content contributed by themselves and others. Seeing social media content enriched their experiences and brought back vivid memories that they experienced at previous ArtsFest. Overall, we can see that people were generally positive about the social media content presented in the ArtsFest app.

TABLE I. EXPERIENCES EVOKED BY SOCIAL MEDIA CONTENT (1 = STRONGLY DISAGREE; 5 = STRONGLY AGREE).

Survey Question	Mean (SD)
Relevance of the photos and comments to the festival	3.99 (0.78)
More aware of what is going on during the festival	4.03 (0.91)
More dynamic and richer festival experience	3.55 (1.06)
More engaged in the festival	3.32 (1.01)
Enjoy looking at photos and comments	4.01 (0.82)
Bring back one's vivid memories at previous festivals	3.72 (0.95)

We also conducted a content analysis for the comments shared by participants. Two authors independently categorized all comments and jointly derived four categories as shown in Table II. Not surprisingly, the highest category was expressing one's excitement and appreciation (e.g., "arts fest is amazing," "really nice shot," etc.), followed by describing people, events, activities, and atmospheres of the festival (e.g., "beautiful quilt," "love the sand sculpture," etc.). Interestingly, there are a number of comments that describe one's reflection on past festival experiences (e.g., "in twenty plus years we have experienced every extreme of weather. one year we bought sweatshirts!," "This photo made me think of a friend", etc.). We discuss this category more in the next section.

TABLE II. CATEGORY AND ITS COUNT OF USER COMMENTS.

Category	Count
Expressing one's excitement in the festival and appreciation to others' photos	56 (47.0%)
Describing people, events, activities, and atmospheres of the festival	36 (30.2%)
Reflecting on past festival experiences	21 (17.7%)
Others	6 (5.1%)
Total	119

V. DISCUSSIONS

While we demonstrated that social media content can be successfully leveraged to enhance the experiential outcomes of an event, our findings about how people engage with past data point to the possibility of future research to better facilitate and

support recurring and cyclical events. Current social media content management research primarily focuses on trending events that occur irregularly or planned events that happen mostly once. For events that occur regularly (e.g., annual local arts festival), continuing digital curation effort that utilizes both machine and human computations could create new affordances that allow returning attendees of recurring and cyclical events to relive and rejoin their experiences from the previous events by identifying and preserving stable and contextual event information and social media content in between events.

Our current algorithm identifies relevant social media content and relies on the festival participants to curate past and real-time festival information by annotating, commenting, and sharing their experiences with others. However, scalability could become an issue as social media usage becomes even more widely adopted in the future. Future systems could leverage automatic image tagging and recognition, and topic modeling algorithms to seed the curation process. Advanced machine learning algorithms could then be applied to infer real-time classification based on historical data, especially given the consistent nature of recurring and cyclical events. A context-aware mechanism based on users' interests, location, and time expressed both explicitly and implied implicitly in context can be used to filter and proactively suggest relevant social media content as well as to improve user experience.

In this work, we have shown that social media content can be used to reconstruct people's festival experiences. Although this may be beneficial for community members to engage in personal reflections, digital storytelling, and contributing to community heritage, privacy remains a dire concern. An in-depth analysis of the privacy implications and risk assessment of future mobile systems that leverage users' contextual information (e.g., activities, locations, time, etc.) is warranted to maximize collective benefits at the local community level and to minimize the risks of unintended consequences.

VI. CONCLUSION

In this project we leveraged algorithmic and human-computational approaches to organizing social media content in order to amplify the experience of a specific regional and community event, an arts festival. We designed a smartphone app that presents real-time social media festival content and conducted a field study the regional arts festival with 1,438 users who helped curated past content and contributed new experiences through the app. Our work shows that contributions and interactions with social media content through mobile devices can heighten the sense of awareness, engagement, and participation as active spectators. Our analysis revealed rich interactions with social media content that not only captured and enriched app users' personal festival experiences, but also evoked points of reflections that influenced their festival experiences with their friends, family members, and online community members. Essentially, the extraction and presentation of past festival content creates a

social scaffold that jumpstarts people's experience at a festival event.

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