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# Overlaid Information Communities

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**Abstract**

This position paper discusses the notion of situated information spaces – harnessing the power of many to create a situation-dependant, context-driven information layer over the world. My take on this topic will be put forward at the Shared Encounters workshop at Chi 2007, San Jose.

**Keywords**

Situated informatics, locative media, GIS, social web

**Introduction**

Online social networks (OSNs) have been the trend of the past few years, with start-ups like Friendster (2002, with 36+ million users as of January 2007), MySpace (2003, with 130 million users as of November 2006) and Facebook.com (2004, 14 million+ users as of January 2007) [5] pushing the trend. The features of these OSNs vary, but have one common similarity: they track networks of people and provide an easier means to communicate and interact with them. In the words of Facebook.com, the most recent success in the crowded world of OSNs, “Facebook develops technologies that facilitate the spread of information through social networks allowing people to share information online the same way they do in the real world”. The important distinction between Facebook and the other popular social networking sites is not main concept of providing content and sharing it to

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*CHI 2007*, April 28–May 3, 2007, San Jose, California, USA.

ACM 978-1-59593-642-4/07/0004.ACM 978-1-59593-642-4/07/0004.

others in your social network, but of its context linking and content aggregation features. This will be explained in more detail later.

A recent trend of OSNs make use of location data to provide services that let people track where their friends are, to help people meet up (e.g. [2, 16]) and to recommend services [3]. In the past five years, researchers have been exploring the possibilities of location-aware mobile systems (e.g. [8, 10, 14]), and we think that observations of these systems can be used for the development of a different kind of system.

The remainder of this document will explore how the success of OSNs can be used to inspire the development of “overlaid information sharing systems”. The system uses existing ideas but would use a mixture of techniques to generate context metadata that makes searching for a certain type of information easier, which effectively places a data layer within the space of all contexts. Most of the contextual data can be derived automatically from our mobile phones, as a mixture of automated inference and tagging. This means that we take advantage of the mobility of the devices we carry around with us.

### **Location Sensing & Privacy Issues**

Systems that use location data as a means of aiding social interactions, by nature, are inherently filled with privacy issues. For example, how do we make sure that a user’s location is only revealed to trusted people? A common solution is to only reveal the location to your manually chosen social group, and to provide controls to only reveal location information when the system is explicitly asked to. Most of the research in social networks that use location data works like this.

However, it can be imagined that, with *careful control* over content and privacy, we can create systems that share location data with *everyone*. The notion of “familiar stranger” can be used to support the idea that people do place some importance on others that they are not fully acquainted with, but see regularly; that recurring co-presence in a place has consequences even with people who have never met [13].

Places act as social filters – people acting individually and collectively, actively structure their environments. A feeling of closeness to a place could be provided by having access to information people have written about that place. Such a system would thrive on an information space where opinions and ideas overlay and flow across the real world, enabling people to discover the personality of the locations they visit through the people that are linked through those locations.

### **The Overlay**

We can imagine a system that uses proximity detection between users as a means to filter an *information space* of user generated content. Content could be similar to what people post in blogs that often, *but not always* contain information about locations [12], or can be extended to include any kind of data, for example text or multimedia. User defined tags help define the context so that other users that use the location can access communities with users that share similar contexts. Over time, this information space would collect data related to these contexts. Simply by being at that place at a given time links you to a community, built pervasively, existing as long as people care about it. Nobody could predict what data would be shared, but we can ponder. How about reviews of a movie

theatre, thoughts on a historical landmark or collaboration on a research topic using a conference in Spain as a contextual label? The key here is emergence; give users access to an information space, a place to put their social media, tag locations, create communities, and tools to access, aggregate, rate and discuss that content, and see what happens. YouTube did it with videos. Nobody knew that it would be so popular to share short video diaries of a user's personal life. This success can be explained by Metcalf's law, which can be applied to predict that the usefulness of such social networks is roughly proportional to the square of the number of users using that service [6], and it's obvious that this would refer to statistics on the massive number of videos viewed on the site (1.7 billion) [1].

### **Content Aggregation**

Content embedded in the world has the capability of overwhelming the user by its sheer size. Inspiration can be drawn from Facebook.com and its aggregation features. Information posted by your social network – photos, blog posts, comment and so on are instantly updated on your friend's dashboards, subject to customizable privacy controls. This builds on the content syndication idea behind RSS, in effect creating a customized feed filtered in real-time by your position in a social network. We can draw from this idea, and offer filtering by *context*; with location and time being the most important. We ponder over scenarios where people would like to create virtual information spaces categorized by activities and places; in effect linking the *situated reality* to a virtual white board, which anyone can contribute to. Why should such communities be so difficult to create using current systems?

### **Use Scenarios**

A couple of scenarios can be developed to explain the concept. A small group of students who take an undergraduate programming module have two lectures a week. Most of the students do not know each other well, and even after weeks they do not see each other as friends. They treat each other at most as acquaintances; they see each other in lectures but the interactions do not carry on outside of that context. Now think of the task where the students wish to trade techniques, ideas and collaborate on programming tasks. Doing so with a core group of friends is easy to organize, but if you wish to take advantage of the whole collective is hindered by technology. A slightly more technologically advanced approach is to set up a community on the web, such as a web forum; but this requires effort. Traditional methods do not make it easy to collaborate with more than one peer at a time, and CSCW systems are dedicated for specific tasks only. Why is it that there are not systems to support this kind of collaboration space between people without having to explicitly install and configure software? The task could be made easier with context aggregation and an open information sharing and collaboration workspace. Here, not only is location important to label information, but time and possibly user generated tags (for example, adding another dimension to the metadata, a course title: "second year mass heat and momentum transport lecture").

A second scenario would be a restaurant or café owner wanting to track and encourage reviews of their restaurant from customers. There are currently two problems here. The first one is that most customers do not bother to search on the web for the web sites of places they have visited and leave comments.

Secondly, not all café owners have the resources or desire to create a website just for this purpose. Why can it not be that simply being situated in a place (the café) makes it simple for you to leave messages in that space? A system that tracks presence in the world and records contextual information makes it easier to search that world, recall where you've been, and so leave comments for that café owner.

Such a system is so open that we cannot possibly cover all use scenarios – we leave that to emergence.

### Content Creation: Motivation

So what motivation would people have to create content for this 'virtual information space' built on top of reality? The recent Web 2.0 approach to communities has proven that information provided by the participants of the communities themselves is useful. A key motivation, as described by Maslow in his hierarchy of needs (see Figure 1) is *actualization*.

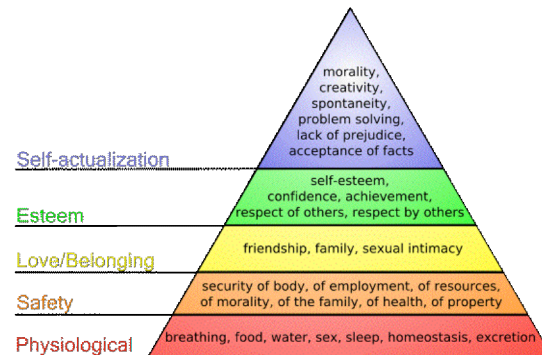


Figure 1. Maslow's hierarchy of needs [4]

Represented the top of the triangle is actualization, and is what people seek once they achieve esteem and respect from their community and peers. The term self-actualization, as described in [9], is a term used by Kurt Goldstein, and is the "fundamental need of human beings to make the most of their talents (unique abilities)". Maslow describes it as "intrinsic growth of what is already in the organism, or more accurately, of what the organism is" [4, 11].

The term "social currency" can be used to describe the contribution to the actualisation of a person in a community that depends on the relative popularity of that person. This social currency is gained differently depending on the community. For example, traditional BBS systems relied on "number of posts" and "number of posts per day" to satisfy a person who interacts with others via the system. New users of the BBS assume that the dedication to a board, measured in number of posts, is a good indication of the expertise or popularity of the person; hence the contributor is motivated to post more and keep this reputation.

YouTube, an online video streaming service, allows users to upload short videos and share them with the community and friends. We can argue that self-actualisation is a key driver in motivating users to post videos time and time again. A phenomenon has developed which prompted Google to acquire YouTube on 13 November 2006. The statistics are incredible:

*"In a single month the number of videos on the site grew 20% to 6.1 million. YouTube has some 45 terabytes of videos. Video views reached 1.73 billion. 70% of YouTube's registered users are American; roughly 50% are under 20. The total time people spent watching YouTube since it started [in 2005] is 9,305 years." [1]*

Yahoo! Answers [7] is another example, and works on the basis that there are many people on the Internet with levels of expertise in certain areas. It is a way of gathering large amounts of opinions by taking advantage of a vast user base. Yahoo! Answers incorporates a points system, with a cash reward system in the works, where rewards are given for good answers, but an article by Siklos [15] suggests that introducing an ancillary reward “introduces an externality that degrades the value of the community itself”. It would be interesting to explore whether this applies to the majority of non-professional content providers.

### Conclusions

The boundary between the virtual and physical world is blurred as information on mobile systems are augmented with contextual metadata, increasing the relevance of information to a particular place and speeding up search times for that information. Communities are built around locations, where you can have a conversation with people associated with a place, with similar contextual trails as you. The theory is still in early development, and some questions to be raised include the following: does the feeling of belonging to a location increase when we create information spaces via communities based on those locations? How do we enrich the definition of a place with information about the people that act within the location? Is the creation of user-generated content mainly motivated by reward systems or the satisfaction of sharing useful knowledge? What social behaviors would emerge from increasing the intimacy between a person and the places they spend their time in by relating communities to place?

There are some technological questions to explore: what kind of distributed system would be required to support such a large scale system, and to achieve full decentralization, do we need to use peer-to-peer technologies? How can we infer meaningful contextual information to reduce the amount of user input required, given the technology available to the average consumer, and how would this data be processed in a useful way by the system? How could we ensure that the information shared kept under control, given that the information space would be editable by anyone? Is the level of control even possible? A further study would be intriguing, and would help understand how we can use technology to make people feel *closer* to a place.

### Biography

Michael Voong received his BSc degree in Artificial Intelligence and Computer Science from the University of Birmingham in July 2006. Since October 2006, he has been studying as a full-time Ph.D. student under the supervision of Russell Beale. His research interests include mobile learning, location-based mobile systems, social networks and Artificial Intelligence applied to adaptive user interfaces.

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