W3C Workshop on the Future of Social Networking

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Our vision of the Future Social Networking

Social Networks are becoming more and more popular these days. The fact that people want to be in contact with each other all the time, along with currently existing technology makes it possible to create Social Networks on mobile phones. The main and most famous networks have already ported their applications to hand-held devices, but the results are merely interfaces to their web portals. Mobile Social Networks require their own User Experience and behaviour.

Besides these mobile versions, many Mobile Social Networks have appeared especially designed for phones. Yet, while the interface and User Experience have been adapted, the behaviour of the Social Network does not quite adapt to the hardware features of these devices. The mobile phone capabilities are still highly underrated.

In Telefonica, we believe in a much deeper vision of Mobile Social Network. We believe in applications that adapt completely to the user needs and can give personalized information; applications that act automatically and perform many tasks on behalf of the person holding the phone; applications that use the mobile phone features to the fullest in order to enhance communication between people.

Human communication is more than information exchange, a text message sent to the mobile phone of a friend is normally enough to notify him some happening. But we, as social beings need more than words to communicate, we usually rely more in non verbal language to interpret what other people are saying than in their actual words. In our online communications we supply the lack of clues from body language or voice tone by using emoticons to add meaning to our texts. The possibility of adding context information to the messages or media interchanged by mobile social networks users offer them a more natural and rich way to communicate with their contacts, helping to smooth the distance barriers.

To achieve this vision, it is necessary to gather context information using the mobile phone. Rather than using only location information (as some Mobile Social Networks are starting to do), we envision Social Networks as fully Context-Aware systems that use the capabilities of hand-held devices to collect context information. Current mobile phones are fully equipped with sensors capable of acquiring many kinds of information. They have accelerometers to measure movement, microphones to record and analyze voice, cameras, location sensors, time… and even may be equipped with RFID technology, temperature sensors, Bluetooth, etc. If they are not able to get a piece of information by themselves, they have local and Internet connections to retrieve it from the outside. With that wide array of sensors is possible to collect context information such as location & time, weather, traffic status, temperature, walking speed and much more.

As well as context from sensors, mobile phones can as well collect information about the user that carries it everyday: contacts, phone calls, messages sent and received etc.

All this information conforms the whole context of the user that is part of a Social Network.
Using all this information, we can create new features for Mobile Social Networks:

- Automatically create the social graph. Use context and interaction with the device (SMS, phone calls, etc.) to generate a **user social map** that allows the users to build their social map based on the communication handset activity. Since a mobile phone is aware of how many times a user contacts another person, this graph can have different weights and different kinds of relations. The context information can answer questions such as "How much time is spent near a contact in the Social Network?" which helps create a much more complete social graph.
- The context information can complete the content the user creates. More information than location can be attached to the context, all the documents the user creates can be stored with meaning using enough information about the context and circumstances of the moment the document is created.
- The mood can be guessed from the retrieved information of the user and environment.
- Based on context and user information, an automatic and deep user profile can be created. This, along with the meaning stored with the content, enables the application to give much more accurate recommendations. Creating such profile can even help a user to know information about herself she did not know.
- Advanced profiling capabilities are possible, such as analyzing compatibilities between people (enough context data could give information regarding their tastes, things they like to do everyday, etc.). It is also possible to detect potential new contacts that are alike or potential new social relationships.
- The context information is useful as well for adapting the device, its features, interface and User Experience to the circumstances and needs of the user in every moment.

As a research entity, Telefonica is interested in creating context-aware systems suitable for mobile phones and their restrictions, as well as reasoning engines that process that information in order to perform actions that depend on context. Those engines must work under the hardware and processing power restrictions of handsets.
As a mobile operator, Telefonica wants to provide this kind of service to customers, playing an important role in the information retrieval, since there is a lot of useful context data reached directly via the operator that otherwise would be very difficult or even impossible to obtain.
This vision is especially conceived for mobile handsets, and these devices require a special design and User Experience. Applications must not limit to port their web or desktop interfaces to mobile phones, extensive studies of user interaction are needed. These studies gain much more importance in the future, as Mobile Social Networks become proactive, perform tasks automatically or adapt to the context. A balance between automatic and manual is crucial to achieve success, since a too proactive application would probably be annoying for the user. Interaction studies must be done to analyze to which extent an application must act on behalf of a user. We should not forget that there is no more intelligent and proactive machine than a human.
Another important aspect to take into account is security. Since there is a significant amount of personal, context and location data about the user, it becomes strictly necessary to keep privacy as severe as possible, always respecting user rights. Security is as well a very important issue. Keeping the information confidential also means

protecting it from attackers and providing reliability to data. An environment where mobile users share and create contextual information is prone to security flaws and the privacy of the user must be guaranteed in almost every situation.

NEMOS – A vision made prototype

Following this vision, the NEMOS project wants to make it a reality. Although it is still under development, the ideas envisioned in the theory will be put into practice in a prototype. User tests will give feedback about the acceptance of the idea and how adequate is the User Experience.

Some of the features of NEMOS are:

- Get context information through the Internet or sensors inside the mobile phone to create a context model.
- Proactive behaviour: the device adapts to the environment and context conditions, changing the UI and even the way it has to behave (for example sounds and type of notifications).
- Automatic Social Profile Map**.** Use context, interaction with the device (SMS, phone calls, etc.) and contact information on the phone to generate a **user social map** that allow the users to build their relationship map based on the communication handset activity.
- Mobile social network aggregator. Allow the users to access to other social networks
- Upload content and documents to the community with **context** information attached that give meaning. It also helps in tasks of search and recommendation (search content in this location or documents created while the user was in concrete circumstances).
- Create electronic Post-its attached to places that relate location data to content.
    - Leave a note in a place. Notes **pop-up** when users pass by the same **place** again.
    - There can be personal notes (personal reminders), communication notes (friends remind friends of errands at a concrete place) or general notes (for the audience: Concerts and events held in that place).
    - Opinions: What other people think about that place
    - Possibility of explicit search of notes and conditional pop-ups. Notes only pop-up under certain context conditions, to certain users/groups or at certain time of day.

NEMOS tries to research into deeper interaction between people and their relationships, and it is the first step towards our vision of future Social Networks.

Further work

Once the first step is finished, several steps towards the future have been planned in the near future. The main topic in which we will focus our efforts is giving NEMOS more advanced profiling features. Using more contextual data, a deep analysis of the user interaction and behaviour will be carried out. Following the principles of Reality Mining founded in the MIT, that information will be the source that tells us the day-to-day activity of a person’s life. One of the goals is to transform mobile phones into personal information-gathering devices that can be used anytime anywhere, exploiting

their inherent capabilities of ubiquity, sensing and processing power. As said before, mobile phones are widely extended and fully equipped with sensors, actuators and processing units, but they are as well part of everyday life, which makes them the ideal devices to gather data concerning the behaviour of any user.

With that information, a much deeper user profile can be created, which will shape a user behaviour model, useful for tasks ranging from recommendation to profile matching or even city planning: if a user goes from point A to point B several times a week, and there are many people like him, maybe a new bus line is needed.

That work opens an interesting research line which is the user behaviour modelling from context.