

Location-Based Mobile Collaborative Digital Narrative Platform

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Abstract—This study is based on interactive design theory, supplemented by the concept of communication. We propose a "Mobile Collaboration Digital Narrative Platform", through which, with the aid of technologies, a user can, depending on his or her location, download one's favorite collaborative narrative content, and also have the ability to add, edit or record what is happening around; thus, linking the narrative content and the location. Through the function of "collaboration", the content can be made more diverse and rich and the reader can better immerse him or herself in it. The platform also can work in offline mode. Currently, the preliminary design of the system has been completed, and tests in different situations will be conducted and user behaviors will be recorded and then analyzed. Quantitative and qualitative evaluation and analysis of interface design, operational processes, system functions, and collaboration narrative content of the output are in progress. We believe that this study will be an important application of mobile content.

Keywords-Location based; Digital Narrative; Collaborative Narrative; Mobile Technology.

I. INTRODUCTION

In the era of Internet and the rapidly changing technologies, the types of narrative have become diversified and rich. This also makes digital narrative have more different ways to create innovative and surprising content.

One result of the Internet boom, Tim O'Reilly emphasized that the content generated by users, through user interaction with Web 2.0, results in diverse and rich content. This also makes the form of digital narrative has had a major change. The International Telecommunication Organization (ITU) indicated that in 2010, more than 90% of the worldwide population use mobile phones, of which 9.4 million are 3G users [16]. Meanwhile, the Institute for Information Industry (III) in Taiwan said that for the 3rd quarter of 2010, 69.5 % of mobile users have subscribed to mobile Internet service [1].

The above data imply that we are gradually entering the era of mobile Internet. Our daily lives are filled with a variety of mobile devices. Thus, we can also imagine that the future media narrative will be impacted by the new technology platform and people's lifestyle changes. This will become a totally brand new outlook.

This research is focused on the new media narrative for this trend, and develops a pilot platform design. To this end, the goal of our work is to design a location-based mobile collaborative digital narrative platform. This platform must have the features of 'mobile', 'location-based', and 'collaborative'. The design is based on the user behavior and experience on using the mobile platform for digital narrative. With the designated collaboration features assisted by mobile communication technologies, users can create spark clashes with each other, and can even easily disseminate their ideas and record things with their surrounding stories.

A. Why Mobile

As mentioned earlier, data show that the number of mobile phones has exceeded 100% of the population, and mobile Internet subscription is also increasing at an exponential rate. Our lifestyle is thus changing: whatever we rely on computers to do before, is now being replaced by mobile devices. The other is being under the influence of globalization. The world is like a global village, and people moving for interchanging information become a trend. Therefore, high mobility device, has been become an indispensable tool for modern lives. According to the survey from a wireless service company in U.S., SinglePoint [23], the phone is the closest media to the user (Figure 1). We are in the age of speed and convenience; mobile phones are definitely becoming the best choice for users to get all the needed information.

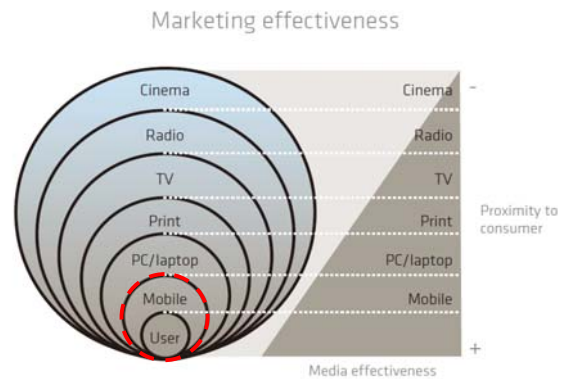


Figure 1. Relationship between media and users [23]

B. Why Location-Based

Nowadays, the characteristics of the smart mobile devices contain touch input, GPS, sensors, and Internet access capabilities. We can only carry one mobile phone to make records and tell a story of life without constraints of space and time. Narrative in the past has ignored the atmosphere of ‘space’; however, the portability of mobile devices gives the narrative vitality for the new development opportunities to the narrative of space. Narrative scholars such as Herman said: "a storyteller prompts his or her interlocutors to relocate from the here and now of the current interaction to the alternative space-time coordinates of the storyworld." [15]. Henry Jenkins said: "In a new transmedia storytelling environment, I want to introduce an important third term into this discussion - spatiality - and argue for an understanding of game designers less as storytellers and more as narrative architects." [17]. Therefore, through the supplement of mobile devices, the narrative may be able to let users add more space into the story elements. In addition to the narrator, audiences are also assisted through mobile technology, so that the narrative content with the perception of space can have more immediate and immersive nature of the association. Just as Y.-F. Tuan said, "we can perceive the body senses the presence of space" [7].

Besides, from the users’ habits and experience point of view, “location-based services” is the highest viscosity of service (Figure 2), according to market research consulting firm InsightXplorer survey. This is because the location is a significant factor in attracting users [2]. Therefore, the location information will be built in our platform system, and is also an important basis for the user to search, edit and read.

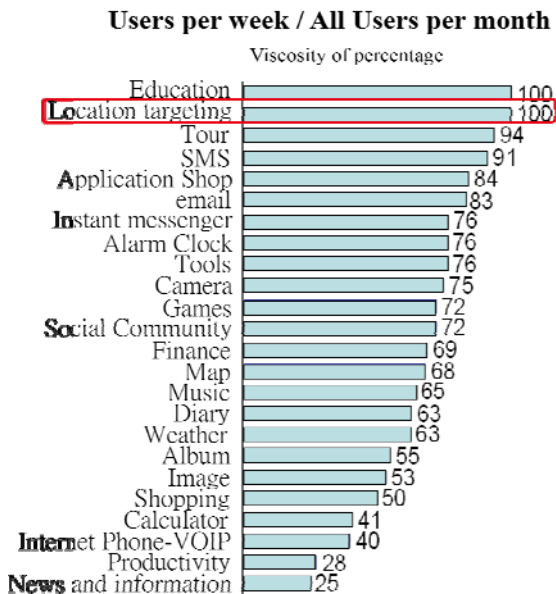


Figure 2. Using viscosity survey [2]

To this end, we also find some service and content providers trying to develop similar applications. These applications are based on the story games with location information. With these features, the games are more

“stereo” and more vivid. For example, Disney's Kim Possible World Showcase Adventure [24] uses Walt Disney World theme parks as the playgrounds, and uses the Disney animated TV series Kim Possible as the story elements. In this game, everyone can join the organization using mobile devices. The system can set the roles as heroes or villains to achieve the tasks given. The Walt Disney Company hoped that the application can impress the minds of tourists, and somewhat make the park much special from others.

The Disney's application is customized and not open to the public to develop more other applications. However, it did the concept proof of the trend for location-based story games.

C. Why Collaborative

The earliest forms of storytelling were thought to have been primarily oral, combined with gestures and expressions. Digital storytelling means using new digital tools to help ordinary people tell stories in a compelling and emotionally engaging form, so that the story becomes more rich and diverse and full of surprises. Cao [22] had proposed a PESE (Personalized Storytelling Environment) system which used the concept of Web 2.0, namely, collaborative narrative approach to production stories. The idea for PESE is to combine both multimedia production and Web 2.0 production knowledge. Storytelling is an efficient means to fulfill learning goals. Knowledge is exchanged within communities when stories are told.

Jhao-Ling Chen [9] created collaborative narrative storylog which was integrating the social sciences with computing technology to help reveal personal brain thinking to realize physically by storytelling, immersed audio, location-specific content, and blog. Users interact with others to create the story from the formation of the partnership, and thus widen the virtual social relationship.

Collaborative narrative created the "Collective wisdom" which is an important output in the Web 2.0 era. Cooperation not only enriches the narrative content, but also broadens social relations. Through mutual cooperation with the exchange of ideas and feelings, then a story with wonderful content can be produced. Therefore, the collaboration feature will be also one of the features in our platform design.

To sum up, the contribution of this research includes the pilot study of the field of “mobile narrative”. We figure out the important features that have to be added in such systems. We also base on our survey results to develop a platform to do field trial.

D. This paper organization

This paper is organized as follows: Section I, as aforementioned, briefed the relevant research and survey data. Then we addressed the motivation, background and goal of our work. Section II presents the case studies. We will discuss and analyze the characteristics for the existing mobile digital narrative applications. To this end, we also compare them from different usage aspects. Section III will describe our system architecture and experimental process

design. Section IV presents the evaluation results for the study. Finally, conclusions and future prospects will be presented in Section V.

II. CASE STUDY

A. PicPlz

Picplz (Fig. 3) is a photo story-telling application. It is built-in a variety of filter effects which allow users to take beautiful photos in different styles easily. Photos can be also tagged with the location information and messages. At the same time, they also can be synched with many social networking sites.



Figure 3. PicPlz interface fig [25]

B. Broadcastr

Broadcastr is a voice platform. It gives a way to record voice that you saw and heard. Anyone can upload a voice recorder to the platform with the tag of its location in the physical coordinates. The users have to be at the right location to be able to listen to the audio tagged by the same location. Thus the experience of hearing the audio will be more 'stereo'. (Figure 4).



Figure 4. Broadcastr interface fig [26]

C. Instagram

Instagram is a photo story sharing application. To use it is very intuitive. Through its built-in camera effects, users do not have too much skill of photography, and are able to shoot quite photography texture photos. Briefly speaking, what you see will be what is taken. Also the recorded images can be uploaded to Facebook, Twitter and other social networking sites to share with friends (Figure 5).



Figure 5. Instagram [27]

D. Summary

The above case studies show that using mobile devices to record our life stories or doing digital narrative creation can produce different narrative content. And allowing interaction between people will even change the content subtly. Although the above applications utilize the characteristics of mobile phones, it still did not fully use all the features of smart phones. Specifically, they are not sufficient to support the needs of the new narrative trend we mentioned in the previous section. Therefore, our system design is developed for improving all the above related applications. Table 1 summarizes the comparisons for the mobile applications including our platform, called Plastery.

TABLE 1. PLASTORY (DESIGN IN THIS RESEARCH) COMPARISON WITH OTHER APPLICATIONS (SOURCE: THIS RESEARCH)

	Plastery	Picplz	Broadcastr	Instagram
Platform	Android	Android iPhone	iPhone	iPhone
Location Information	✓	✓	✓	✓
Collaborative	✓	✗	✗	✗
Offline Edit	✓	Can take photo, Can not upload automatically	✗	Can take photo, Can not upload automatically
Media Type	Photo Sound Text	Photo	Sound	Photo

This platform will build the database to store user-edited files. Users can upload or download data, and can also query collaborative content. In order to achieve the space concept of narrative, so the contents to be queried must be restricted with the user's associated location. Through the platform, digital narrative storytelling can have a whole new content creating experience.

III. SYSTEM ARCHITECTURE AND EXPERIMENTAL PROCEDURE

A. System architecture

The system architecture is the client-server model. The server is the database for storing and processing data (story) generated by users. After editing, users can upload the stories to the database and share the content with others. In order to maintain the ‘spatiality’, only the content restricted to the nearby location can be queried or downloaded to the mobile device (client). The mobile app will have the features mentioned before, e.g. location service agent, information processing agent, sensing management and data analysis, etc. (Fig. 6).

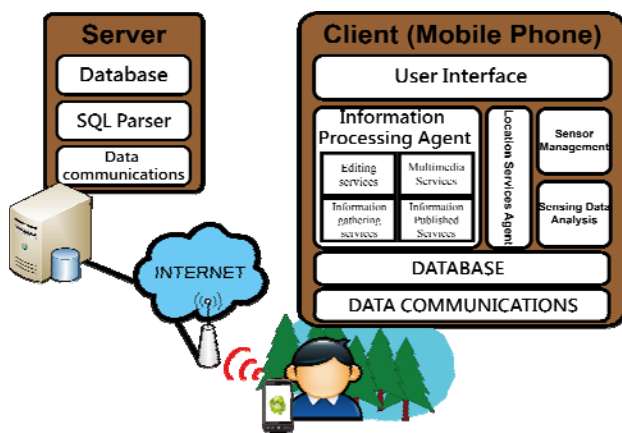


Figure 6. System architecture

B. System Design

The system is implemented on the Android phones. The features include the following:

1. Add collaborative editing.
2. Support offline editing.
3. Allows the users to use a variety of media type for digital narrative.
4. To a restricted geographical location, the user must visit the place to be able to read the existing narrative.

The followings will explain the user interface and operation procedures for our system:

First the user must apply for an account of the system to log in before using (Fig. 7). After logging, the system will remember the status automatically, unless the user clicks log off.

We design four sub-pages with the main page (Figure 8). These four sub-pages are major frequently used functions. This sub-pages design in this user interface is for easily switching pages. Fig. 8 shows the location of nearby users and currently available narrative themes.

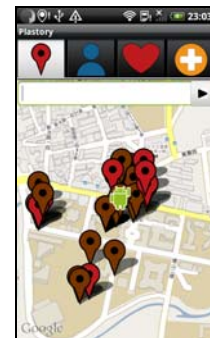
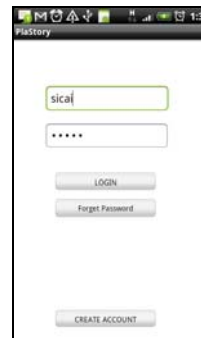


Figure 7. System Login screen, Figure 8. System main page

Click the anchor on the map (Figure 9), the system will show the list of the nearby narrative themes below. This list design is for easy distinguishing from all the themes, in the case of too many themes overlapping on the map.

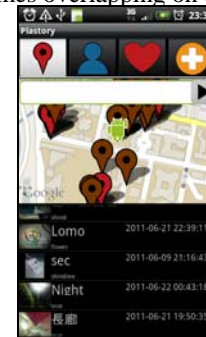


Figure 9. The menu bar of clicking the anchor on map

Figure 10 is the profile page. The page will display the personal points value (the number of stars), the number of friends, the number of collaborative partners, and the number of published content. Three types of the content presentation can be chosen, namely (from left to right in Fig. 10), rendering on the map, arranged in thumbnail and list type.

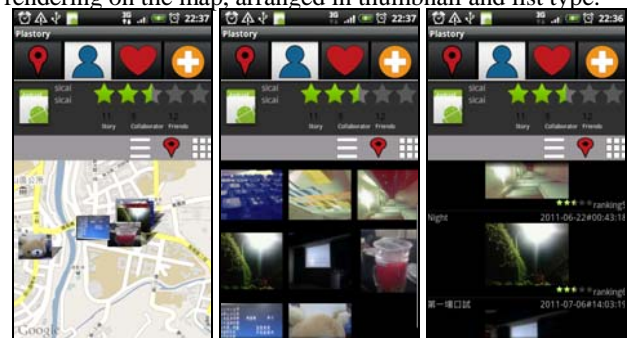


Figure 10. Profile page

Figure 11 is My Stuff page that includes my friends, my collections, and shopping cart items. "Shopping cart items" is designed to allow users to access other people's stories, so that the contents of the platform can have a high degree of interaction/collaboration in order to be able to produce more diverse and rich content.

Add new page is shown in Figure 12 The content is divided into adding new story theme, and adding

collaborative story. The latter can be used by any purpose of content creation such that the collaboration will lead to many possibilities of content produced, and also change the original mode of communication.

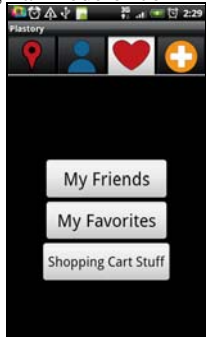


Figure 11. My Stuff page

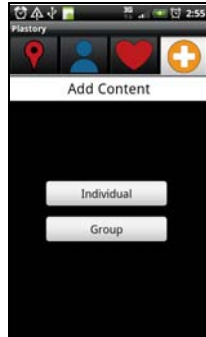


Figure 12. Add New page

We have introduced the system's main screen and operation procedures. After editing the content, it will be stored in of the local database and get synchronized with the Server until the networking access is available. Besides, if encountering other's mobiles in the vicinity, the newly editing content can be exchanged mutually in order to have more timely interaction and efficient collaboration with the content.

C. Experimental procedures and evaluation methods

As for experiment, we first design the use context by features of the platform, and then invite the users to use the platform for the designated situations. The system will record the use process which will be evaluated for the system interface and usability problems between various scenarios by the human-machine interface evaluation method. The system will also log the editing and reading situation for further understanding of user behaviors. The following will have the detailed description of the experiment:

1) Contextual Design

For evaluating the collaborative editing features for the platform, we design the following test scenario:

During the off-campus extracurricular teaching activities or collaboratively collecting data, it often takes time and is inefficient to make notes or interaction if using pens and papers by the traditional ways. However, in the mobile generation now, through the various functions on the mobile device, such as: cameras, microphones, GPS, etc., we are able to instantly record sound, image and location. Our system platform fully integrates these functions which are further coupled with the collaboration mechanism. Thus, the way of communication has changed and information dissemination becomes more real-time. A new mode of digital narrative is formed.

Besides, during the test scenario using the platform to create or read story/message, we are also interested in finding how users feel, and what users prefer in doing various narrations. Therefore, we will ask the users to use the platform in some difference venues and at all time. Then

the system will have more complete log for us to analyze and evaluate.

2) Human-Computer Interface Evaluation

In this part, two evaluation methods for evaluation are adopted, namely:

- Think aloud method

Thinking aloud method was proposed by Ericsson and Simon in 1984. This method is to allow the users to express their thinking, feeling and suggestions verbally when operating the system. What the user do and say are recorded for analysis. Nielsen [20] said that using the think aloud method to conduct usability assessments, about 80% of usability problems can be found if five persons are tested. Almost 95% of the problems can be found if ten persons are tested. Therefore, five to ten persons to participate in the test can get the best efficiency. The advantage of this method is to understand the relationship between how they use the system and what they think. Aside, the system can be directly enhanced by the suggestions that users make.

3) System log analysis

We develop the points and ranking system to motivate users to create good quality of content and to participate more frequently with the collaboration. The results will be displayed on the integral User's personal page to encourage users often use the platform. Other users can also contribute and encourage high-quality content by giving appropriate scores. The points will be used as the basis for ranking when navigating. We think that such a mechanism should improve the quality of the content, and also learn the user content preferences and usage behaviors.

The parameters used to calculate points are: using time, the number of articles published, the number of collaborative articles published, the number of new friends, viewing times of the published content, the number of content collected, the number of cited content (Add to Cart) and so on. Personal profile page will display the total score by different number of asterisk.

IV. EVALUTION RESULTS

The evaluation has two parts: interface/features design, and system performance/satisfaction. In the first part of evaluation, we found out that users did like to use mobile devices to do narrative. However, they prefer use more photos to record than audios or videos. Nevertheless, they all expressed they will consider to use audio in the future. The reason might be that the new mobile system needs to take time to influence the users' narrative behavior. Another reason could be the limitations of the inconvenient mobile device to input voice. Instead, most users prefer using short, annotated texts accompanied with the photos they take.

By the thinking aloud method and the subjects' feedback in the interface part, most subjects thought that graphical button interface design needs to be more intuitive. For instance, the text on the screen could cause misunderstanding

or confusion, and the screen click feedback for user is very important, because if there is no feedback mechanism, the user will not know whether the click is successful or not. We amended the interface design by the suggestions, then implemented on the android mobile phones, and did the field trial to evaluate the performance of the system.

In the part of the overall system, users respond that too long login/upload time would miss recording important moments, and also could make users impatient not to continue operating the system. Even so, the users all gave positive appreciation to our functional design. Users agreed that our mobile collaborative digital narrative platform have reached the goal of this study. For example, the system can use different media to narrative, and narrative content can be sorted/queried. Users assents that relation of location and contents is attractive. The stories generated can incur their curiosity, and shorten time to acquaint themselves with the location. The results are consistent to the motivation and goal of the work.

V. CONCLUSION AND FUTURE ENHANCEMENT

The design of a location-based mobile collaborative platform is proposed in this paper. The field experimental results show that the system achieved positive satisfaction from the users, and did fit the narrative trend in the new era.

This research can be viewed as a pilot study in the field. It is first focused on narrative behaviors. According to the interviews, most users would like their content to be shared with friends. This implies users generally prefer the social functions which can be extended to the system in the future. On the other hands, for the efficient transmission of the content in the databases, we will suggest to extend the abilities of transmission to be P2P mode or DTN (Delay Tolerant Network) in the next version. With this pilot study, we believe that the development of mobile collaborative platforms will achieve more successes.

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