

Impact of Social Media on TV Content Consumption

New Market Strategies, Scenarios and Trends

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Abstract—The mass adoption of Social Media together with the proliferation and widely usage of multi-connected companion devices have tremendously transformed the TV/video consumption paradigm, opening the door to a new range of possibilities. This Special Issue has aimed at analyzing, from different point of views, the impact of Social Media and social interaction tools on the TV/video consumption area. The targeted topics of this Special Issue and a general overview of the accepted articles are provided in this Guest Editorial.

Keywords— *Social Media, Social TV, Multi-Screen Scenarios, Interactive Systems, Personalization, Content Management, Context-Aware Systems, Recommendation Systems, Annotation, Edition, Media Synchronization*

I. INTRODUCTION

The IEEE Computer Society (CS) has recently introduced various Special Technical Communities (STCs) [1] as organizational entities to develop (online) communities with common interests, e.g. in selected technical areas, with the goal of fostering interaction, collaboration and innovation. Among these STCs, the STC on Social Networking (STCSN)¹, aims at fostering interaction between like-minded scholars and practitioners in the fields of online social networks, Web 2.0 platforms, social computing, social media, as well as cross-cutting issues, such as business models and societal aspects of social networking (e.g., privacy and data protection). Likewise, STCSN aims at gathering and disseminating new research contributions, activities, timely updates or even opportunities on these fields. For that purpose, STCSN regularly publishes E-Letter editions comprising a set of research articles that discuss specific topics in the realm of the community.

In particular, this Guest Editorial introduces the Special Issue on “Impact of Social Media on TV Content Consumption: New Market Strategies, Scenarios and Trends”,

which has sought contributions that link Social Media and social networking with the TV and online video consumption paradigms. Social networks have become pervasive in our daily life and have deeply transformed the way we think, communicate, interact and gain access to information of interest, in addition to influencing our decisions. This proliferation has also tremendously impacted the way users consume TV and online video content. For instance, recent surveys have indicated that a big percentage of consumers (up to around 80% in specific cases [2]) use a secondary device while watching TV. Although the multi-tasking activity can be completely unrelated to the TV watching experience, such as when users are surfing the web sending e-mails, a wide variety of new related media possibilities and services can be exploited. In particular, the use of Social Media (through either the main screen or secondary screens) when watching TV opens the door to a new range of possibilities in this area, providing augmented experiences in which users can access and consume extra related content, and be provided with a new rich set of (interactive) possibilities. The goal of this Special Issue has been to gather a collection of research works that have contributed to this paradigm and trend shift (e.g., by developing innovative services, platforms or functionalities) or have analyzed it (e.g., by performing studies, investigating the associated challenges and potential opportunities...). Potential topics of interest included, among others:

- Emerging TV business models thanks to Social Media (ratings, marketing and advertising strategies, big data, data mining, hybrid broadcast broadband services...).
- Technological solutions, advances and challenges.
- Services, tools and products.
- Management of online communities.
- Emerging scenarios and content consumption paradigms: multi-screen settings, shared media

¹ stcsn.ieee.net

experiences between remote users, personalized experiences, etc.

- Interaction channels between users (audio, video, text chat...): habits, trends and preferences.

As a result of the dissemination of the Call for Articles and of the review process, five articles, which are briefly introduced in the next section, have been accepted.

II. OVERVIEW OF ARTICLES

The five articles featured in this E-letter edition nicely cover most of the targeted topics in the Call for Articles. These articles present the contributions and discuss the associated challenges and research objectives of various, recently finished and ongoing, EU-funded projects, which reflects their relevance.

The first article, authored by Badii et al. [2], introduces the current state and objectives of the ongoing (from September 2013 to October 2016) EU FP7 “Socialising Around Media” (SAM) project². The project focuses on the development of an advanced digital media delivery platform for second screen and content syndication within a social media context, providing open and standardized ways of characterizing, discovering and syndicating digital assets (e.g. films, songs, books, metadata...). The main goal of SAM is to deploy an ecosystem in which content providers and broadcasters can provide TV viewers with enjoyable experiences for their secondary devices that complement and extend their usage of the first TV screen. Through the personal secondary devices, users can be provided with additional content and can be immersed in social media communities, which can be created either explicitly or implicitly, based on contextual information from the user interactions in the system (e.g., the media assets being consumed, their activity in social networks...), their profiles or their interests. The article pays especial attention to the description of the context management/syndication, multi-screen interaction, dynamic community creation and social media analytics sub-systems that are developed as part of the project.

The second article, authored by Tomas et al. [3], focuses on describing the role of Human Language Technologies (HLT) within the scope of the SAM project. The tasks covered by HLT in the platform developed in that project include ontology development, entity linking, sentiment analysis, emotion detection, ontology matching, and text summarization. The article describes these tasks, the followed approaches and their benefits in the context of social media and content consumption. For example, HLT provide core functionalities for analyzing user comments in the context of media consumption, offering better Quality of Experience (QoE) to the consumers and improved business intelligence reports to the content providers.

The third article, authored by Tsiropoulou et al. [4], provides an overview of the toolkit that is being developed within the context of the EU H2020 Multimedia Content Annotations for Rapid Exploitation in Multi-Screen

Environments (MECANEX) project³. The MECANEX toolkit consists of the following key components/tools: a) an automatic annotation and editorial tool; b) a multi-screen tool; and c) a social and personalization tool. The annotation and editorial tool offers the ability to semi-automatically enrich video collections for multi-screen applications, while the social and personalization tool is targeted at building customers’ profiles based on their information, which can be either explicitly provided or implicitly collected/inferred (with the help of recommendation mechanisms). In conjunction, these tools will allow delivering enriched multimedia content to the consumers, aligned to their preferences and needs (thus increasing the perceived QoE). The MECANEX toolkit is envisioned to be adopted by production and post-production companies, as well as by content providers or relevant service oriented companies, to improve the chance of developing more solid business models as well as marketing and advertising campaigns.

The fourth article, authored by Dijkstra et al. [5], describes the set of technological components, algorithms and toolsets used/developed within the recently finished EU FP7 STEER project⁴ to enable a new range of Social Telemedia services, focusing on two use cases: 1) Collaborative Storytelling; and 2) Live Augmented Broadcasts. In this context, Social Telemedia services refer to community-centric ecosystems linking social networking platforms and networked media. Within these ecosystems, user communities share and consume different kinds of (live) media assets (e.g., textual information, photos, short clips...), related to their interests and/or personal experiences (e.g., in live events). Accordingly, these media assets need to be captured, distributed and assembled in real-time to generate overall consistent perceptions of the targeted (remotely shared) events. The project also contributes with innovative algorithms and tools to extract and process social informatics generated by social networks to enhance media services with service personalization, better content distribution and context-aware content discovery. The article also describes the experiments that have successfully demonstrated the feasibility and benefits of the STEER system in two live social events: the 2014 Winter Olympics and the 2015 Silverstone Formula 1 Gran Prix.

The fifth article, authored by Montagud et al. [6], provides an overview of the impact and potential opportunities offered by Social Media and social interaction tools when consuming TV/video content, from two different point of views: i) when isolated users are consuming multiple related content on either the same or on different (close-by) devices (e.g., in multi-screen scenarios); and ii) when multiple geographically distributed users are concurrently consuming the same media content, while socially interacting. It is argued that, in both kinds of scenarios, Social Media can contribute to: i) access to extra related content; ii) add extra functionalities/services (e.g., votings, TV quizzes...); iii) foster social interaction; iv) provide a feeling of “*networked togetherness*”; and v) empower the audience’s immersion and engagement. All these features support the important role of Social Media in the current dual transition from passive, single-content and single-

² <http://samproject.net/>

³ <http://mecanex.eu/>

⁴ <http://fp7-steer.eu/>

device TV/video experiences towards active, multi-content and multi-device TV/video experiences, and from physically shared TV/video experiences towards remotely shared TV/video experiences. Finally, the article highlights some remaining challenges and open issues that still need to be addressed in the near future to provide truly augmented, personalized, interactive, immersive and shared experiences, combining Social Media and social interaction tools with TV/video consumption. From these challenges, especial attention is paid to synchronization and interactivity issues, context-aware aspects, and dynamic building of ad-hoc communities. That work has been conducted within the context of the objectives and contributions of an ongoing research project, funded by the Spanish Ministry of Economy and Competitiveness, which focuses on the development of HbbTV 2.0 compliant (i.e., hybrid broadcast broadband delivery) services, combining Social Media and multi-sensory data. Besides, it also touches upon some of the objectives and contributions of the recently finished EU FP7 VConect project⁵.

III. FINAL REMARKS

Overall, the Guest Editors are very satisfied with this Special Issue. The quality of the articles is quite high and their contributions are timely and relevant, being most of them linked with recent and ongoing EU-funded projects.

Although this set of articles is far from providing a full coverage of this research area, we hope their reading will give the general audience an up-to-date overview of the most relevant aspects in this area and provide them valuable insights. We also hope that this Special Issue will stimulate further exploration, foster discussion and collaboration in related topics, and inspire further innovative research in this area.

We would also like to point out that given the highly active involvement of both scholars and industry practitioners in this timely and relevant field, we expect that significant advances and exciting results from expanded explorations will appear soon on the horizon. Accordingly, it would be convenient to revisit the latest advances in this topic in a mid-term period.

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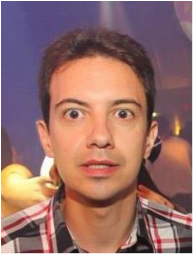
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REFERENCES

- [1] D. S. Milojicic, P. Laplante, “Special Technical Communities”, *IEEE Computer*, vol. 44, no. 6, pp. 84-88, June 2011.
- [2] Social TV and second-screen viewing: the stats in 2012 www.theguardian.com/technology/appsblog/2012/oct/29/social-tv-second-screen-research, October 2012 (last access in November 2015).
- [3] A. Badii, M. Tiemann, D. Tomás, A. Menychtas, C. Santzaridou, A. Psychas, J. V. Vidagany Espert, “SAM: Socialising Around Media; Context-driven content and dynamic social communities for TV second screen devices”, *IEEE Computer Society Special Technical Community on Social Networking (STCSN) E-Letter*, vol. 3, no. 2, December 2015.
- [4] D. Tomás, Y. Gutiérrez, “Human Language Technologies in Media Consumption: The Case of SAM”, *IEEE Computer Society Special Technical Community on Social Networking (STCSN) E-Letter*, vol. 3, no. 2, December 2015.
- [5] E. E. Tsiropoulou, E. Stai, S. Kafetzoglou, K. Rapantzikos, S. Papavassiliou, M. Zwicklbauer, P. van Leeuwen, V. Karamali, “Multimedia Content Annotations for Rapid Exploitation in Multi-Screen Environments: The MECANEX project vision”, *IEEE Computer Society Special Technical Community on Social Networking (STCSN) E-Letter*, vol. 3, no. 2, December 2015.
- [6] S. Dijkstra, O. Niamut, N. Race, N. Efthymiopoulos, S. Denazis, M. Mu J. Taal, “STEER: Exploring the dynamic relationship between social information and networked media through experimentation”, *IEEE Computer Society Special Technical Community on Social Networking (STCSN) E-Letter*, vol. 3, no. 2, December 2015.
- [7] M. Montagud, P. Cesar, F. Boronat, D. Marfil, “Social Media Usage Combined with TV/Video Watching: Opportunities and Associated Challenges; Towards Augmented, Interactive, Personalized and Shared Experiences”, *IEEE Computer Society Special Technical Community on Social Networking (STCSN) E-Letter*, vol. 3, no. 2, December 2015.

⁵ <http://www.vconect-project.eu/>



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