

# Mobile Devices, Social Network Services, and Landscape: Enhancing Public Park Maintenance Systems Through User Generated Content (UGC) with Hashtags

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## Abstract

Presently, social network services are some of the most heavily used internet services. Every second, social network service users provide large amounts of social data, called “social big data.” The overwhelming amount of data, however, presents a challenge in terms of using the information in a meaningful way; landscape managers, for example, have yet to access social big data productively.

This study attempts to offer suggestions for enhancing landscape maintenance efficiency and user participation by employing User Generated Content (UGC), especially that generated with hashtags. With a particular hashtag, data collectors can extract effective data from UGC. This study uses hashtags for data collection from UGCs with regard to public space.

For this research, a survey and field research was conducted with volunteer mobile device users in Seoul Forest Park in Seoul, South Korea. Research participants received questionnaires with questions concerning their most frequently used social network service as well as preliminary knowledge about a hashtag’s function and usage rate. The participants took pictures of park locations or features requiring maintenance or improvement, and uploaded these photos to social network services with selected hashtag keywords and location data. The data collected from the participants was classified under four themes: social network type, hashtag keywords, site image, and explanatory note.

The preliminary results of this study suggest that using data from mobile device users is a way to incorporate social network technology into landscape management to achieve a more effective and interactive public park maintenance system.

## 1 Introduction

### 1.1 Mobile Devices and User Generated Content

The world of communication changes continually with mobile device development. Before the cellular phone era, Internet connections for public use were very limited. The smartphone revolution, led by the Apple iPhone in 2007, significantly changed people’s living patterns. Since mobile devices are usually connected with the Internet, people now have access to Internet servers anytime they want. Accordingly, smartphone users have begun to produce User Generated Content (UGC; GOODCHILD 2007), constituting a fundamental part of the social data that is often called “social big data.”

An interesting feature of UGC is its base: the content is voluntarily generated from individual blogs or social network services (SNSs) for free. No one requires or even encourages users to create information postings; rather, the data are generated by people who like to upload information to share with others. The rapid increase in smartphone use has made this system possible because it offers many ways to share news with low barriers to entry such as communication applications in smartphones, individual weblogs, and microblogs via SNSs (TAYLOR 2012). As GOODCHILD has observed, the reason UGC is produced without any reward is people's natural desire for "self-promotion" (2007).

## **1.2 Possibility of UGC and Landscape Architecture**

Many research studies have pointed out the possibility of analyzing social big data for use in diverse fields. GOODCHILD has noted that volunteered geographic information (VGI; one form of UGC related especially a user's geographic location) created from social media can offers improvement in military and commercial intelligence (2007). In his later work, the author observed that VGI is even better than authoritative data from official organizations (2012), from which we can conclude that information from UGC is more accurate than that from traditional information providers.

The remarkable potential of UGC stems from the fact that it requires communication with the public. TAYLOR (2012) noted that understanding the connection and interests between individuals and the public by means of big data yields the possibility of more effective results for many projects than traditional methods do. Moreover, big data provide the essentials for successfully implementing designs and passing zoning codes, regulations, and financing for projects that benefit a defined majority of the population.

Though it has become clear that understanding and employing UGC has essential benefits for many fields, the challenge remains to filter and use this information in a meaningful way. Landscape architecture is among those that have yet to access mobile devices and UGC productively. In the landscape architecture field, the recent technology evolution has influenced mostly graphic tools, which can produce fancier diagrams, beautiful plans, and realistic collages. In other landscape architecture processes, like maintenance, technological innovation is more difficult to find. In order to enter the digital era more fully, those who work in landscape architecture are endeavoring to incorporate more technological elements, including more effective use of UGC.

Therefore, this study aims to offer some preliminary results that will demonstrate the possibility of using UGC in landscape architecture, obtaining volunteer reports to focus on public park maintenance. Park maintenance was chosen because the high level of communication required with park visitors means that UGC may have strong potential for offering ideas for improvement in this field.

## 2 UGC Categorization with Suggested Hashtags in Park Maintenance

### 2.1 Necessity of UGC Categorization Tool and Hashtags

The enormous amount of data on the Internet is not in itself meaningful unless it is categorized according to specific themes. TAYLOR (2012) pointed out in his research that although UGCs from SNSs provide “the richest and most timely datasets,” the first step is finding the way to “utilize and analyze” them fully. Only with effective categorization tools can the enormous data set from UGC prove useful.

To start categorizing, the researchers chose the hashtag as the tool. The hashtag was created by a Twitter developer, Chris Messina, in 2007 (HASHTAGS.ORG, 2012). Its main purpose was to manage incoherent “tweets (posts in Twitter)” with specific keywords. Using the number or pound symbol (#) – now called the “hash symbol” – as a prefix, one word becomes a keyword that has a sharing link inside. With hashtags, users can continue their conversations on the same topic in a single thread (HASHTAGS.ORG 2012). Since it was created, the hashtag has become a popular and essential imbedded tagging/sharing function used by various SNSs: Twitter, Facebook, Google+, Instagram, and so on (HAMED & WU 2014). Even predicting hashtag popularity to identify fast-emerging topics has attracted the collective attention.

The hashtag has many merits as a categorization tool for UGC. First, it can be made very easily by adding a hash mark in front of a keyword, a specific brand name or even a very short phrase, like #whereisjames. Second, no additional tool is required to gather UGC under the same hashtag in one SNS. To collect UGC that is related to a particular hashtag, the SNS’s search feature can be used. Generally, big data uses Single Query Language (SQL) software with other complex tools, but with hashtags, all users can shrink down the data on the Internet under their own keywords. Finally, hashtags are open to all users, are generated voluntarily, and are free. In SNSs, data released by every person is out there, waiting to be understood (CATLIN-GROVES 2012). Hashtag allows users to earn those data without any charge.

### 2.2 Suggested Hashtag for Public Park Maintenance

To collect specific social data by hashtag, the researcher must know the keyword for gathering information. If there is no keyword related to the research topic, categorizing is impossible. Unfortunately, professional topics are usually not related with commonly used words, so SNS users generally do not share exact keywords that are useful to researchers. A simple solution was used to solve the problem for this study: a hashtag was created and spread to the public. The following steps are recommended in generating and using the hashtags.

#### 1) Choose efficient keywords to manage

When UGC is collected with a hashtag, it is very important to select the right keyword in order to shrink the search results correctly. According to TSUR AND RAPPOPORT’s research (2012), a hashtag needs to be “clear, informative and not too complex.” In the test for that study, people preferred simple words that are easy to interpret as hashtags even if the word

had many characters (e.g., people preferred #technology over #savethenhs, though both are 10 characters). The ideal form of hashtag is that attaching a keyword after the targeted park's full name or acronym with an underscore for notification of the park's location: for instance, #Centralpark\_Broken, #Seoulforest\_Dirty, and #Hydepark\_Idea. (Underscores are used because hashtags do not accept white space.)

2) Encourage park visitors to use given hashtags in SNSs with picture and location data

After the hashtag is chosen, it should be altered for park visitor use with ideal form. The UGC would have four types of information: social network type, hashtag keywords, geotagging status, and explanatory note (Figure 1). Several methods may be used to announce that the park collects hashtag content: voluntary reporting, banner (offline), website banner ad, or public reaction via an information center (Figure 2). Any manual on how to report by hashtag should emphasize inclusion of pictures so that park management can objectively identify the problem and find its location easily.



**Fig. 1:** An ideal example of UGC with suggested hashtag. The post should have correct hashtag, short explanation, and site picture. Site picture helps to define where the problem happened.

To maximize UGC voluntary rates, the park maintenance should provide strong motivation to the public, one of which is offering a reward. The “My Starbucks Rewards” program is an example of successful user motivation system. In 2008, when Starbucks experienced a business depression, they started “My Starbucks Rewards” program, in which people who buy coffee get a star stamp. When they reach a specific amount, they received something free from Starbucks. This motivational promotion worked, and Starbucks was able to overcome its economic depression (PAGLIERY 2014).

An example of a reward in park maintenance could be a name tag, such as a small card or plastic board, which briefly identifies who reported a problem or submitted an idea once the manager has fixed or improved the site (Figure 2). It would be a powerful way to encourage voluntary UGC by motivating via self-promotion, as mentioned above.



**Fig. 2:** Banners can be good advertisement for encouraging hashtag use (left). Name tags can motivate people to report more actively (right).

### 3) Collect UGC with each hashtag

After enough UGC is generated, the park maintenance office collects and searches it using SNS search functions. Saving and organizing the data under each category with third party software, like Microsoft Excel, is recommended for future use. Later, the data set can be used as a base for analyzing visitor behavior patterns through given keywords and location.

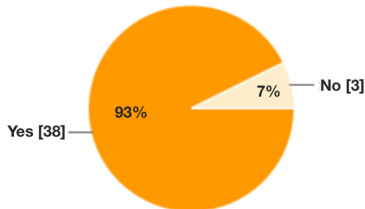
## 3 Hashtag Management Simulation Plan in Seoul Forest Park

### 3.1 Landscape Maintenance Status of Seoul Forest Park, Seoul

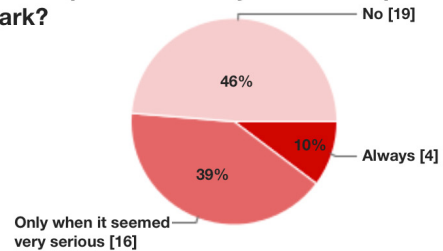
In Seoul, South Korea, the city government's Park and Green Space Office is officially in charge of maintaining the 2,082 public parks in the city, which have a total area of 146.48 km<sup>2</sup> (SEOUL CITY WEBSITE 2013). Public parks are managed with official designated services, certain officers being responsible for regular checking and cleaning. In reality, because of the size of the area, this structure does not respond immediately to public claims. Normally, for example, if a safety fence is broken in the park, the only way it will be fixed is if someone from park services finds the problem unless a visitor voluntarily reports it. This systematic inefficiency can be remedied either by park officers' checking a park's condition more often, which requires adding more manpower to discover problems, or adopting an effective reporting system, thus allowing public participation. The latter is a more sustainable option than hiring more workers; however, park visitors do not often voluntarily report problems. According to the random-target-questionnaire survey conducted for this study, very few park users have voluntarily reported a problem. The low number of reports stems from users' not knowing how to report a problem as well as from inconvenience (Figure 3-1 and 3-2). And according to the personal interview with the public park authorities, it is hard to maintain a large park owing to the lack of manpower. Seoul Forest Park is one of it.

Seoul Forest Park, established in 2005 to provide green space and recreational places for the city, is approximately 1.16 km<sup>2</sup>. Since the park was opened, it has become one of the most visited public parks in Seoul, many citizens visiting frequently and regularly. The park management office has reported that over 4 million people visit Seoul Forest Park annually (SEOUL CITY WEBSITE 2014).

**Have you felt uncomfortable for any reason when you visited a public park?**

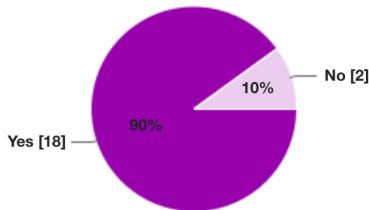


**Have you ever made a voluntary report to solve a problem when you visited a public park?**

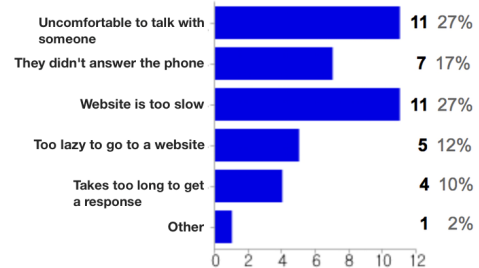


**Fig. 3-1:** Responses regarding voluntary reporting rates in the park

**Have you ever felt uncomfortable making a voluntary report?**



**What makes voluntary reporting inconvenient? (multiple choice)**



**Fig. 3-2:** Responses regarding voluntary reporting rates in the park

The park's reporting system is currently not working well as that in other parks. Large parks usually have website reporting boards and call centers to get feedback, which Seoul Forest Park has, also. Nonetheless, the Seoul Forest website receives only about 25 posts annually, to which a response is made after two or three days, on average (SEOUL CITY WEBSITE 2014). The call center receives 10 to 15 calls daily from park visitors in the busy season (May-October), but officials can only respond to only 2 to 4 cases because of a lack of human resources.

Korea has high potential to reduce those problems through the use of UGC because nearly 73 percent of South Korea's population uses smartphones, constituting the world's second highest smartphone usage rate (FOX 2013), while 67.1 % of Koreans have at least one SNS account (STATISTIC KOREA 2013). Thus, gathering data regularly by mobile devices would be easier than it is in other countries.

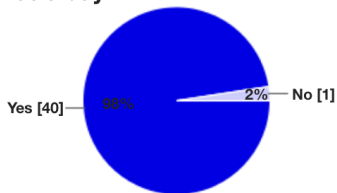
### 3.2 Current Process of the Simulation

As the first step of the survey, participants were randomly chosen to participate in the research from the visitors at east area of Seoul Forest Park. The chosen participants received questionnaires with questions that inquired about their most frequently used SNSs, as well as their knowledge about hashtag function and usage rate. Results from the total of 41 participants who responded to the survey are shown in Figures 4 and 5.

Most of the survey participants from Seoul Forest Park have at least one SNS account (40 of 41, 98 %), and most of them use Facebook and Twitter. Among them, 68 % (28 of 41) said they know about hashtags and how they work, and 58 % of hashtag users have a specific purpose for using them.

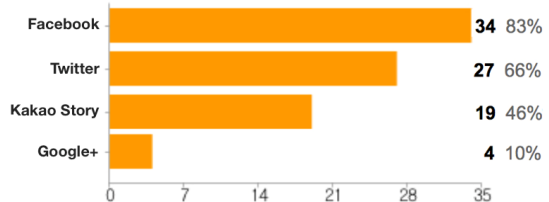
The next step for the study was to oversee the collection of UGC from participants who had used the suggested hashtag keywords to submit pictures of the park locations and features that required maintenance or improvement. Given hashtags are #Seoulforest\_maintenance, #Seoulforest\_broken, and #Seoulforest\_idea (Those seem too long, but it needs to be considered that all keywords were given in Korean for the research). Once enough UGC data are obtained from the participants, the author will classify it according to four themes: social network type, given hashtag keywords, uploaded image contents, and explanatory note.

**Are there any SNSs that you use more than once a day?**



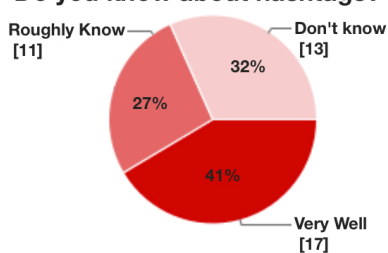
**What kind of SNS do you use?**

(Multiple Choice)



**Fig. 4:** Responses from visitors to Seoul Forest Park concerning their SNS usage

**Do you know about hashtags?**



**What do you normally do with hashtags?**

(Multiple Choice)



**Fig. 5:** Responses concerning hashtag use in Seoul Forest Park

## 4 Preliminary Results and Discussion

The survey content and interviews with park visitors and managers have so far confirmed the potential, at least, of collecting UGC with hashtags. Park managers in the Seoul Forest Park said it could provide a new interesting feature to the park services, allowing the park authorities and visitors to communicate through hashtags. Park visitors thought that the method would make it more convenient to say what they wanted about the park. The responses so far seemed to demonstrate that the social approach is more attractive than the traditional and that has proven itself effective (GOODCHILD 2012). Although there are not enough participants who have offered hashtag posts yet, the research is still ongoing. Currently offered posts can be searched with followed hashtag in Facebook, Twitter, and Instagram: #서울숲\_관리, #서울숲\_제안, and #서울숲\_파손.

Some limitations remain in hashtag use. First, even though most people have an SNS account, if they use the account rarely or not at all, this method will not work. Second, hashtags can be searched by an SNS's default search function; however, doing so will find responses only within the same SNS. In other words, without third party software, it is currently impossible to gather UGCs across all types of SNSs. A way is needed to gather all UGCs for more convenient categorization. Finally, according to MA, SUN, AND CONG, it takes time for hashtags to spread and be searchable (2012). To make specific hashtag into an accurate maintenance management tool, park visitors need to use the hashtag regularly first.

To solve those limitations and go further, an analysis of deeper interaction among SNSs, UGC, and landscape architecture will be needed. This research may help those who manage landscapes to recognize the ways in which social big data and UGC might be applied to maintaining landscape architecture.

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