#Scanners 2 – The MOMENT: A New Brain-Controlled Movie

Richard Ramchurn
AlbinoMosquito
Nottingham, UK
richard@albinomosquito.com

Steve Benford
Mixed Reality Lab
University of Nottingham,
Nottingham, UK
steve.benford@nottingham.ac.uk

Max L. Wilson
School of Computer Science
University of Nottingham
Nottingham, UK
max.wilson@nottingham.ac.uk

Sarah Martindale
Horizon Digital Economy Research
University of Nottingham
Nottingham, UK
sarah.martindale@nottingham.ac.uk

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Abstract
While many still consider interactive movies an unrealistic idea, current delivery platforms like Netflix, commercial VR, and the proliferation of wearable sensors mean that adaptive and responsive entertainment experiences are an immediate reality. Our prior work demonstrated a brain-responsive movie that showed different views of scenes depending on levels of attention and meditation produced by a commercialized home-entertainment brain sensor. Based on lessons learned, this demonstration exhibits the new interactions designed for our new brain-controlled movie, The MOMENT, being released in 2018.

Author Keywords
BCI; EEG; Film; Art; Movie.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction
Over time, people have tried to replicate and augment for recorded media some of the audience interaction possible with live performance, e.g. live TV audience interactions (often via voting), and even attempts at choose-you-own-adventure movies[1]. While the intention has been there, the facilitating technology has

[1] http://prettybird.co/us/talent/collaborators/eko/work/possibilia-interactive-film/ - Possibilia (Interactive Film)

been slower to develop, and the notion is often dismissed [1,3], on the grounds that conscious interaction conflicts with the desired immersion. Recently, however, newer developments have seen interactive choose-you-own-adventure episodes on Netflix[2], the commercialization of VR technology in the home, and the more general adoption of wearable sensors in activity monitors and smart watches. More personally and socially adaptive filmic experiences are emerging[3] and, in parallel, brain-adaptive artistic performances are a current focus of HCI research [4].

In our own prior work, we aimed to develop a brain-responsive experience that facilitated passive interaction whilst maintaining immersion. We produced a unique professional movie experience, with a £20,000 budget for actors and production costs [6], which had four parallel layers synchronized throughout. The layers represented both internalized experiences and external views of the evolving plot. Alongside the production of the movie, we developed and evaluated the #scanners platform [4] to tie the display of the parallel views to different signals produced by a home-entertainment brain sensor: NeuroSky Mindwave. Our findings showed both benefits and limitations to the informal and loose control that levels of attention gave to the experience, and the social experience of such individual control.

The New Movie and Interaction

While the previous movie had four available layers of a single narrative, The MOMENT[4] has been designed from the outset to enable interaction between multiple narratives. A new passive brain-driven interaction design was developed to sustain deep engagement by mitigating the naturally competing aspects of viewers' behavioural interaction and cognitive constructivism; conscious interaction is cited as the central problem of interactive movies [1]. The MOMENT was produced with a £50,000 budget for 8 actors, 20 cast and crew, and pre/post-production. Central to the production of the movie and interaction are 3 connected narratives, each with a primary audio track for diegetic (in-narrative) sound [2], and a secondary track of purely non-diegetic (overlaid) audio to complement the primary audio track of the other narratives. After production, therefore, The MOMENT is a 25-minute movie experience, which consists of 75 minutes of footage and 150 minutes of audio. While there is a single overall plot, there are 101 trillion ways to view the content.

Interaction with Narratives

At all times, there is a primary (x), secondary (y), and unused (z) narrative. As shown in Figure 1, drops in *attention* data from the NeuroSky headset cuts between a primary narrative (x) and a secondary narrative (y). The movie maintains the diegetic primary audio associated with the primary narrative (x), but viewers 'peek' at the secondary narrative (y). When cutting to the secondary narrative (y), its secondary non-diegetic audio track is added to complement the maintained diegetic audio of the primary narrative (x).

The two narratives (x,y) available to the viewer within any one scene are determined by the narrative viewing patterns during the preceding scene (Table 1). If the viewer experienced more of primary narrative (x), the unused narrative (z) becomes the secondary narrative (y). If they viewed more of the secondary narrative (y), then it becomes the primary narrative layer (x), and the unused narrative (z) becomes secondary (y). If the

[2] https://help.netflix.com/en/node/62526 - Interactive content
[3] e.g. http://www.bbc.co.uk/rd/projects - Projects - BBC R&D
[4] http://www.imdb.com/title/tt7853742/ - The Moment (2018)

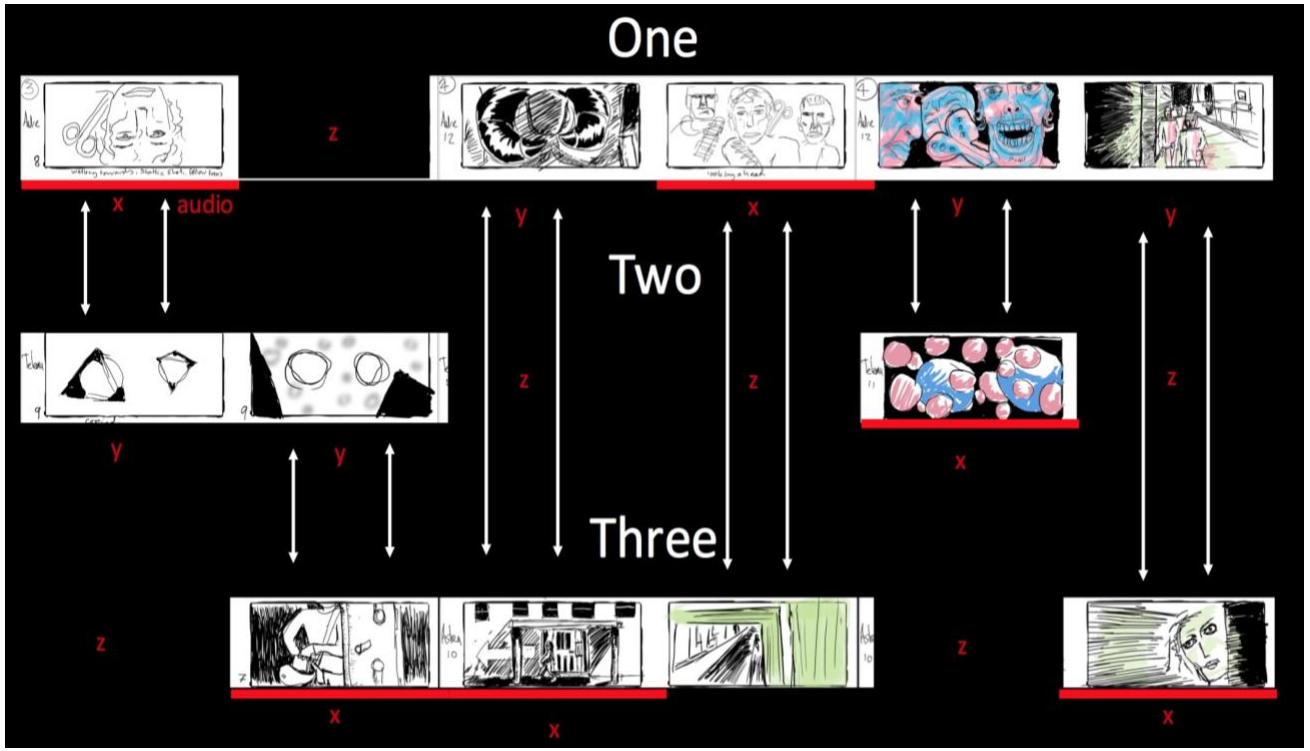

Figure 1: Viewers see and hear a primary layer, but can 'peek' at a secondary layer whilst still hearing the developments in the primary layer. Depending on how each layer is viewed, they may be swapped out for a third layer at the end of a scene.

Behaviour	Config for Next Scene	Description
1) (x) viewed most. Frequent cuts	(x) Audio+Video, (y) video	Remains the same
2) (x) viewed most. Infrequent cuts	(x) Audio+Video, (z) video	Swaps secondary layer
3) (y) viewed most. Frequent cuts	(y) Audio+Video, (z) video	Swap primary, swap secondary
4) (y) viewed most. Infrequent cuts	(y) Audio+Video, (x) video	Swap primary with secondary
5) (x,y) viewed equally. Frequent cuts	(z) Audio+Video, (x) video	New primary, primary becomes secondary
6) (x,y) viewed equally. Infrequent cuts	(z) Audio+Video, (y) video	New primary, keep secondary

Table 1: The influence of attention levels (NeuroSky), and explicit viewing choices (blinking to cut between layers), determines which layers in the next scene become primary (x) with video and audio, and secondary (y) with video only, and unused (z).

viewer saw an even balance of both narratives, the third narrative (z) layer becomes primary (x) as a deliberately disruptive technique to make sure the viewer is exposed to all three narratives.

The 2018 Tour

Post-production on the new movie will be completed in early 2018, and it will be premiered at a major UK festival in Summer 2018. The experience will then be toured in a small mobile cinema for 8 viewers, custom fitted inside a caravan, which will allow the experience to be delivered to diverse audiences around the UK, and then toured internationally from Winter 2018.

CHI2018 Demonstration

As the full movie is 25 minutes, participants will have the opportunity to experience a partial cut of the movie. The demonstration at CHI2018, therefore, will focus on experiencing the interaction design, as well as acting as a preview ahead of the movie premiere.

For CHI2018 attendees, the current focus of physiological data in both creative practices [4] and entertainment experiences highlights the importance of understanding these newly-possible emergent interactions. While models of interaction for these kinds of experiences are still being formed [5], there remain many open questions about designing interactions for physiological data and passive interactions: How do we design passive interactions for physiological data? How important is explicit control vs responsive design? Can people exert relative control over these autonomic processes? Do people enjoy the experiences these interactions create? How should the experiences be designed and built to make use of passive interactions?

We expect that the CHI2018 demonstration of the next brain-controlled movie interaction will provide a vehicle for continuing the discussion of these issues, and allow CHI community experts to experience, reflect on and critique the interactions prior to the public exhibition and data collection phases of this work.

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References

1. Ben Shaul, N. 2008. *Hyper-Narrative Interactive Cinema: Problems and Solutions*. Rodopi.
2. Bordwell, D., & Thompson, K. 2008. *Film as Art: Creativity, Technology, and Business*. *Film Art: An Introduction*. McGraw-Hill Education.
3. Lunenfeld, P. 2004. The Myths of Interactive Cinema. In *Narrative Across Media, The Languages of Storytelling*, Marie-Laure Ryan (ed.). University of Nebraska Press, 377–390.
4. Nijholt, A., Jacob, R. J. K., Andujar, M., Yuksel, B. F. & Leslie, G. 2018. Brain-Computer Interfaces for Artistic Expression. *In Proc. CHI'18 EAs* (in Press).
5. Pike, M., Ramchurn, R., Benford, S., & Wilson, M. L. 2016. #Scanners: Exploring the Control of Adaptive Films using Brain-Computer Interaction. In *Proc. CHI '16*. 5385-5396.
6. Pike, M., Wilson, M. L., Benford, S. & Ramchurn, R. 2016. #Scanners: A BCI Enhanced Cinematic Experience. In *Proc. CHI'16 EAs*. 293-296.