Vision Social TV: Towards Personalised Media Experience and Community Atmosphere

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ABSTRACT
The traditional TV viewing experience is being greatly influenced by the emerging social medias and online content distribution technologies. Social TV is becoming a hot topic in the media industry. The demo introduces a social TV platform, which enables the research and experimentation of personalised media experience and community atmosphere.

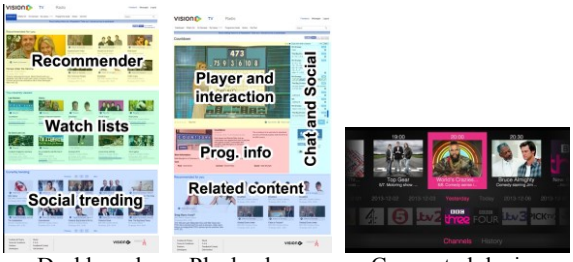
Author Keywords
Social TV; Personalisation; Online IPTV

ACM Classification Keywords
H.5.1.Multimedia Information Systems: Evaluation/methodology

INTRODUCTION
The boom of social media and new web/media technologies has fundamentally changed the way TV programmes are retrieved and watched, especially by the young audiences. Many social TV systems have been developed in recent years to enable social interactions around TV programmes. Current work includes social-aware recommender [3], interactive communication [2], and social awareness. Cesar et al. conducted a survey of over 30 existing social platforms and proposed a framework for future social TV. The work identified four major social activity categories: content selection and sharing, communication, community building, and status update. Five aspects, including device/network, modality, presence, synchronisation, and strength tie, are also specified [1]. In line with the related work we demonstrate a social TV platform with comprehensive statistics and evaluation facilities enabling social research and experimentation. The demo also shares our recent development on two new social TV features: personalised media experience and community atmosphere.

VISION SOCIAL TV PLATFORM
Vision social TV is the third-generation of an IPTV Living Lab platform ensuring the end-to-end delivery of high quality audio-visual services to Lancaster University staff and students for the purpose of research and real-life evaluation. Vision currently employs three groups of supporting functional components: ingest, front-end, and statistics service. The core of Vision's front-end service is a set of rich web services encapsulating functions to extract service data from data sources, and to provide well-specified data APIs. Vision offers both web-based user interface and connected device application to its users. The design of web interface adopts a responsive layout framework to warrant consistent user experience on heterogeneous user devices (Figure 1).

The statistics service of Vision is the core component that offers the ability to track user's interactions with each other and with the Vision content service in fine-granularity for comprehensive data analysis. The *report engine* resides in user devices to catch predefined and time-codec events such as playback requests or status information, pre-process the data and report to the *stats ingest service.*



Dashboard Playback page Connected device

Figure 1 Web interface and connected device

In order to facilitate comprehensive social analysis, Vision statistics are managed in both conventional relational databases and a graph database. The NoSQL graph database offers data models of high efficiency and performance for social analysis.

We use a multi-mode property graph data model where rich TV programme meta-data, live user activity data, and social media relationship co-exist in a common space. In the graph database, information is stored as `triples' such as *(user {user id})-[:request {timestamp, page id, etc}]->(content {programme id})*, and *(content {programme id})-[:has_director]-(director)*. This design enables graph search such as "Looking at all the users who's been watching the same TV programmes as me, derive a list of

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Films that these users watched but I missed." using graph query languages (Figure 2).

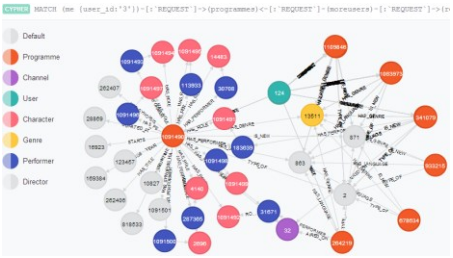

Figure 2 Graph analysis

Since October 2013, statistics service has seen millions of records in statistics database. The statistics analysis API supports a range of analysis such as the distribution of live and on-demand programme requests at any select time and date. The shown statistics data has been used for context-aware recommender and content caching algorithms.

SOCIAL FEATURES

The data in statistics databases are the key data sources that are fed back in real-time to the Vision TV service for creating the personalised experience, community awareness and social atmosphere. Through the user activity data, Vision studies the patterns of user behaviours and individual's preference in content navigation and viewing. Besides the dynamically reconfigurable web layout, Vision offers a range of personalise services. For instance it models how users play, pause, resume and complete the playback across user devices with respect to genre, viewing history, and time of the day. The information then can be used to estimate the likelihood of a content being resumed after the initial viewing session is left unfinished.

The community atmosphere in Vision is constructed using aggregated activity data and user communication features. Users in Vision are informed of the popular live programmes watched by other community members, the most watched VoD programmes and recommendation using viewing history of people with similar preferences.

Direct communication between users is believed to be a key feature for social TV environment. Vision enables a multi-timeline chat feature allowing users to give comments (up to 128 characters per comment) when a programme is broadcasted live. Chat messages are visible to all users who watch the same programme whilst users can *like*, *unlike*, and *report* any message. This creates a social space for people in different physical locations to communicate as if they are together. Even for users who tend to be passive in giving comments, the messages running along the video playback window (Figure 3) resemble a social atmosphere as a type of "ambient information" which vibrates the isolated TV viewing experience by individual. Vision's chat feature is also unique in the way that all chat messages are captured with accurate time-codes which allows all messages to be replayed when a TV programme is watched as on-demand content at a later point. By doing so, Vision not only captures the live TV content but also the associated user viewing experience, despite the actual age of the content. To further improve the user experience in the captured live atmosphere, we also allow chat messages to be given during on-demand playback allowing the social atmosphere to further develop beyond the time span of live events. Furthermore, the chat feature is accompanied by a heat-map, which labels messages associated with the content in a timeline (Figure 3). The heat-map assists Vision users to efficiently navigate between ``hot'' social moments of on-demand content.

(a) Chat module

(b) Close-up of the heat-map

As part of the statistics service, chat messages are also studied as crowd-sourced annotations. Using natural language processing and machine learning tools, chat messages are exploited for TV programme sentiment analysis and clustering for social-assisted recommendation.

CONCLUSIONS

The demo introduces our recent efforts in experimenting future social TV platform, especially the features related to personalised user experience and community atmosphere. Using emerging media and web technologies, we demonstrate the integration of statistics services in Vision social TV content service to better understand user preference and social experience in future TV viewing.

ACKNOWLEDGEMENT

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