WiMo: Location-Based Emotion Tagging

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ABSTRACT
In this paper we introduce WiMo, a location-based social networking tool that enables users to share and store their emotional feelings about places. WiMo creates a mobile social network based on common interests and enables users to share not just information but also opinions, experiences and passions. The application uses a geo-emotional tagging system running on a GPS enabled mobile phone to ascribe emotions to places. In this paper we describe the development of an emotion tagging interface and present a case study scenario to situate the application in a real world setting. We then describe work-in-progress on the development of the WiMo prototype interface, and the interaction process for users. We further outline the features of the system and finally discuss next steps in the development of the application.

Categories and Subject Descriptors
H.5.2 [**User Interfaces],** H.5.3 **[Group and Organization Interfaces]**

General Terms
Design, Human Factors.

Keywords
Emotion, Tagging, Mobile, Social, Location, Micro-blogging

1. INTRODUCTION
Traditional tours of cities often reveals a good deal about the places that can be found in the city but little information about its social fabric. Consequently there have been a number of attempts to study and understand tourist's behaviour and in particular the social aspects of visiting places. A study of tourist requirements for the design of a city guide was conducted by Brown and Chalmers [1]. This study used a variety of methods including participant observation, video-shadowing, interviews with tourists and ethnographic observation of a tourist help centre. They concluded that "we currently have little understanding of how tourists organise their activities or of the problems they face [1]. Their work explicitly noted situated reasons for behaviour, such as taking pictures for friends at home, and various tourism technologies (e.g. paper maps and guidebooks) being used in combination with each other. In a comparable study by Axup et al. [2] of backpacker social matching it was found that a key motivation for backpacker MoSoSo (Mobile Social Software) is that people enjoy reliving mutual past travel experiences, and an application should support users finding others whom they have shared past experiences with.

In response to issues such as these a number of commercial applications have been developed such as Qiro,[1] Dopplr[2] and recently Google Latitude[3] offer messaging services based around location, social network data and personal profiles. However there has been less development that focuses on explicitly sharing emotions about places. One exception is the bio-mapping project by the artist Christopher Nold who has created a highly personalized mapping process based on volunteers wired up with GPS and polygraph technology who wander around is a neighbourhood area, noting feelings and reactions to their surroundings [3].

The WiMo system presented here seeks to further integrate informal social networks with user's sharing practices about places. Instead of a generic introduction to a place, the WiMo user can read tags about the place created by his or her friend and sent automatically by the WiMo system on their mobile phone. In the next section we discuss a small ethnographic study of emotion mapping and location tagging. This is followed by a case study scenario, a detailed description of the prototype user interface and an overview of the technical specifications.

2. EXPLORATORY FIELD STUDY: EMOTION AND PLACE
Affect and emotion play an important role in our everyday lives. There are many different interpretations of what we understand by the term emotion, but in this paper we refer to subjective response to the world around us. A commonly agreed aspect of our emotional response to the world is that it is intrinsic to how we act and react in the world. According to the neuroscientist Damasio "humans deal with emotions on a continuous basis and emotions are intrinsically part of our intelligence, part of the social interaction and the ability to make decisions." [4]. It is therefore important to us as humans to be able to define, express and share our emotions with others. In a world where we increasingly carry and use computers to communicate and share information the challenge is how to find ways to enable this process and in particular how to cope with the delicate balance between human input and computer automation. The key aspect of emotions we concern ourselves with in this text is how we respond and communicate our feelings about places. Emotions and space are also fundamentally intertwined. Places have atmospheres and incite different and often strong emotions in people; for instance

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[1] http://www.qiro.net/
[2] http://www.dopplr.com/tour
[3] http://www.google.com/intl/en_us/latitude/intro.html

the spot with a beautiful view in a foreign city or the comfortable feel of the street in which your home is located. However, emotions are by their very nature ambiguous, so in order to share them there must be some way for the person to communicate their emotions simply using a mobile device. For this reason we undertook a simple informal exercise to investigate a common way of expressing emotions about a place.

2.1 Method

The exercise was in the form of an ethnographic study undertaken with a focus group of participants. Participants were asked to visit a series of places and record their feelings and experiences in words (max. three lines) about the location. The description of the participants' feelings was collected and these were then shared in a focus group session. In this workshop the participants discussed their individual contributions and were asked to agree upon one attribute which fitted well with the collected feelings.

The participants were all familiar with the city of Berlin, Germany and they were asked to reflect on range of different places in the city:

- Your home (private space)
- The street where you live (private space)
- New Jewish Museum (public space)
- New National Gallery (public space)
- Viktoriapark (public space)
- Brandenburger Tor (public space / tourist area)
- Potsdammer Platz (public space / tourist area)
- Sachsenhausen (public space - a former concentration camp)
- Woohoo restaurant (semi/public space)
- Whitetrash nightclub (semi/public space)
- Ikea store (commercial space)

2.2 Participants

There were 6 participants, 2 female and 4 male. The participants had a mix of cultural backgrounds and all knew each other. They were not paid to participate.

2.3 Results

There were around 25 different expressions collected in the individual phase. The words included:

> *"grand, amazing, existing, depressed, fun, relaxing, calm, tranquil, cool, low, frustrated, comfortable, painful, annoyed, cosy, pleasant, unimaginable, loud, bored, impressed, amused".*

In the workshop phase the initial responses were reduced into a chart with more general groupings of feelings. It was immediately clear that was not possible to define a generic set of basic emotions, since each person expressed their emotions quite differently. Therefore the group attempted to discuss ways in which they could agree a common framework for describing and sharing their emotions with others. Out of this process some key issues emerged:

1) A common emotional response was a simple fairly instinctive 'like' or 'don't like' reaction which could be understood across the group.

2) A second characteristic that emerged was whether the person felt comfortable or at ease in a place.

3) It was found that the aspect of a liking or disliking a place was not linked to their sense of comfort at that place. For example some people disliked the restaurant environment but felt comfortable there, whereas others 'liked' or appreciated the concentration camp but found the place very uncomfortable.

4) When trying to assign emotions as attributes to spaces it was observed that the physical extent of a place was often ambiguous. It was difficult to define a physical space since it was not experienced as a point location but as an area or 'place'. The exact extent or localisation of the 'place' also varied from participant to participant.

5) The factor of time played a very important role as the same place had a completely different impact during different times of year and also at different times of day.

2.4 Defining an Emotional Matrix

Drawing on Scherer's dimensional structures of the semantic space for emotions [5] which uses a four axis distribution of emotional responses we developed an emotional matrix for the WiMO application. This enables users to define the type of emotion they relate to the place. In order to do this the WiMo matrix differentiates emotions between 'like' and 'don't like', and also enables user's to define the quality of the space by choosing on a sliding scale between 'comfortable' and 'uncomfortable' (see Fig 1). The user is therefore able to define the emotional quality of a place in an intuitive and meaningful manner.

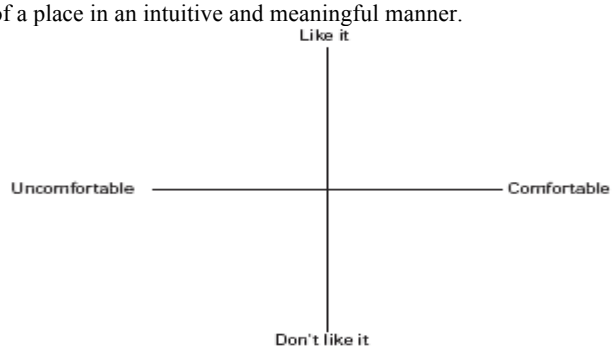

Fig. 1 WiMo emotional matrix

In order to respond to the issue of how to ascribe an emotion to a geographically ambiguous 'place', it was agreed not to use a point location. For this reason the WiMo application allows the user to create their emotion as a 'cloud'; the size or area of which can be chosen by the user depending on the physical extent of the place they wish to describe.

3. WiMo PROTOTYPE

3.1 Emotion Tagging Interface

A common approach to describing a place is the use of a tag or an awareness cue [6, 7] or a short notation that summarises the key qualities in a commonly understood format. The quality of the tag is critical to the systems, since research by Ames and Naaman on tagging in Flickr, found that the motivation for tagging is not just to make a photo searchable by the contributing user, but to enable users to discover other users' photos [8]. Thus the user's ability to assign a relevant and meaningful emotion to a place in a sense defines their social standing to unknown users, and more generally the usability and sustainability of the application.

The system's key component is the ability to manage and display location-based tags centred around the users' emotions. Through a tagging process the user can make an unlimited number of tags, describing particular emotions about places. These tags can also overlap with other users: so that for instance the same place could be tagged with both `restaurants' and `Jenny's favourite places'. When the user chooses to leave an emotional geo-tag at a location the user first defines the quality of the emotion in the matrix.

Fig 2. Prototype showing process of creating geo-emotional tag

Following this the tag is displayed as a blue cloud icon, which the user can customize by defining the approx area of the cloud so that it matches with the physical extent of the place the user is trying to describe (Fig 2). The user can also leave short messages linked to the geo-emotional tag, which are displayed on a map background (see Fig 3).

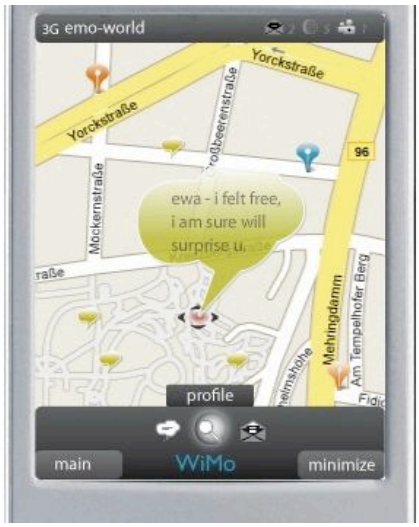

Fig 3. Prototype showing message attached to geo-emotional tag

A further feature of the WiMo system is that these tags can be personalised through the user's self-defined filtering criteria. For example, a user could easily instruct the WiMo to only display tags relevant to a group of friends with whom he is spending the evening. On the other hand, on a Monday morning the WiMo could display only tags relevant to the user's business, rather than social tags. The social tags give users the opportunity to understand their surroundings by informing them of the social meanings of the surrounding world.

3.2 Scenario

In the development of the prototype a case study was undertaken, where a participant was asked to test the features of the system in a real-world setting. The case study took place in Berlin, and was performed by a participant 'Jenny' who was new to the city. In the scenario, Jenny wakes up on Saturday morning after having a hectic first week at work, and checks her WiMo. She first looks to see if there are any interesting events happening in Berlin that day. She decides to go to a street festival in Kreuzburg by bike so that she can explore a new area of Berlin. On her way to the festival she finds herself in a lovely park near Kreuzburg, but she realises at the same time that she has lost her bearings on the route to the festival. She opens up WiMo on her mobile to check which part of Berlin she is in (Fig 2). Since she is not in hurry, she decides to spend a bit more time in this area and she sits down on a park bench. She really likes the surroundings and feels comfortable being there. So that in future she can share this place with her friends she uses WiMo to keep track of her feelings about this specific places, by leaving a geo-emotional tag (Fig 4).

Fig 4. 'Jenny' opens WiMo application to check where she is, and then uploads her feelings about the place to WiMo

However she decides to share her feelings with only one specific friend, and not to allow access to every WiMo user. When Jenny finishes entering her feelings about the location, WiMo updates the information and automatically displays five more geo-emotional tags from nearby areas according to user profile that Jenny specified while uploading her own emotional tag. She finds it fascinating to read other user's experience about the place, and it helps her to find people with similar interests to her.

3.3 Interface Architecture

On the main screen of WiMo there are six main services (Fig 5):

1) **Status:** User's current state of mind or activity. This is a message describing the current mood of the user and is selected at log in.

2) **Mails**: The main communication constellation where user can communicate with other member of a group.

3) **WiMo-World**: The overview map is visualized as an overlay on Google Maps/ Ovi Maps, and also displays the geo-emotional tags and real-time presence of other users within a certain radius.

4) **Friends**: Main section where communication between friends can happen. Friends are defined by the user, and status can toggled between on and offline. If a user clicks on a particular friend from their list WiMo will display the following information about them: distance of friend's position from user's current location, place last seen at and the location they were last seen at.

5) **WiMo-tag**: One of the key features of WiMo application, where user can define and share their emotional feelings (see 4.1).

6) **WiMo-Community**: After either scanning a tag or selecting a social space, the user enters an asynchronous discussion space that presents user-generated media clips in a browse-able, graph-based interface.

The WiMo interface can also be accessed through a PC using a web browser, so that users who want to spend time reviewing information such as user profile and distant places can do so from a fixed location.

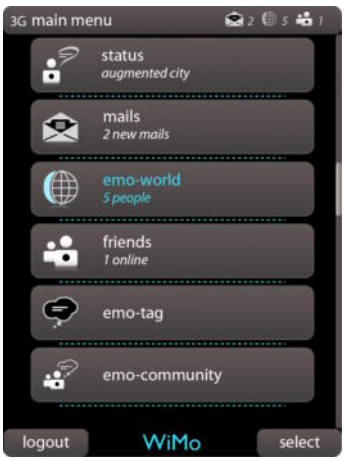

Fig 5. WiMo Prototype main interface

3.4 Technical Specifications

WiMo client is programmed in J2ME, and runs on Symbian OS and the prototype is shown on a Nokia N95 smartphone. This route was chosen to ensure a wide range of coverage on handsets. The framework comprises the Emo-Tags server, WiMo server and metadata server.

The Emo-Tags server is mainly concerned with the mapping of the tag IDs to the corresponding URLs. The application server is responsible for the interaction with the mobile phone and other WiMo services (e.g. application specific POI's, proprietary maps). The metadata server, which runs on a MySQL Server, contains user location and user status. The main data tables contain the User ID, GPS Coordinates, status and location of information folder. This folder also contains secondary information such as the user's shared files as well as backup data. In the interaction process, the user inputs a geo-emotional tag using WiMo client on their mobile device, this data is then uploaded to the Emo-Tags Server that maps the tag ID to the corresponding URL and redirects the mobile phone to the desired services. The tag hereby defines the entry-point to the application e.g. the WiMo-Community.

The user's phone periodically updates the WiMo server with their own locations (X), which maintains per-phone location in its localization database. When the user sends a query to a specific region the WiMo server sends a request to the metadata server together with a user ID. If feasible, the metadata server retrieves all Emo-tags which match the time, location and permission attributes, and returns them to the user organised by proximity to their actual position. Otherwise, the server selects phones located in the region X (that have declared themselves available) and forwards the query to them. Phones that arrive later at X also receive the query. When a phone responds to this query the response is linked to the query and placed on the map as a new interactive Emo-tag. Queries are active for a pre-specified lifetime which is configured by its originator. Upon expiry, they are removed from the Metadata server.

To achieve content distribution in physical space the WiMo server also 'pushes' location-specific WiMo-Community to phones that arrive at that location. The push operation is triggered when the phone updates the server with its location. Of course, not all community are pushed to phones, only the channels that have been subscribed to by the respective user.

4. NEXT STEPS

The critical next step for the WiMo application is to undertake usability testing with participants. It is planned to run an empirical study with fifteen participants within a fixed time-frame and in a specific geographically defined setting. Seven of the participants will be selected so that they have existing social ties, and the remaining eight will be strangers. Each of the participants will be loaned a mobile handset with the WiMo application installed. They will also receive an initial training session to explain how to use the application, and given an overview on the purpose of the study. The study will take place over a period of a week, and all activity on the application will be recorded. The data log will be analysed to see how the exchange of information among the participants occurred. Following this analysis, interviews with the participants will be undertaken asking them to evaluate the system, and in particular to describe their approach to assigning emotions to places and sharing them within the group. Once the study has been completed the results will be reviewed in order to make improvements and develop a full working model.

5. SUMMARY

Emotions are a critical aspect of our experience of places and we proposed that the sharing of these emotions represents a powerful social practice. We presented work-in-progress on a mobile system, WiMo, that enables location-based social context-awareness and networking through emotional tagging. A case study scenario was described and we further outlined the development of a working prototype where emotional tags are defined by the user using a matrix, and then overlaid on a cartographic map interface. An overview of the interface framework was then outlined, which included the opportunity to leave messages, view status and manage the user's social network. This was followed by an outline explanation of the technical specifications of the system, and finally a discussion of the proposed usability studies required for the future development of the WiMo application.

6. REFERENCES

[1] Brown, B. and Chalmers, M. 2003. Tourism and mobile technology. ECSCW. Kluwer Academic Publishers, Norwell, MA, 335-354.

[2] Axup, J., Viller, S., MacColl, I., and Cooper, R. 2006. Lo-Fi Matchmaking: A Study of Social Pairing for Backpackers. In proc. Ubicomp 2006, Springer, Berlin, 351 – 368.

[3] http://biomapping.net/

[4] Damasio, A. 1994. Descartes' Error: Emotion, Reason and the Human Brain. Avon, New York.

[5] Scherer, K. R. 2005. What are emotions? And how can they be measured?". Social Science Information, 44(4), 693–727.

[6] Oulasvirta, A., Petit, R., Raento and Tiita, S. 2007. Interpreting and Acting Upon Mobile Awareness Cues. Human-Computer Interaction 22 , pp. 97-135

[7] Hansson, R., & Skog, T. 2001. The LoveBomb: Encouraging the communication of emotions in public spaces. Extended Abstracts of CHI'01. New York: ACM.

[8] Ames, M. and Naaman, M. 2007. Why we tag: motivations for annotation in mobile and online media. CHI '07. ACM.