

Nostalgia Bits  
Conceptual model for Communication Patterns  
*Deliverable D1.5*



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# Chapter 1

## Introduction

This document presents a conceptual model for the communication patterns supported by the Nostalgia Bits service. The goal of the conceptual model is to describe the nature of the interactions between the users and the service, as well as between the users through the service. Different communication patterns are envisioned for Nostalgia Bits, for different purposes. For this reason, this document proposed a classification across several dimensions. It is organized as follows:

- In Chapter 2, we look at how human communication can more or less explicit. Starting with an observation of what happens in the physical world, we then look at what happens in the digital world. Based on this, we derive some use cases and features that could be implemented by the Nobits service.
- In Chapter 3, we look at how space and location impacts human communication. More specifically, we look at social interactions that can be either co-located or remote. Based on this, we show that the Nobits service should support both types of interactions, by providing complementary features and components.
- In Chapter 4, we focus on the temporal dimension of the communication patterns and explain how the Nobits service should cater both for synchronous and asynchronous communication.

## Chapter 2

# Explicit-Implicit Communication Dimension

Human communication can be more or less explicit. In the physical world, when two people talk or write to each other, the communication is very explicit. Messages are consciously produced and consumed by the participants in the discussion. There are however also more subtle and sometimes unconscious ways to communicate. Examples include body language, facial expressions, gestures, etc. Interestingly, it is the combination of these types of interactions that make human communication very rich and very efficient.

Explicit communication is often about exchanging factual information, whereas implicit communication is often about sharing emotions and more subtle cues about the state of the participants. This has been the focus of abundant research, in particular in the field of Computer Supported Cooperative Work (CSCW) and is closely related to the notion of awareness. Awareness is rather broad concept, for which several definitions have been proposed in the literature. It can be summarized as a general sense of what other people activities and state of mind. In the workplace, when people share an open space, they are constantly and effortlessly exchanging messages (e.g. a colleague). When people work remotely, all these cues disappear and collaboration becomes more difficult. Technologies have been developed to address this issue and to create seamless connections between remote locations. Media spaces, ambient display and collaborative editors are examples of such technologies.

One particularly interesting aspect of implicit communication patterns is that they are well suited to the convey affective and emotional state of participants (as an example, consider that body language reflects the current state of a person). Furthermore, they are also capable of inducing a change of the affective and emotional state of participants (as an example, think about your reaction when you see someone smiling or frowning at you).

### 2.1 Related Concepts and Features in Nostalgia Bits

Explicit and implicit communication patterns are both important for Nostalgia Bits and should be combined appropriately in the design of the service. This hypothesis was made at the inception of the project and has been confirmed by the initial user studies. The following features illustrate how Nostalgia Bits aims to support *explicit communication* between the users:

- One objective of the Nostalgia Bits service is to allow participants to share memories, by means of story telling. Story telling is an explicit form of communication, whether it is done orally or verbally. Therefore, the service should make it possible to capture and share concrete textual descriptions, very much like wikis and content management systems work.

- On top of the content creation features, the Nostalgia Bits service should also make it possible for participants to communicate with each other, using the shared content as a context for communication. As a matter of fact, we see a number of variations for this type of feature, along the dimensions described in this document. Exchanging text messages through the digital service, having realtime video conversations, having face-to-face discussions are some examples we have in mind.

The following features illustrate how Nostalgia Bits aims to support *implicit communication* between the users:

- One design objective for the Nostalgia Bits service was that users should not necessarily have to use a traditional personal computer to use some of the features. For instance, a digital picture frame that periodically fetches and displays shared content (photographs) from the Nostalgia Bits service is an example of a simple, yet effective ambient communication design. We emphasize the term *communication*, because we believe that through the sharing of photographs, people are engaged in a shared experience and collaborative process. It is a perfect example of implicit communication pattern.
- In this scenario, we furthermore argue that the emotional impact of sharing photographs is very strong for the recipients. In the focus groups conducted during the first project phase, some participants have reported that they find the internet technologies *cold* and *impersonal*. If Nostalgia Bits was a pure content management system, there would be a risk that users would not feel engaged and *connected* with each other. The fact that the service also supports simple and effortless photo sharing is therefore important.
- Another type of implicit communication enabled by the Nostalgia Bits service was inspired from previous work on *awareness* systems. These systems try to create a sense of *being together*, even if participants are separated by space or time. To achieve this goal, they firstly capture some form of activity in a first space (with various sensors), they then create a model of the ongoing activity and they finally create representations of the activity in another space (with various actuators). This idea has been incorporated in the design of the Nostalgia Bits service. When users interact with the service (whether they produce content, interact with content, interact with each other), their actions are captured and fed into a model. This model is made available through APIs, which makes it possible to create representations of the ongoing activity. These representations can be more or less abstract and can be generated by different types of ambient devices.
- One example for such an ambient device is a colored wall-mounted panel, which displays dynamic visual patterns. The panel can be configured, so that it glows every time a photo shared by his owner receives a comment or a rating in the on-line space. The communication supported by this device is obviously very implicit, but it is also very powerful. Firstly, the user does not have to make the effort to connect to the on-line service and to check for updates (the appliance is a way to maintain a seamless connection between the service and its users). Secondly, we believe that the immediateness and the aesthetics of the representation has a stronger emotional impact than a traditional web-based representation.

## Chapter 3

# Spatial Dimension

Communication patterns supported by the Nostalgia Bits service have a spatial dimension, in the sense that they can be either remote or co-located. The distinction between these two forms of communication and their relative merits was probably one of the most important learnings of the user studies conducted at the beginning of the project.

Initially, Nostalgia Bits was primarily described as an on-line social service. The features of the service would allow people to find each other, to share content with each other and to engage in on-line collaborative activities. One of the scenarios described to target users involved a grand-father and his grand-son. Working remotely, the two would go through content uploaded by the grand-father in order to produce a digital report (for a school assignment). As a matter of fact, the important outcome of the process was not the report. The important outcome was that because the grand-father and the grand-son were engaged in a collaborative activity, they had a context that supported and nurtured communication. As a result, the sessions were foreseen to be richer and longer lasting than simple video calls which are often reported as awkward.

When target users were asked about this type of features, they expressed strong interest but raised the importance of the spatial dimension in Nostalgia Bits. Indeed, they said that they were eager to share memories, to engage in story telling activities and to have more social interactions with various types of people. But they also said that they saw more value in co-located, face-to-face interactions than in remote, computer-mediated interactions. Hence, they reacted very positively to scenarios where elderly would meet other people (whether their peers, children or members of the local community) and engage in co-located reminiscence processes.

During the inception of the project, it was foreseen that the process of capturing content (by scanning old photographs, uploading digital photographs, etc.) might be an issue for some users. The idea to organize *content capture workshops* was proposed, where contributors would get help from technology savvy participants in order to share content and learn about the service features. At first, this was seen as an activity that would support the Nostalgia Bit service and foster its adoption. Based on the initial user studies, it turns out that these types of workshops should actually be considered as an integral part of the Nostalgia Bits service (and that they should drive the design of some of the service features).

### 3.1 Related Concepts and Features in Nostalgia Bits

As it is the case for other dimensions, we believe that it is the combination of co-located and remote communication patterns that make the Nostalgia Bits service valuable. Highlighting the value of co-located reminiscence workshops does not mean that remote computer-mediated processes have no value. For instance, target users expressed strong interest in the outcome of the workshops (i.e.

additional content published in the Nostalgia Bits service) and in the fact that it could be shared with their extended families. The following features illustrate how Nostalgia Bits aims to support *co-located communication* between the users:

- The Nostalgia Bits service provides interfaces to upload digital content, consisting of textual descriptions (stories), photographs and other multimedia artifacts. In general, these interfaces can be used both in co-located and remote settings. In the first case, they would typically be used jointly by a group of people (the content contributors and a technology savvy participant). In the second case, they would typically be used by an independent user. The same user interface could well be used in the two situations, even if a customized user interface could make the group experience smoother. For instance, think of a technology savvy participant uploading content on behalf of several contributors in the same session. In this case, the user interface should provide a means to explicitly define the author of every piece of content (whereas in the general case, the identity of the currently logged-in user is used implicitly).
- To efficiently support co-located group activities, it is important to consider and plan the multi-media infrastructure used at the periphery of the Nostalgia Bits service. Laptops, tablets, scanners, digital cameras and beamers are all equipments that should be integrated in the setup in a way that facilitates interactions and discussions. One of the practical challenges to consider is the availability of an Internet connection, which cannot be taken for granted in places used to conduct the workshops (classrooms, elderly care centers, etc.).
- As mentioned before, the objective of co-located workshops is to foster interactions and discussions among participants. In other words, participants should be engaged in a smooth collaborative reminiscence process. We believe that technology serves a dual purpose. On one hand, it should support the reminiscence process (e.g. consider something as simple as a beamer projecting personal photographs, prompting questions and discussions). On the other hand, it should capture some of the communication and interactions (e.g. the comments made by participants about a particular photograph) so that it can be fed back and archived into the service.
- We believe that simple physical artifacts (that can be manipulated, passed around, etc.) are very good at supporting natural and seamless interactions between participants. For instance, a feature of the Nostalgia Bits service could be to print shared photographs on paper, with overlaid QR-Codes. During the workshop, the paper cards could be physically manipulated by participants. By showing these cards to a web cam, participants could easily have them projected by a beamer. By scanning these cards with a tablet, participants could also easily add comments to the associated media item.

The following features illustrate how Nostalgia Bits aims to support *remote communication* between the users:

- The initial use cases envisioned for the Nostalgia Bits service were adapted to remote communication. Users should be able to upload digital content and to capture memories. Users should be able to browse through the collective content and augment it with comments, feedback, etc. Users should be able to exchange messages with each other. In this respect, Nostalgia Bits can be described as an on-line social service and offers features similar to popular services such as wikipedia, Flickr and Facebook.
- As described in Chapter 2, the integration of ambient devices in the Nostalgia Bits system is an attempt to blur the distinction between remote and co-located user experience. Indeed,

ambient devices can be designed to recreate some of the subtle communication cues that are naturally and effortlessly exchanged in co-located settings, some of which trigger an affective response (e.g. seeing someone smile while watching my photograph makes me happy, seeing someone frown while watching my photograph makes me want to understand why).

- The previously described idea of Nostalgia Bits artifacts being printed on paper cards, with overlaid QR-Codes, is not restricted to face-to-face activities and can also facilitate remote communication patterns. After a reminiscence workshop, the paper cards produced by participants could be pinned on walls (in a classroom, in a care center). Visitors with a smart phone could then later scan the QR-Code. They would then see the artifact on their screen with associated stories and would be able to give their feedback and add their comments. This social activity would itself be captured by the Nostalgia Bits service and would be notified to the story contributors. For example, a person who has contributed a story to Nostalgia Bits could have a lamp glow in his living room every time the story is read by someone. While it is difficult to describe and measure, we believe that the emotional impact of such a notification system is strong (stronger than an e-mail notification, for instance). It can then trigger a process, where the person would connect to the Nostalgia Bits web portal to find out the explicit details about the feedback. Ultimately, this could lead to an explicit communication with the person sending the feedback.



## Chapter 4

# Temporal Dimension

The temporal dimension of communication patterns in the Nostalgia Bits service is orthogonal to their spatial dimension. It is used to capture the fact that some features support *synchronous* (*real-time*) communication, while others support *asynchronous* communication. In Chapter 3, we explained how reminiscence workshops were a key component of the overall Nostalgia Bits service. We explained how initial user studies have highlighted the perceived value of such workshops for the elderly and how they have to be considered as a first-class citizen in the service (as opposed to merely being a way to facilitate content capture).

Face-to-face communication is by nature synchronous, which means that everything we said about the reminiscence workshops is valid for synchronous communication patterns. One interesting question is to examine the *modality* of the synchronous communication. The most natural way for people to communicate when they are at the same location is to do it verbally. One can easily picture a group of people sitting around a table and having a conversation (about a collection of photographs, for instance). There is a lot of value in the discussion happening during a reminiscence workshop. It would therefore be very valuable to capture and archive this discussion. Technology is available to record and index audio streams. The result could become itself an artifact managed by the Nostalgia Bits service (i.e. visitors would not only browse through personal photographs, but they would also hear what elderly remember about them). Creating an audio collection that is easy to browse and navigate, however, is not trivial and goes beyond the scope of the Nostalgia Bits service (it is also a question, whether the raw content would be usable, or whether it would require significant post-processing and editing to be usable; so that irrelevant digressions that make face-to-face interactions enjoyable but that would not be relevant in the archives could be removed).

The Nostalgia Bits service can also support synchronous communication patterns across distance. This is the case when participants interact with the activity modules integrated in the Nostalgia Bits portal. Very different types of activity modules can be envisioned. In generic terms, a Nostalgia Bits activity module is an application that supports a collaborative task that involves Nostalgia Bits artifacts. An activity module often consists of a shared application (shared in the sense that participants can manipulate the same objects and see each others actions) augmented with audio and/or text side communication channels.

Asynchronous communication patterns are also considered important for the Nostalgia Bits service and are enabled by features commonly found in social services and user-generated content services. For instance, content creation and content consumption do not have to happen at the same time. A user who logs into the Nostalgia Bits portal can explore the entire content collection, whether the authors are currently on-line or not. In addition, annotating and commenting artifacts creates information that is persisted and that can be consulted at a later stage by the contributor

of the annotated artifacts.

The ambient devices integrated with the Nostalgia Bits service seek to create a bridge between synchronous and asynchronous features. The design of the wall-mounted panel that represents ongoing activity with patterns of colors is based on the hypothesis that receiving an abstract notification in realtime has a strong emotional impact on the user (“Someone is commenting one of my photos *right now*; I can almost *sense* it”). The hypothesis is that the continuous flow of ambient notifications allows the user to stay conscious of the social service and curious about what is happening. Every notification is a trigger for the user to connect to the social portal, through which explicit interaction can happen.

## 4.1 Related Concepts and Features in Nostalgia Bits

The following features illustrate how Nostalgia Bits aims to support *synchronous communication* between the users:

- To come back to the reminiscence workshop scenario, one could think of lightweight ways to gather input from participants while they have discussions and share memories, even if the entire audio stream is not captured. For instance, one could imagine an interface on a digital tablet, which participants could be used to tag, annotate or comment the photograph currently projected by a beamer. The user interface could integrate predefined buttons (“I like”, “I was there”, “This was in 1959”, etc.). The rationale would be that using the application is easy and does not get in the way of the conversation, but at the same time provide data to enrich shared content and to create connections between people and media items.
- A simple example for a Nostalgia Bits activity module is a puzzle game, which uses a contributed photograph as its art work. One can imagine that grand-parents and grand-children would use this puzzle as a shared application. They would be able to jointly solve the puzzle, by moving the pieces around (each participant would be able to grab and move the pieces). They would most likely also use an audio channel to be able to chat while solving the puzzle. Solving the puzzle is actually not what matters most in this scenario. What matters most is that because they are solving the puzzle together, grand-parents and grand-children are engaged in an activity that makes the conversation more natural, engaging and long-lasting.

The following features illustrate how Nostalgia Bits aims to support *asynchronous communication* between the users:

- A number of features that were previously described and that are typical of social services fit in this category. The functions that allow users to upload content, to browse through content and to annotate or comment content are asynchronous by nature.
- When describing the role of ambient devices, we mentioned the notion of *awareness*, which we described as a general sense of what is happening in the system. Until now, we focused our explanations on scenarios where activity is detected in the (on-line) Nostalgia Bits service and represented in a way that can be very abstract (e.g. a lamp glowing or a wall-mounted panel displaying a particular pattern). This might have given the sense that awareness and ambient devices are used only to support synchronous communication patterns. This is actually not the case. Firstly, it is interesting for people to have an idea of what is happening in the service at a given time, but it is also interesting to have an idea of what has happened in the past (e.g. what has happened since *yesterday*, what has happened *recently*, etc.).

When the contributor of an artifact connects to the Nostalgia Bits portal and looks at the activity surrounding the artifact, he will typically find out how many people have seen the it recently, what proportion of people has liked it, what type of comments have been posted, etc.

- The fact that awareness requires an understanding of what has happened in the past needs to be taken into account when designing ambient devices. To illustrate this idea, consider an ambient device which role is to inform users about the popularity of their artifacts. A first idea would be to define a mapping between the quality of the ratings and the color of a wall-mounted display. In this design, whenever a positive rating is added to a shared artifact, the ambient device owned by the contributor of the artifact turns green. Similarly, whenever a negative is added to an artifact, the ambient device turns red. This simple design fails to capture the temporal dimension of the represented activity and the freshness of the notification (i.e. Was the rating just posted or was it posted a week ago? The last rating was positive, but what about the 9 before that?). A variation on the design would be to integrate the brightness in the mapping. Typically, an intense color would represent a rating that has been posted recently. Over time, the intensity would decrease and fade out, thereby giving a sense that the notification is getting old.

## Chapter 5

# Conclusion

In this document, we have described several dimensions that are used to classify the communication patterns supported by the Nostalgia Bits service. The service is rich in the sense that it integrates a web portal and a vast array of client devices that take advantage of the open APIs publicly available. Indeed, the Nostalgia Bits service was not designed to provide a finite set of pre-defined features, but rather to enable the iterative and collaborative addition of features and applications (by third-party developers) on top of a collective corpus of personal memories.

Because of this diversity, all the dimensions described in the document are relevant and can be illustrated with usage scenarios to bring value to end-users. They should therefore be seen as a framework for classifying features and understanding how different types of features complement each other. For instance, we have explained that one role of the ambient devices is to create a seamless and emotional connection between the Nostalgia Bits service and the real world (people do not have to connect to the web portal in order to *feel* what is happening in the service).

We have also insisted on the importance of the reminiscence workshops that are seen as an integral part of the Nostalgia Bits service. Initially, the idea to organize workshops was primarily seen as a way to facilitate content creation (because it was foreseen that elderly might have issues to use even simple digital tools). During the initial user studies, it turned out that meeting other people in the real world and to share memories face-to-face was highly valued by prospective users. From this perspective, one role of the Nostalgia Bits service is to support the co-located activities (e.g. having a repository of digital artifacts that is easy to browse facilitates the group discussions). Another role is to capture the results of the group activities, so that they can be shared with a larger public. It was also shown that target users value the fact that the reminiscence workshops lead to the production of tangible results that they can proudly show and share with their peers and families.