

# TOWARDS AUTOMATIC MOBILE BLOGGING

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## ABSTRACT

Weblog (usually shortened as blog) has gained its popularity lately. There are about 70,000 new blogs a day and about 29,100 blog updates an hour. As an emerging blogging phenomenon, with the proliferation of camera phones, mobile bloggers can write their blogs almost instantaneously. But how much further can current mobile blogging tools enhance the experience? In this paper, we propose a *Mobilog* framework to automate context-relevant annotation and synthesise personalised content for mobile blogging. In particular, we describe a system implementation of the framework, *Travelog*, adapted for tourism applications. Finally, we discuss the challenges and future possibilities for mobile blogging.

## 1. INTRODUCTION

With ~70,000 new blogs daily and ~29,100 blog updates an hour [1], blogging has become a new social networking platform. People usually write blogs to express themselves, by describing their stories, providing opinions on news, sharing travel tips and memorable photos and countless of other experiences. Traditionally, desktop blogging is mostly text-based and requires descriptions to express thoughts, in all functions like an online diary. Mobile blogging is more spontaneous and picture-based, allowing people to capture and share moments whenever and wherever they are [2].

Mobile blogging benefits both consumers and operators. For those not familiar with HTML, mobile blogging introduces a simple method of capturing and sharing daily experiences or unforgettable moments to weblog. Operators in turn profit from the increase of data traffic.

Currently, there are several ways of mobile blogging. First, by posting blogs using embedded mobile browser in smart phones. *Blogger.com*, allows users to capture an event using their phones, then post it to mobile blog via e-mail. Several tools are developed specially for mobile blogging such as: Nokia Life Blog [3], KabLog [4], and Picoblogger [5]. PhoneBlogger [6] publishes blogs via a phone call and is a VoiceXML application. It uses speech recognition and text-to-speech synthesis to collect information over the phone concerning the blog that users want to post.

These tools intend to provide a simple and user-friendly interface for bloggers, but still it can be tedious to enter hundreds of characters for each entry; especially since keypads on mobile phones are much smaller compared to regular keyboards. Voice input, although eliminates the keyboard, suffers significantly from the low recognition accuracy, especially under noisy outdoor environments where mobile phones usually operate in.

In this paper, we propose a mobile blogging framework called *Mobilog* to semi-automate data entry with context-relevant annotation and enhance multimedia blog with personalised content synthesis (Section 2). Section 3 describes an instantiation of *Mobilog* for mobile blogging during travel. *Travelog* is illustrated with text description generated and image enhanced automatically using contextual information captured from user. Finally, section 4 covers the challenges and future possibilities for mobile blogging before conclusion in Section 5.

## 2. MOBILOG - MOBILE BLOGGING AUTOMATION

The motivations behind *Mobilog* framework are two-fold. First we would like to alleviate the data entry problem on mobile devices during spontaneous blogging. However it is certainly not our aim to replace manual blog writing that allows expression of personal opinion and experience. In the *Mobilog* framework, the text description is generated by extracting context-relevant information. We hope that our system can provide a decent mobile blog draft to allow instantaneous sharing. The user can supplement the generated blog with text messages simultaneously or modify the blog when better input devices are available.

Next, since an integral part of mobile blogging is images taken spontaneously, often with physical constraints, we would like to enrich mobile blog entries with new multimedia content synthesised from user input or other related sources. We are aware that new or virtual content generated for a mobile blog would make the blog content become unreal if one insists that mobile blogs should only record raw images captured from the real scenes. Fig. 1 depicts the *Mobilog* framework with the innovations on description generation and content synthesis.

### 3. TRAVELOG SYSTEM

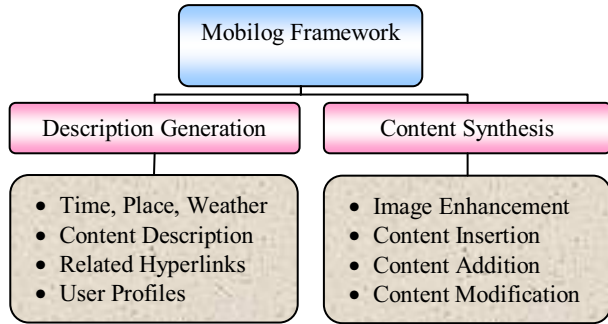


Fig. 1. Mobilog: a mobile blogging automation framework

Context provides useful information to describe the photos taken by users [7] as part of their blogs. In particular, the time, location, and weather during image capturing are useful data for a blog. Personal information such name, birth date, itinerary etc are also interesting information to enrich a blog entry. This information can be obtained from the EXIF header [8] (e.g. image creation time), mobile device (e.g. GPS if available, location within cellular network) or relevant servers (e.g. weather service) automatically.

Content description requires semantic image analysis. In this paper, we utilise an external image-based information retrieval system known as SnapToTell [9] to provide annotation about a picture taken. The retrieved text description, broken down into keywords, plus other contextual information such as location, can be used to search for websites related to the current blog using web search engines and have them listed in the blog. Lastly, the user can supplement the generated description with a manual text entry via SMS.

Besides providing automated draft description for the blog, Mobilog also aims to enrich the multimedia content in the blog with content synthesis techniques. One possibility is to enhance the quality of images taken by mobile phones. For instance, we can apply histogram equalisation technique for contrast enhancement.

There could be physical constraints (e.g. low image resolution, image capturing angle) when the user took the pictures. With the answer from image recognition such as the SnapToTell service [9], a poor resolution image can be replaced by a higher resolution image and other images of the same scene (e.g. different views, night shot) can be added to the blog.

In some occasion, the user would like to have himself appeared in the picture but has failed to do so. With his portrait stored as part of the personal profile, Mobilog can superimpose the user image into the blog image. To add fun elements to the blog, virtual content such as text can be added to the image taken and objects in the image can also be modified (e.g. color changed). We will demonstrate several examples in our experimental results below.

As an application of Mobilog, we have designed and implemented the *Travelog* system. Travelog is developed to be a tourist tool in mind; making use of the SnapToTell server, this system allows users to create blogs based on the scenery descriptions obtained from SnapToTell with a captured photo and contextual information. Based on the text description returned, Travelog server will use keywords to perform a search through Google Search Engine and return hyperlinks to the related websites. The returned results and any additional comments from the user will then be used to create the web blog entry instantaneously. The Travelog server can also enhance images posted to the weblog with content synthesis techniques.

Fig. 2 and 3 show the dataflow of the Travelog system. The current Travelog system implementation consists of the camera phone with GPRS connection, the Travelog server, the Travelog site to store user profiles, and the interfaces to the SnapToTell server [9], the trusted sites such as local weather server [10], Google Search Engine (Fig. 2), and the hosting sites blogger.com (ATOM API [11]), and Flickr (Flickr API [12]) (Fig. 3).

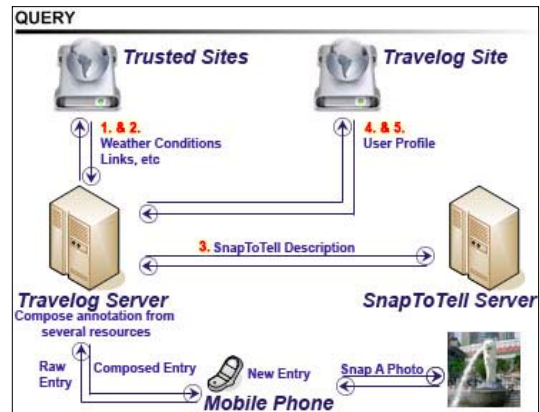


Fig. 2. Create a new blog entry at the QUERY phase

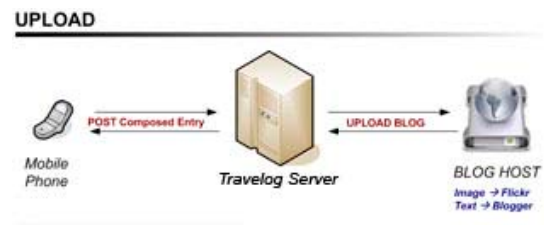


Fig. 3. Post a blog entry at the UPLOAD phase

The client application is developed using the Symbian platform and SDKs on Nokia Series 60 phones. More specifically, we used Symbian C++, S60 2nd Edition Feature Pack 2 for Nokia 6680 phone. The Travelog server is built on JAVA 2 platform using J2SE 1.5.0.

There are two steps in mobile blogging in Travelog, namely QUERY phase to compose a mobile blog entry and

UPLOAD phase to post the blog entry to weblog site, as shown in Fig. 2 and 3 respectively. Fig. 4 depicts a sequence of screen shots of blog composition during QUERY phase.

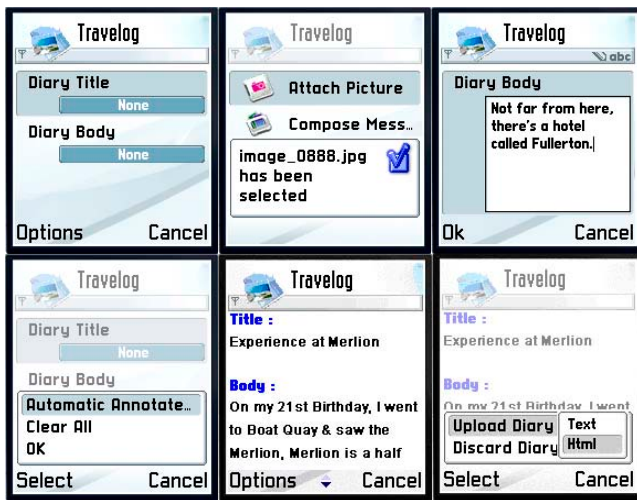


Fig. 4. Screen shots of blog composition on mobile phone

At QUERY phase, a user starts a mobile blog with a title (first screen shot, Fig. 4). Then the user selects the image captured for the current scene from the picture folder (second screen shot, Fig. 4). He can now invoke the automatic annotation option with or without manual entry of text description (third & fourth screen shots, Fig. 4). The raw entry consisting of the title, the image and the text message (if any) will be sent to the Travelog server (Fig. 2).

If the automatic annotation feature has been invoked, the Travelog server will send the image (with location information if available) to the SnapToTell server [9] to obtain description about the scene in the image, contact the Travelog site to find out more about the user, request services from trusted sites such as local weather server and Google Search Engine to get current weather information and related URLs in order to compose a blog entry and return it to the user (Fig. 2). The user can view the composed entry on the phone (fifth screen shot, Fig. 4) and choose to upload as text or HTML (last screen shot, Fig. 4). The user can also attach audio information about the scene (e.g. surrounding sound or narration from SnapToTell server [9]) (although not many blog hosts support audio attachment).

Finally the user posts the composed blog to the blog host (blogger.com) at the UPLOAD phase (Fig. 3). The response returned to the user to indicate the status of upload operation. Since blogger.com does not provide image uploading API currently, Travelog uses Flickr service to host images [12].

Following the input sequence as shown in Fig. 4, the outcome of the mobile blog entry is presented in Fig. 5, with additional annotations (on the right) to explain the details.



Fig. 5. A sample blog entry in the Travelog system

As shown in Fig. 5, the Travelog system has created a blog entry with user input (title and photo) and the help of contextual information. Using the user's profile, the system personalises the time as "21<sup>st</sup> birthday". The SnapToTell server identifies the "Merlion" in the photo and fills in the keywords "Boat Quay" and "Merlion" to complete the first sentence. The description about "Merlion" from the SnapToTell server provides the next sentence. The weather condition "partly cloudy" is obtained instantaneously from the local weather service. The paragraph is ended with the manual text message sent by the user (Fig. 4).

The Travelog system also makes use of the keywords "Merlion" and "Singapore" to retrieve a list of related websites from Google Search Engine, three of which has been shown in the blog entry in Fig. 5. They help to provide additional information about the scene to the blog viewer while keeping the blog entry concise.

Besides semi-automatic annotation, the Travelog system also modified the photo with additional content to synthesise the image shown in Fig. 5. Using the original image of Merlion sent by the user (the selected image thumbnail in the second screen shot, Fig. 4), the user portrait (first author) retrieved from personal profile has been superimposed at the lower part of the image and a string of text has also been overlaid on the sky region, as shown in Fig. 6.



Fig. 6. Content synthesis in Travelog System

We have conducted usability and server performance tests with 10 users. Most testers found the experience refreshing and easy to use without explicit usage instructions and had rated 4/5 on look and feel. Table 1 compares the average time taken for manual and automatic blogs generation (Fig. 2). There will be a more systematic evaluation in the near future.

Table 1. Average Manual & Auto Blog Generation Time

Modules	Time Taken
1. Google Search Engine Service	8.0 secs
2. Weather Service	2.0 secs
3. SnapToTell Service	11.1 secs
4. Content Annotation	29.7 secs
5. Entry Submission to Blog Site	15.7 secs
<b>Automatic Blog Generation (1 to 5)</b>	<b>66.5 secs</b>
<b>Manual Blog Generation</b>	<b>5 mins</b>

#### 4. DISCUSSION

Camera phone help to create and maintain social lifestyles through real-time, synchronous, distant sharing of sent images [13]. Mobile blogging provides asynchronous sharing alternative with more expressive and interactive commentary for a larger readership, not convenient and cost-effective with direct image sending.

Context such as time, location, personal data have been proposed to create metadata for mobile imaging [7]. The IDEIXIS system [14] finds location-based information on websites with images matching the captured mobile images. In our case, we use scene identification of SnapToTell [9] to generate description for web search.

We also plan to use image matching at domain-specific sites (e.g. online travel guides) and photo-sharing sites (e.g. Flickr, Blogger) to extract precise description and to perform collaborative annotation respectively. Better description may help to provide more relevant search keywords. We can also exploit context and similarity in an image sequence to infer description and to summarise the images [15]. Similarly, the search capabilities can be extended to blogs sites linking across content with text, images and even voiceXML based ASR queries.

Besides generating blog description, methods to provide the relevant personalised blog description that represent self-expression and self-presentation [13], will be another challenge. A simple near-term solution is to provide and customise style templates for different users. An interesting alternative will be to learn user blogging style from past blog entries. Advanced content analysis algorithms helps to enhance image quality or select better images from available sources, determine appropriate image regions for content

removal, insertion and modification during content synthesis.

Last but not least, to put mobile blogs into geographical perspective for better visualisation and navigation, we can leverage on the mapping services such as Flickrmap [16] to weave photos and related information together.

#### 5. CONCLUSION

In this paper, we have proposed a Mobilog framework for generating description and synthesising contents for mobile blogs, upon which we developed and illustrated a Travelog application for travel-oriented blogging. We have presented new challenges and future work for mobile blogging as well.

#### 6. ACKNOWLEDGEMENT

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