Designing Attention for Multi-screen TV Experiences

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ABSTRACT

In this Work-In-Progress we discuss our work on designing attention for multi-screen TV experiences. We first briefly describe the current trends, and then progress to touch on two investigations we have conducted. In the first study we look at current viewing habits, paying particular attention to how we deal with attention overload when viewing secondary devices while watching television. Then, we go on to describe work we have conducted into investigating how we may orchestrate attention between displays. We conclude by discussing our work's current trajectory, and then go on to state what it could mean for broadcasters and those who wish to design applications for multi-display TV experiences.

CCS Concepts

•**Human-centered computing** → **Human computer interaction (HCI);** *HCI design and evaluation methods; Laboratory experiments;*

Keywords

Multi-screen; TV; Attention; Companion Content; Media

1. INTRODUCTION

Engaging fully with a digital experience requires our uninterrupted attention, meaning nuanced details in the programme can be missed if our attention runs adrift. This is especially pertinent in an era where handheld devices proliferate. In light of this, however, multi-screen experiences, whether instigated by the broadcaster to support a television programme or as an independent viewer behaviour, are becoming increasingly prevalent (discussed further by Rooksby et al. [5]). Indeed, second screen companion content is becoming increasingly common – broadcasters and application developers are utilising the fact that we frequently interact with our devices while watching television to provide supplementary content. This ranges from supplementary information, to play along games. Its purpose, nonetheless, is to make us more involved with the programme, and to create a more immersive experience. This idea, however, is inherently confounding, as the notion of dividing one's attention to different foci can be inherently un-immersive and potentially distracting. Therefore, in this WIP we present our work, in which we consider methods for creating more immersive, holistic experiences for companion content experiences.

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2. COMPANION CONTENT

Companion content is material that complements a 'primary' television experience, commonly displayed on tablet computers, laptops, or smartphones, often updated in time to complement a TV experience. These are normally applications developed by a broadcaster or independent app developer to accompany a television programme. Examples of this range from simple pieces of interactive content related to a programme, to full dual screen movies. Academic studies have probed companion content, mostly through the deployment of companion applications. For example, work such as that of Geerts et al. [3] who investigate a deployment of the De Riddler companion app, and Basapur et al. [1] who cover a deployment of their FANFEEDS application. Work such as this gives us a strong insight into what works, and what does not. In addition, a seminal paper by Cesar et al. [2], gives an in-depth analysis interactive TV up to 2008. But now that broadcasting is entering the IP age, with concepts such as object-based broadcasting[1], we can consider further the massive possibilities dual-screen content affords.

3. ATTENTION OVERLOAD OVER TWO SCREENS

To explore the confounding nature of a dual screen immersive experience in which me must divide our attention, we conducted interviews with participants to gain insight into attention overload in their general dual-screen viewing habits. We interviewed participants to gather an impression of their second screen usage. Specifically we wanted to find out: firstly, if they interact with devices while watching content; secondly, if they get information overload while viewing two devices; and finally, if they sacrifice viewing certain bits of content. As this was a semi-structured interview we then probed further into comments to find out the finer details of the claims. The interviews were recorded, transcribed, and then analysed using a grounded theory analysis to probe for trends in the data. We conducted the experiment with 20 participants in all.

[1]More detail in: http://goo.gl/pjkQbg

In general it was clear that attention overload was a significant problem for most of the participants. In fact, a large portion of those who watched television with a secondary device noted some degree of information overload. To which they adopted one of two strategies – mitigating, or compensating for overload. By mitigating we refer to the avoidance of information overload, examples of this included pausing the programme to fully attend to the one device for a key moment, or by pausing the programme and then resuming when they had finished with the second screen content. With regards to compensating, we refer to users missing something in a programme, and then taking action to recover the information – we found the most common method was rewinding, but also participants asked those around them, or looked up information online.

Though there have always been other activities fighting for attention from the television, for example social interaction and eating (discussed in detail by Schmitt et al. [6]), we believe that second screens in the living room drive this further. Comments suggest that a considerable proportion of participants found themselves rewinding (compensating), pausing (mitigating), and missing content altogether to engage with their secondary devices. The difference, we believe, is that secondary devices generally display content that is quite ephemeral in its nature – our social media feeds are only pertinent for a short window, and we do not want to miss a moment. Regardless, it is clear that a strong portion of participants are missing significant portions of programmes to interact with secondary devices, so a pertinent question is: how can we design dual-screen television content that is complementary and does not detract from either display?

4. MEDIATING ATTENTION

To address the innate tension in introducing second screen content (companion content) for participants to engage with we recently proposed the notion of mediating users' attention (described in more detail in [4]). The general principal of doing this is to embed notification-like stimuli into the television programme, and the tablet experience to force shifts a user's attention. We conducted an experiment into this in which participants watched television content and we attempted to shift their attention between the devices by embedding different types of stimuli. We looked at visual methods on the device (content shaking), auditory methods on the device – unrelated abstract sounds (earcons), and sounds related to the TV content (auditory icons) – and two methods on the television itself: one static, and one with motion.

We found in general that participants want their attention mediated. When watching a dual screen experience they becoming increasingly aware that they may be missing content on the second screen. This causes either them to look down constantly, checking for new content, or (in some cases) miss second screen content. With regards to stimuli, we found that peripheral stimuli (on the secondary device) commanded attention quickly, and that notifications on the television allowed participants to consciously delay when they switched their attention to the second screen. We go on to propose a series of heuristics to allow broadcasters and dual-screen application developers to command a user's attention based on how pertinent the information is to a specific timeframe, or how essential it is to the whole experience.

5. CONCLUSIONS AND FUTURE WORK

The information gained in the interviews previously discussed sits in the context of a larger body of work not yet ready for dissemination. In this, we are systematically investigating the subjective and objective effect of second screen visual complexity on the TV viewing experience. We believe that the findings briefly covered in this WIP anecdotally inform some of the findings we are currently analysing, placing them in a real-world context, informing the design of second screen content and, more broadly, allowing us to consider the current state of the living room in terms of technology.

We believe the notion of mediating attention to be one solution to this type of problem when we consider companion content. In essence, we can create multi-screen experiences in which the broadcaster/developer controls a user's attention. For example, when they wish for a piece of companion content to be fully attended to (as opposed to the television) broadcasters can make the visual content on the television more 'missable' and less intense, and then we can mediate their attention towards the companion device. The TV can then become more of a background experience – providing an ambient audio-visual context for the more detailed content to sit in. And of course, conversely, such techniques could be applied the other way – in crucial moments on the television, companion content can be less detailed and stimuli can be provided to draw a user's attention more towards the TV. We believe that through development of new techniques, and a greater understanding of the limits of multi-screen perception we can empower broadcasters and app developers to think more about how we can blend displays, and afford a greater and more holistic multi-screen experience.

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