Color Plate B

Joe Marshall, *I Seek the Nerves under Your Skin*, interactive artwork, September 2009. Runner on ramp at Berkeley Art Museum and on the street in Liverpool. (© Joe Marshall)

ARTIST'S NOTE

I Seek the Nerves under Your Skin: A "Fast" Interactive Artwork

Joe Marshall with Alan Chamberlain and Steve Benford

ABSTRACT

I Seek the Nerves under Your Skin is a wearable audio artwork that is experienced by people running while wearing a special jacket and headphones. This artwork encourages people to run increasingly fast, pushing themselves physically and mentally, which mirrors the intense, crescendoing performance of a poet heard on the headphones. This article discusses the challenges of designing and deploying an artwork that is experienced at high speeds.

I Seek the Nerves under Your Skin (2008–2010) explores the extreme effort of running fast. It uses an existing poem ("Babelogue" by Patti Smith [1]). A feedback loop encourages listeners to sprint at increasingly higher speeds, pushing themselves physically and mentally while they hear Patti Smith's performance becoming increasingly frenetic, mirroring the extreme effort they are putting into the run.

People experience *I Seek* outdoors; this combines the private experience of listening on headphones and the public activity of running as fast as possible. This rich and intense experience created a whole set of challenges, which creator Marshall tackled using both prior experience building interactive artworks and insight from academic human-computer interaction research. The primary production challenge was that, unlike most interactive work, *I Seek* is experienced at speeds of between 10 and 20 miles per hour, in uncontrolled environments.

I Seek has been staged publicly with 80 listeners and in two locations: Liverpool, U.K., and Berkeley, CA, U.S.A. This article describes how it was produced and the challenges of staging it. The authors' intention is to provide insight for others wishing to develop similarly fast interactive experiences.

THE EXPERIENCE

A listener begins *I Seek* by putting on a jacket and headphones (Fig. 1). As soon as he or she starts to walk, the poem begins playing through the headphones. If the listener continues slowly, after a moment the poem fades out, then restarts. If the listener goes faster, the poem runs for longer before fading. To hear the whole poem the listener must accelerate to a sprint by the end of the poem at 90 seconds. This is deliberately made difficult, so only some listeners will hear the complete poem. When the listener is done, the jacket and headphones are removed and given to another listener. Marshall built three jackets, so three people can experience the work at once.

CONCEPT

I Seek is based on three principles. Most important is the analogy between the mental state that the listener's running induces and the almost feverish mental state of the performer of the poem. This analogy inspired a very simple feedback loop, forcing people to run harder to listen further. Marshall also made it difficult: People have to run fast. Some people could not run fast enough, mirroring the fact that not everyone is capable of reaching the heightened mental states of a skilled performance poet. The chosen poem, "Babelogue," is a piece of intense shouted performance poetry that describes the intensity of feeling that Patti Smith experiences during a performance ("I seek the nerves under your skin" is a quote from the poem).

Fig. 1. Equipment for *I Seek the Nerves under Your Skin*, interactive artwork, September 2009. (© Joe Marshall)

Joe Marshall (researcher, artist), Mixed Reality Lab, Department of Computer Science, Jubilee Campus, University of Nottingham, NG8 1BB, U.K. E-mail: <jqm@cs.nott.ac.uk>.

Alan Chamberlain (researcher), Mixed Reality Lab, Department of Computer Science, Jubilee Campus, University of Nottingham, NG8 1BB, U.K. E-mail: <azc@cs.nott.ac.uk>.

Steve Benford (researcher, lecturer), Mixed Reality Lab, Department of Computer Science, Jubilee Campus, University of Nottingham, NG8 1BB, U.K. E-mail: <sdb@cs.nott.ac.uk>.

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In the combination of running and listening, Marshall aimed to create a "flow activity" [2]—wherein people engage in a challenging yet rewarding activity in such a way that they are not conscious of discrete actions that they perform to control the situation, rather being aware only of the activity as a whole. Many interactive exercise artworks are "persuasive technologies" [3], designed to encourage exercise. Marshall believes such work treats exercise as a painful thing, with the assumption that people do not like exercise, but rather need to push themselves in this direction. This approach is also ineffective, as brief interactive experiences are unlikely to affect meaningful behavior change. This work, instead, intends to engender the joy that one listener described as "running for the sake of running" [4].

Design

The interaction design takes inspiration from previous artworks that Marshall has been involved in conceptualizing. In all these works he aimed for simplicity in terms of how people were to enter the experience and interact within it. During involvement in two cycling-related artworks [5], for example, he realized the difficulty in combining screen-based interaction with exercise. This problem was solved through the use of purely audio interaction. Participants could thus avoid looking at a screen, so that the artwork did not interfere with activity or cause safety issues (e.g. crossing roads without looking [6].

Having seen the organizational challenges involved in starting people off on a complex interactive experience [7], Marshall decided to minimize the time it would take to enter the *I Seek* experience. It is merely a matter of signing any waiver required by event organizers and putting on the headphones and jacket. The technology starts automatically. Since the experience starts and finishes seamlessly, it can easily take place at busy events.

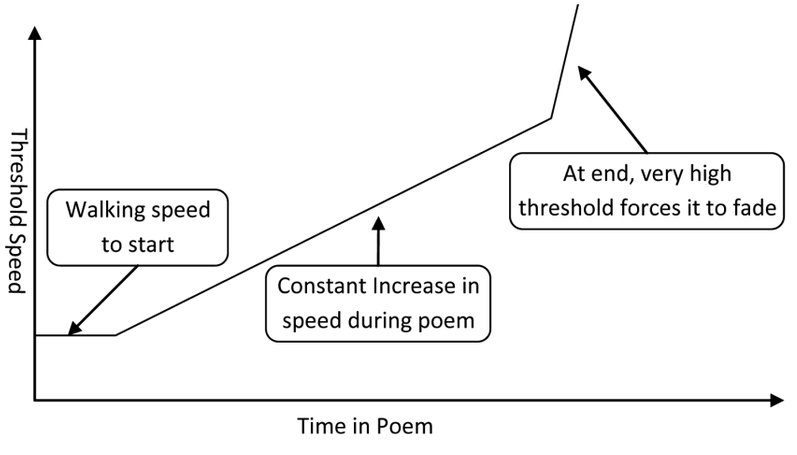
Reeves et al. describe interaction techniques involving hiding and revealing elements of interaction to spectators [8]. Marshall used their "suspenseful" interaction strategy, in which spectators can see the person interacting with a system yet cannot hear the system's response. The headphones support this, making the audio a hidden, personal thing; the physical design, featuring large headphones and a fluorescent jacket, advertises the work to spectators, enticing them to experience the work.

To build this artwork required technology to play audio and detect running speed. The artist did not use GPS due to its poor detection of speed. Instead, he built a speed detection system using a Nokia mobile phone with a built-in accelerometer that detects how fast a person steps. The phone also supported sound file playback. He acquired fluorescent jackets and sewed elastic guides for headphone wires. The phone fits tightly into a jacket pocket, which makes the accelerometer reliable.

The software [9], upon registering a small amount of movement (indicating that someone has the jacket on), starts the audio track. It continually compares the listener's measured motion to a threshold value, which rises depending on how far through the poem the listener is (Fig. 2). If movement falls below the threshold, the audio begins to fade. The listener must speed up to make it fade back in; otherwise the sound fades completely, returning to the initial "waiting for movement" state. People can have as many tries as they like at listening to the poem without outside intervention. When the equipment is taken off, it is ready for another listener.

Marshall tested different thresholds by trial and error, getting friends to test various configurations. The thresholds were finally set so that fit athletes can finish the poem but unfit people cannot. He tested the work in several environments, from flat parkland to hilly woodland full of roots and mud.

Fig. 2. Rising speed threshold during the poem. (© Joe Marshall)



Staging

The artist staged *I Seek* at two contrasting venues: the Contemporary Urban Centre in Liverpool, U.K. (2008), and at the Berkeley Art Museum, CA, U.S.A. (2009). In Liverpool, listeners ran on the streets in a dilapidated ex-industrial area of the city, on a dark, rainy autumn night. In Berkeley, listeners ran in the complex landscaped grounds of a modern building, with multiple levels and ramps and varying terrain (Color Plate B).

Experiences of *I Seek*

After Liverpool, it was clear that participants found *I Seek* exciting and interesting; however, Marshall had little knowledge of how people experienced it and how they responded in their running. At Berkeley he collected information on peoples' interactions with *I Seek* by integrating data-logging into the software and by interviewing listeners after they finished. This section describes the insight gained from this data in themes intended to be relevant to artists using exercise in publicly situated work.

Environment and Terrain

John Hockey [10] describes the complex relationships between runners and terrain, which make terrain far more of an issue for runners than for walkers. Not surprisingly, terrain had a big impact on one's experience of *I Seek*. This was particularly true of the complex environment at Berkeley, which listeners said added to the intensity of the experience: "There were a lot of areas that were roped off, and it's like you're running through a place . . . dodging chairs and people and stuff like that . . . that actually added to the overall sensation." Bystanders also became obstacles, both physically and due to social expectations, with one runner describing reluctance to run past people: "[I] slow down when I pass by, and then it's like 'Oh wait, no, don't stop.'"

People also used the terrain strategically, for example using hills to gain speed: "I saved myself up for the downhill bit, knowing it was going to get harder and I thought, well the downhill would give me a boost . . . so I ran round in circles up there."

Exercise in a Social Setting

At arts venues, it is uncommon to see people running at high speed, a tension Martin Creed played with in *Work No. 850* [11], wherein runners sprinted through a busy gallery. Eddie Ladd's *Bobby Sands Memorial Race* [12], in which she dances on a large running treadmill, also explores running as a performance activity. In *I Seek*, listeners enter a performative role as they run around wearing bright jackets. Unlike in Creed's and Ladd's works, listeners are members of the public, not paid performers. Some listeners found this embarrassing at Berkeley, where there was a crowd and limited space (people were able to run freely but not allowed to leave the museum grounds): "Running back and forth through the same crowd repeatedly is . . . too much." One thing that overcame embarrassment about running was multiple people doing it at once: "I prefer going in a group . . . in a group you don't feel so silly." Some participants competed with friends to reach further through the poem or to run as fast as possible. Listeners suggested that friends watching made the experience more intense and led to some enjoyable interactions: "Somebody started to chase me, I had to run away from him, he started chasing me again, I had to run away again."

Changing Focus of Attention

Running fast in a busy shared space with complex terrain takes a lot of mental and physical energy. The tension between running and listening is a large part of the success of *I Seek*. At some point, the attention required in order to go faster is too much to allow consciously listening to the poem: "At some point you stop hearing what the poem's saying, and you're trying to keep running . . . the poem was actually very fascinating by itself, it had such energy." The poem becomes simply part of a larger activity; "I don't feel like I really heard a narrative, I heard a mood, there's an energy"; "I caught whole sentences . . . but if you ask me now, what they were, I couldn't say"; "[I] checked out of what it was really saying and focused more on my experience of the movement."

The poetry is also mixed with sounds made by the activity of running itself. The headphones cover the ears, reducing outside noise, but when people exercise hard they can hear their blood pumping and their feet hitting the ground: "[I was] hearing my footfalls as, like, bass [in the headphones]." This effect becomes stronger as people go faster, reinforcing the transition away from conscious listening: "The thudding of the running and the beating of the heart took over"; "I could really hear my feet, running, and that was really interesting to me, so the text became more background."

Individual Actions and Interpretation

The most exciting thing about a physically unconstrained work is the unpredictability that occurs when people are let loose with it and seeing patterns of behavior that emerge. In *I Seek*, Marshall observed two themes in the physical, active interpretation that listeners applied to the work. Some listeners chose to treat *I Seek* as a game or competition to try hard to hear the whole poem: "[We] wanted to go faster, see if we could hit more"; "Those two were [competing with each other]." Others treated it in a more experimental and playful manner: "I was playing with it; I actually went into it with a perception that it was not [controlled by acceleration], and then felt that it was change in speed that dictated it," "Experimenting, to see if different movements would get another kind of feedback. . . ."

Designing interaction to support and encourage different interpretations is a challenging task; *I Seek* does this by giving participants freedom of movement and no explicit instructions, allowing for experimental use. Marshall deliberately did not push a particular interpretation, allowing users to create more rich and individual interpretations themselves (this was inspired by Sengers and Gaver's work on designing interfaces for individual interpretation [13]).

Fitness and Individual Differences

I Seek is purposefully hard. Many people did not hear the full poem (roughly 30% of participants heard it). The log data offer some insight into why people were unable to finish; many people did not have too slow a top speed; rather, they went too fast at the start and were unable to keep going. Others paced themselves well but could not reach a high enough speed. It is notable that in this fast experience, pacing seemed to be as important a factor as ability to reach high speeds. During development, several people suggested making the speed threshold relative to initial speed so that everyone would have to push themselves equally hard. However, Marshall deliberately chose fixed thresholds to preserve individual differences in experience of the work. Other individual differences included a large range of sizes and one participant with extravagant facial hair, which made it hard to wear headphones.

Conclusions

I Seek the Nerves under Your Skin explores the intersection between running and listening in a fast-moving interactive artwork. In developing this work, several interesting challenges emerged due to the way that it forces members of the public to move extremely fast while also attempting to focus on the poetry. The description of the techniques and materials used to create it and the experiences of staging it may be useful for others trying to create artworks in which participants move quickly and freely around an outdoor environment.

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The authors work in the Mixed Reality Lab at the University of Nottingham, a dedicated studio facility where computer scientists, psychologists, sociologists, engineers, architects and artists collaborate to explore the potential of ubiquitous, mobile and mixed reality technologies to shape everyday life.