

# IYOUIT – Share, Life, Blog, Play

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## ABSTRACT

IYOUIT is a prototype mobile service to pioneer a context-aware digital lifestyle and its reflection on the Web. The service is made freely available and leverages Semantic Web technology to implement smart application features. We intend to not only present and demonstrate IYOUIT at ISWC'08 but also to provide it to conference attendees, based on their demand.

## 1. OVERVIEW

IYOUIT<sup>1</sup> is a mobile application that allows users to automatically collect so-called context information centered on places they visit and people they meet. The application aims at making it easy to collect such data on a standard phone and facilitates an instant and light-hearted sharing of personal experiences within communities and rich contextual tagging for use in everyday life.

All data collected by IYOUIT is aggregated into a wealth of context information and made accessible to the user on the Web and on the mobile phone. For selected contextual sources, value is added through the transformation of quantitative context information into qualitative statements about a user's given situation. By hooking up to Web2.0 services like Flickr and Twitter, the application allows the user to share personal context with others online. Sharing can be instant, by posting single data items to such services, or through the aggregated contextual experience in potentially lifelong online blogs.

IYOUIT is a fully functional research prototype that can be experienced as an always-on service on the mobile phone, as an added value to 3<sup>rd</sup> party Web services or as a set of components for application development. Both, from our research perspective as well as in its service features, IYOUIT is shaped towards the four target application domains Share, Life, Blog and Play.

## 2. SHARE, LIFE, BLOG, PLAY

*Share* (community-based context sharing): application features of the IYOUIT target domain Share are concerned with the possible synergies of context-awareness and social networking services. Social networking is enhanced through ontology-based reasoning for communities and focuses on the analysis of personal context histories and established relationships to identify possible social network extensions. Semantic Web technology, in terms of formal ontologies, is applied to represent the social network of users with qualified social relationships. Through ontology-based reasoning, data consistency can be ensured and additional relationships can

be deduced to complement the users' circle of friends as a social portfolio. A basic feature of IYOUIT Share is realized in the enhanced photo sharing with IYOUIT through Flickr (cf. Figure 1). Photos taken with the phone camera are automatically tagged and instantly shared via Flickr through established relationships.

*Life* (life support through context-aware guidance): IYOUIT Life is concerned with analyzing user-generated content, such as tags that are manually assigned to photos, and its relation to context over time and space. In the spirit of the Web2.0, the goal is to extract information from the "wisdom of crowds" through aggregation in the geographic space. Clustering methods are applied to large sets of user-generated geo tags to determine regions of interest on maps. These tag clusters – characterized by population, density, position and range – can be used to guide IYOUIT users in their surrounding area.

*Blog* (enhanced contextual blogging): IYOUIT Blog is addressing enhanced automatic blogging capabilities based on ontology-based reasoning to recognize and manage complex contextual events. As most collected context data in IYOUIT is of quantitative nature, abstraction methods and context ontologies have been introduced to deal with context at a high level of abstraction. At the level of these context ontologies, complex conceptual dependencies between context elements are introduced to enrich contextual descriptions and to implement classification-based reasoning about the user's situation. Basic features of IYOUIT Blog are showing in the micro blogging capabilities of the service (cf. Figure 1): personal context snapshots can be automatically informed to buddies or the contextual feed on the IYOUIT Web site; messages to Twitter are automatically enriched with contextual data, such as the user's place or situation.

*Play* (playful experience of context-awareness in games): IYOUIT Play is focusing on low-level and quantitative aspects of context gathering, management and similarity detection. Work is concerned with detecting specific context constellations based on low-level context features and transforming these constellations to both, a formal and a human readable format. Key ideas are materialized in a context-aware mobile game that connects the physical world with context-dependent role-play in a virtual environment.

## 3. BUILDING BLOCKS

IYOUIT builds on its own component framework to manage contextual data and the application as such. The framework has been designed for an open integration with 3<sup>rd</sup> party services and is leveraging Semantic Web technology in various places.

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<sup>1</sup> <http://www.iyouit.eu>

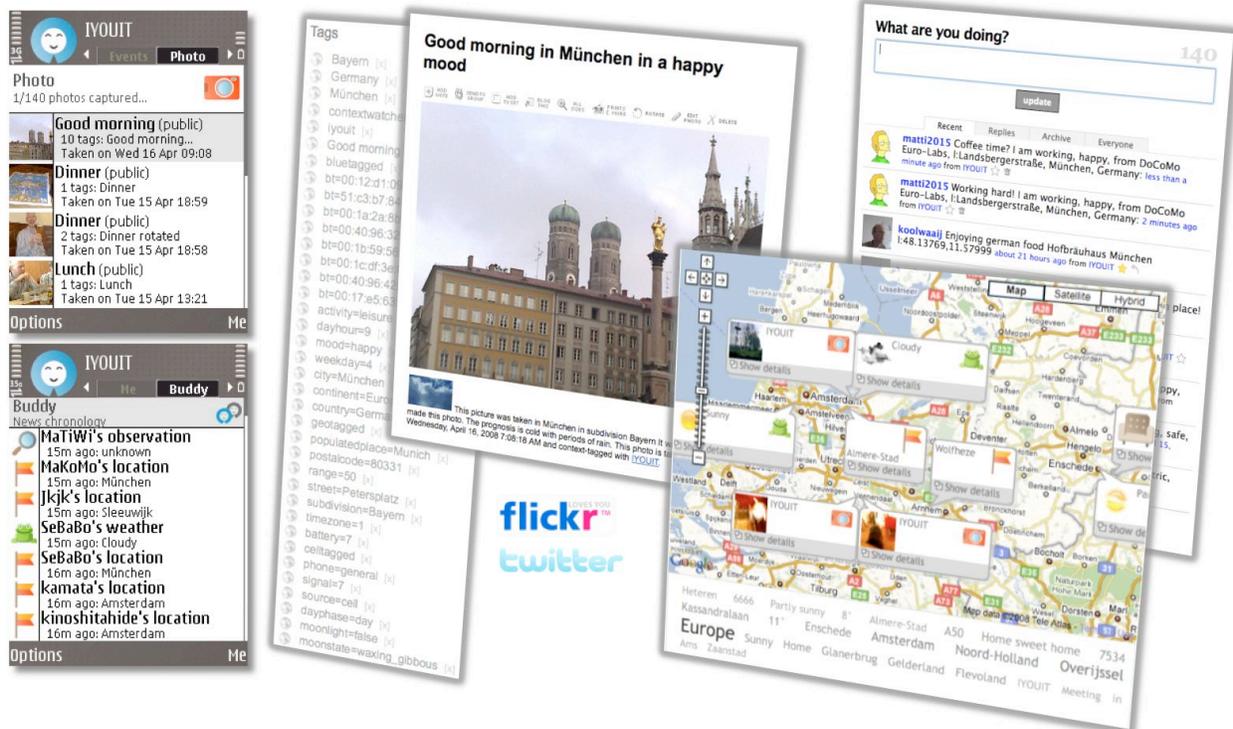


Figure 1: IYOUIT Share and Life integrated with Flickr and Twitter.

### 3.1 Context Management

The IYOUIT Context Management Framework (CMF) hosts and combines various services and data sources [2]. CMF features a broker architecture and fully distributed context data management. Conceptually, our component framework splits into so-called Context Providers (CPs) and CMF management components. Management components, for instance, ensure a secure authentication of entities, implement access control to personal data or allow for the usage of domain specific knowledge formalized within core context and application ontologies. CPs lie at the core of CMF and encapsulate basic context data sources at a quantitative level but can also implement aggregations and abstractions to a qualitative level. Framework components, for instance, track the positions of users, the whereabouts and proximity of their buddies, scanned Bluetooth and WLAN beacons, local weather, photos, sounds, observed products, messages and more.

### 3.2 Embedded Semantic Web Technology

A main objective of our Context Management Framework is to abstract from raw sensor data to eventually gain qualitative information about a user in a given situation. We assume that the meaningful interpretation of context is best feasible at a qualitative level, based on aggregated context data. To determine a common vocabulary for a unified interpretation of qualitative context among CMF components we designed a set of specific context ontologies formulated in the Web Ontology Language (OWL). Each CMF Context Provider is responsible to link the quantitative values contained in context elements to qualitative values expressed using this vocabulary. In addition, selected Context Providers interface with OWL reasoning engines to derive

even higher-level of abstractions through the classification of sets of qualitative values using standard Description Logics [3].

A concise overview of CMF components that integrate Semantic Web Technology is given in [1]. The IYOUIT Location Provider, for instance, has the main task of resolving given location estimations into actual address records, to store location traces and to deduce frequently visited places. To this end, user location traces based on GPS and cell tower information are analyzed through profound statistical learning and clustering methods to determine frequently visited places of stay [4]. Once established, a place is presented to the user to name and typify it by selecting an appropriate concept from the place ontology, which includes descriptions like “Office”, “Home” or “Business Place”. Staying in a place is from thereon recognized automatically by IYOUIT, resulting in qualitative location reasoning.

## 4. REFERENCES

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