Plum St: Live Digital Storytelling with Remote Browsers

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ABSTRACT
What is the place for Internet Art within the paradigm of remote music performance? In this paper, we discuss techniques for live audiovisual storytelling with the Web browsers of remote viewers. We focus on the incorporation of socket technology to create a real-time link between performer and audience, enabling control of audiovisual media directly within the audiences' browsers. Finally, we describe *Plum Street*, an online multimedia performance, and suggest that by appropriating Web media such as Google Maps, social media, and Web Audio into the genre of remote audio performance, we can tell stories in a way that more accurately addresses modern life and holistically fulfills the Web browser's capabilities as a contemporary performance instrument.

Keywords
Remote Performance, Network Music, Internet Art, Storytelling

1. INTRODUCTION
Remote music performance paradigms have blossomed in the last decade. Succeeding early precedents such as *Brain Opera* [1] and network bands, musical collaboration and performance through the net proliferated with TransJam [2], mobile orchestras [3], CODES [4], and others (recently Jam with Chrome). Asynchronously, participants in the global net.art movement created works that used core tendencies of the internet as artistic tools: hyperlink structures, randomly-generated HTML, interactivity, and the Web as a permanent installation space that allows an artwork to evolve over a long period of time. These Web artists established the basic format—long-running interactive installation—which remains the dominant format for Internet Art today [5].

Plum Street brings the Web browser and associated media art tendencies into the tradition of live music performance and storytelling. Below, we describe our remote storytelling system that lets *Plum Street* be performed and distributed live through the Web using sockets, with the goal of using each audience member's browser as a dynamic and responsive instrument for live media gestures. We perform with the content of the Web as a way to communicate accurately what it means to live now. We highlight this as terrain ripe for exploration, with accessible tools capable of new performance methods.

2. CONTEXT
A 1994 work by Heath Bunting, a founder of the net.art movement, illustrates remote human presence and performance through the network. For the work, *King's X Phone In* (1994), Bunting publicized online the phone numbers of all payphones at King's Cross train station in London. He encouraged anyone to, on a specific day in 1994, do any of the following: "call no./nos. and let the phone ring a short while and then hang up. call these nos. in some kind of pattern. call and have a chat with an expectant or unexpectant person. go to Kings X station watch public reaction/answer the phones and chat. do something different" [6]. Bunting takes the pay phone, which is usually used for outgoing calls, and interacts with it, using as art the human presence on the other side of the network.

Concurrently, Joan Heemskerk and Dirk Paesmans of the art collective JODI pioneered artistic uses of the Web browser. Their website, JODI.org, created in the mid 1990s, is not a documentation of their artwork, but is the artwork itself [5]. To visit JODI.org is to be confronted with randomly-generated HTML, images borrowed from the web, webpages that scroll automatically and without direction, all linked together via hyperlinks embedded in the artworks. The viewer structures the artwork through interaction with it, jumping from page to page, image to image, of the browser-based art installation.

Recent public frameworks like Node.JS and Socket.IO make real-time, shared Web interaction more accessible for common artistic use. JavaScript -- the same language that artists like JODI use to handle local web interactions -- can now manage remote interactions, opening a two-way channel through the network and reintroducing the very human presence from Bunting's work into the Web media theatrics of JODI. This is our goal with *Plum Street*.

3. PLUM STREET
3.1 Gesture Distribution

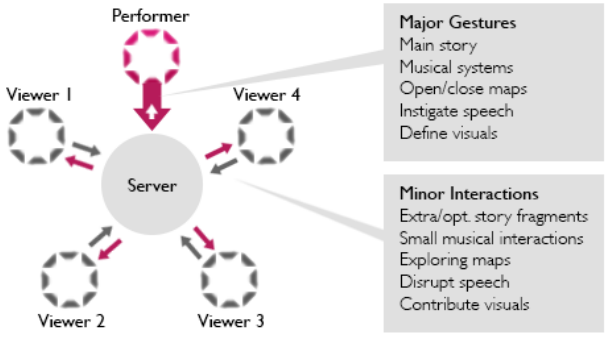

Figure 1: *Plum Street* network paths

In *Plum Street*, we use these tools to create a distributed performance accessible via URL through HTML5 compatible Web browsers. The performance takes control, on a superficial level, of each viewer's browser through JavaScript, allowing the performer to enact media gestures with the browser of each remote audience member. In a way, the performer is able to "browse for you" by opening and closing web content, and does

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so within the context of a musical and textual narrative. The alternative of performing *Plum Street* locally via projection screen felt insufficient; we want to tell stories with the Web, and the Web is experienced through distance, at each of our local computers.

The open, two-way channel lets the audience assist in the story's blossoming. *Plum Street* establishes a performance hierarchy wherein a primary performer generates the significant events (approx. 90% of the story content), while viewers are able to explore the content and uncover additional fragments (a non-essential 10%). Events can be triggered with keys or mouse gestures, and are sent via array packets throughout the network. An array of all recent gestures is sent, so that if an individual event is lost, it shows up with the next event. We found Socket.IO to handle gesture distribution quickly within the equivalent of a chamber audience (<40) connected to the Node server via a local wi-fi network.

3.2 Media

While it is common to see narratives expressed through streaming audio or video on the web, *Plum Street* is fundamentally different. In *Plum Street*, we interact with the more basic content of the Web: HTML, JavaScript, APIs, and Web Audio. This has an important ramification: in remote performance over Skype, the audience sees a copy of the art; in remote Web performance using manipulations of HTML and Web Audio content in the browser, the remote viewer sees the real performance drawn directly from the technology of mediation. It appears that the website itself is telling the story through the combination of these discrete, independent media.

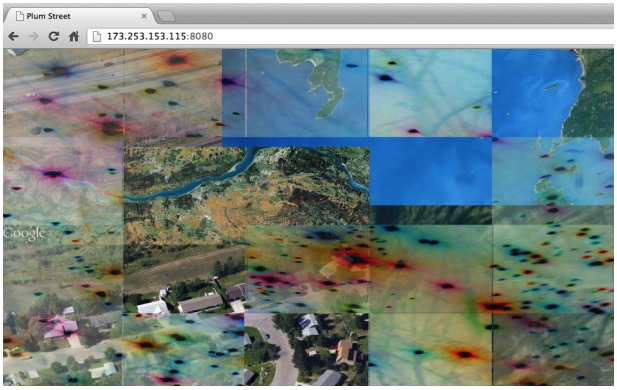

Figure 2: *Plum Street* maps with images on <canvas> [7]

Plum Street focuses on fables of absence, invisibility, distance, and seeing art in the materials of our daily lives. These concepts act as themes while viewers experience the acousmatic story. A narrative was chosen for its capacity for direct emotional impact; a secondary goal of this project is eliciting emotional response from the mundane digital content that we interact with daily. The narrative is revealed through the following media components: audio, image, text to speech, maps, and borrowed Web media.

3.2.1 Audio

The recently released Web Audio API, currently in development by Google, forms the audio engine for this work, offering real-time digital signal processing directly in the browser. We utilize Web Audio to synthesize, filter, convolve, delay, and modulate audio. The flexible playback engine currently allows for a simple granular synthesis. We have experienced limits to speed of rapid processing (for example, using the Karplus-Strong algorithm in higher pitch ranges). *Plum St* currently relies on a mix of pre-composed audio and real-time synthesis through Web Audio.

3.2.2 Text and Speech

Gestures trigger processed recitations of the story. We are currently implementing Text-To-Speech (TTS) JS libraries, in an effort to make the story entirely browser-generated.

3.2.3 Imagery

We use HTML5 <canvas> for live-processing and collaging of artwork by artist Nathaniel Parsons to illustrate events.

3.2.4 Web Media

With Google Maps' open JavaScipt API, we collage multiple maps, each individually controllable and interactive. We create a fictional digital cartography by mixing multiple locations (a particularly blue river in Spain, a jagged forest in Norway). In addition, broader browser manipulation plays a role in *Plum Street* through opening new browser windows, animating scrollbars, and embedding external websites.

4. CONCLUSIONS

The Web browser is ripe as a new medium for live performance. By using socket technology common to collaborative music apps, these performances can be distributed to remote Web browsers. While this may not be a practical method for purely musical performance yet, its advantages lie in the inclusion of other browser-based media art forms, which can use audio as a contextual component much like dance or film. *Plum Street* posits a new breed of performance in which a primary player enacts temporary, gestural audiovisual collages in the network, using the content of our digital lives. With new JavaScript server toolkits available and the Web Audio API in development, we see this performance paradigm as an exciting potential venue for the blurred boundary of electronic music composition and networked media art.

5. ACKNOWLEDGEMENTS

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