Open Research Online

The Open University's repository of research publications
and other research outputs

Television and the future internet: the NoTube project

Conference or Workshop Item

oro.open.ac.uk

Television and the Future Internet:
the NoTube project

Lora Aroyo[1], Lyndon Nixon[2], Stefan Dietze[3], and the NoTube consortium

[1] Vrije University Amsterdam, De Boelalaan 1081, 1081 HV Amsterdam, The Netherlands
[2] STI International, Amerlingstrasse 19/35, 1060 Vienna, Austria
[3] Knowledge Media Institute, The Open University, MK7 6AA, Milton Keynes, UK

"New technology is transforming the TV industry", Mark Thompson, BBC Director General told the newspaper The Observer. The classic notion of TV being a set in the living room with finite channels and linear programming is already gone: TV has moved into the world of Internet and mobile technology and content is growing exponentially in terms of number and diversity. The notion of channels is being replaced by individual choice and on-demand programming. Distinctions between TV and other streaming content are blurred: both live in a shared connected online world. We expect that as the Future Internet develops, TV will complete this disruptive paradigm shift into becoming ubiquituous, always-available, and increasingly personalized. NoTube is a EU funded project (in the Objective 4.3 Intelligent Information Management) which began February 2009 and runs for three years, with the goal to prepare TV for the Future Internet – addressing challenges of TV content ubiquity and choice, personalization and integration.

People's preferences with respect to TV viewing have become very much individualised, personal time constraints are complex, and the availability of digital storage technology as well as a vast variety of devices at the recipient's side has opened a new degree of freedom. From this perspective context-awareness is an essential characteristic of an infrastructure that enables personalized TV service. Modeling and processing of contextual information about consumer preferences and behavior, about capabilities, performance and availability of devices and audiovisual streams is a core research field tackled within NoTube.

Additionally the NoTube project will take into account community aspects (e.g., how one person can benefit from the media memories of others, or with whom they share common interests) in order to lift content consumption from a single-user activity to a social and community-based experience which takes advantage of the vast amount of knowledge captured in user profiles and social networks. These personalized and shared experiences typically take place in a connected multi-device environment. Also, the traditional idea of "device" in terms of media channels (e.g., telephone line, internet line, broadcast line) is rapidly disappearing, as the technological infrastructure is moving towards all content through a single cable. The role of these devices then becomes what they should be, namely a vehicle for rendering in an optimal way for a particular context.

We can perceive three "spaces", namely the physical, virtual and mobile spaces, see Figure 1. The user resides in the *physical space*, e.g., at home, on the street, in a museum. This space encompasses task-specific devices such as TV, VCR and information displays in museums. The user's prime goal in interacting with those devices is to consume and experience content. The rich-interaction environment of the Web plays the role of the *virtual space*, where users typically work with multiple domain-specific applications and perform information intensive tasks, such as searching, browsing and navigating in various content collections. The information prepared on the Web could be further used in the physical space: preferences for TV programs could be uploaded to a TV set-top box. The *mobile space* encompasses all mobile devices (iPods, PDAs etc.), each containing a fragmented portion of user preferences and data. In each of the spaces one can interact with content: one can physically look at a movie on the TV, view a trailer of it on a website or look at a picture sentto your mobile phone. In the Future Internet, we expect these spaces to converge. Semantically-enabled services will facilitate the automatic sharing of user profile data, context and the mediation of broadband audiovisual streams across networks.
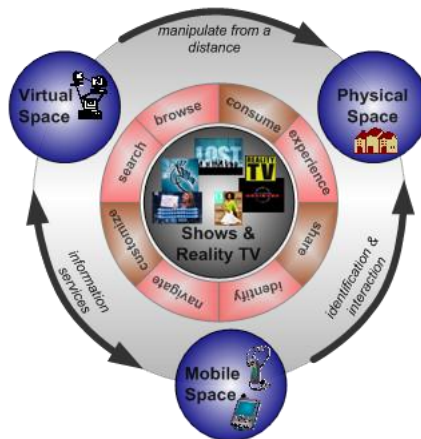

Figure 1: Complementary integration of Web, TV and Mobile

We expect the Future Internet to empower and bring to full fruition the current trends developing in TV which are the focus of NoTube: (1) *personalized content selection*; (2) *packaging of content with additional information* (e.g. relevant Web info on program subjects); and (3) *social interaction in consumer communities*. However, this transformation also requires new technologies based on semantics and services which will be developed in NoTube: (1) a *Semantic TV Resource Broker* will enable the dynamic discovery and orchestration of the most appropriate services for a given context, based on Semantic Web Service technology; (2) *methods for information integration* in the combined TV-Internet environment; (3) extensions of existing *user and context modeling techniques* to meet the demands of the distributed world; (4) development of *novel reasoning services* for personalized content recommendation; and (5) integration of community-oriented and social interaction tools into the TV experience.
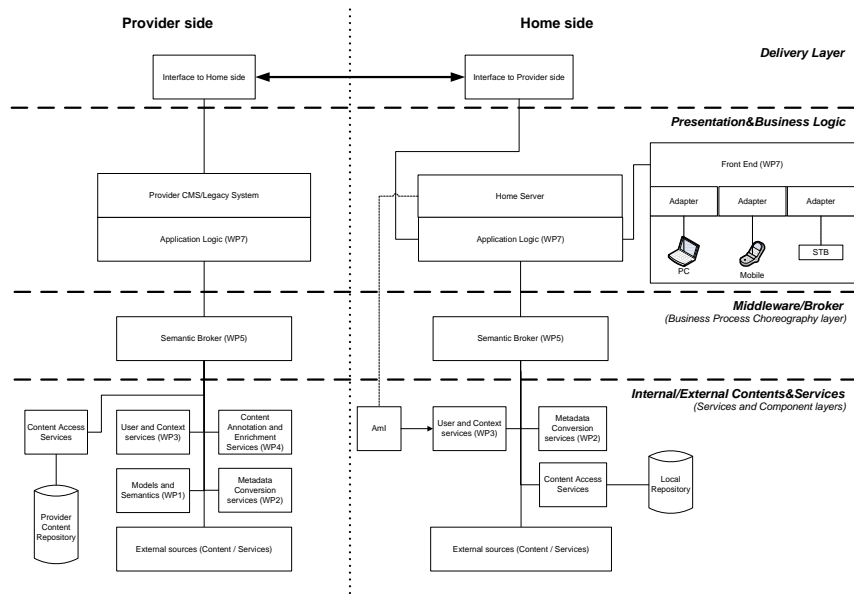
Figure 2: NoTube general architecture

Figure 2 shows the general architecture being developed within NoTube. The main goal is to highlight the building blocks (components) composing the NoTube platform as well as how they're connected together, divided into the Content Provider side and the Home Ambient side. The Content Provider is focused on the preparation of TV contents to be delivered to the end-user, living in the home ambient. With the term preparation we include the ingestion of TV contents, the production of content-related metadata (annotation and enrichment), and implementation of providers' business policies and the application of generic user-context profile categories. The Home Ambient represents the physical space with the user as the central actor. NoTube receives contents from the provider, applies intelligent filtering based on user's personal preference (user and context modelling) and delivers the final output to the chosen channel (i.e.: STB, PDA, etc.).

As the project progresses, this architecture will be refined, the components iteratively developed and first prototypes and showcases from the three NoTube scenarios will be released:

- *Personalized Semantic News*, which focuses on the design and development of a system for the creation of a set of local personalized news services;

- *Personalized TV Guide with Adaptive Advertising*, to offer a new Program Guide experience to the consumers;

- *Internet TV in the Social Web*, which focuses on leveraging the social Web to improve interactivity, participation and empowerment of TV consumers.

For more information, please refer to the project Website http://www.notube.tv