

GPS Film: Not a Moving Picture, A Picture Moving

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Introduction

GPS Film is the invention of a new form of film-viewing experience that uses the location of the viewer to control the story. On a mobile device, a film is assembled in real time based on the location and movement of the person watching it...location-based mobile cinema. The project included the development of a software application that assembles cinematic narrative based on user movement and location, device application programming that uses existing standardized players in this new way, and the production of film content for the system.

The system

Using a GPS-enabled PDA, the hard drive of the device stores the film and the programming required to select clips based on location. The device recognizes the location of the viewer and plays scenes tied to those coordinates. As the viewer travels through pre-defined *zones*, the movie changes when one zone is entered and another is left. The GPS receiver contacts the satellite, the coordinates are loaded and then used to change to the next scenes in the device's database. The result is a new type of film experience that is tied to the movement of the viewer.

Narrative structure

How does one tell a story when any scene can be viewed before any other, when the amount of time within a scene can change based on the speed of travel — train, taxi, walking? How can it make 'sense'? GPS Film entered a new terrain of storytelling. The film's narrative needed to change with each route, direction, speed, and total distance...yet continue a consistent theme, with recurring characters, and an overarching story. Part of the research involved solving this problem by finding a narrative formula that could apply to any story.

Each time the machine is powered on, the opening titles play and the *trigger event* is shown. This event can be comic, dramatic, emotional — the viewer sees a bank robbery, a couple kiss, etc. This event always plays first. It gives a compelling moment that is refreshed in the viewer's mind each time the player is turned on. The device then reads the location of the viewer to determine the zone they are in. The movie shows 'establishing shots' of that area, e.g. views of the shophouses of Chinatown. A title then displays that states "five minutes ago" or "100 years earlier" or "last night", etc. depending on the scene in that zone. Passing

through each zone tells the viewer more about the initial trigger event, giving it deeper meaning and depth. As the viewer explores the zones, he begins to understand how the trigger event came to happen — how the couple arrived at that first kiss, how the bank robbery came to occur. This flashback structure allows for the timeline of the story to be viewed in any order and still make sense.

“Nine Lives”: The first GPS film

The selected story is a populist, slapstick comedy. This genre was chosen to prove that the technology was both flexible for any type of story and something the average viewer could enjoy. Downtown Singapore was chosen for the prototype as it provided a wide range of visual possibilities — modern offices, old shophouses, alleys, parks. “Nine Lives” originated with the “Suspect it, Report it” warnings on Singapore’s public transit system. The writer envisioned an HDB grandmother (called ‘Aunties’ in Singapore slang) taking these warnings a little too seriously and causing a crazy web of misunderstandings, collisions, and false identities. The film introduces a new Singaporean super-hero, “Auntie Vigilante”. The thirteen-character ensemble piece intertwines star-crossed young lovers, dim-witted criminals, a movie-loving Indian cabbie, and a lively cast of other characters.

Programming

Original attempts to create the code in Linux using the Qtopia Software Developers Kit were scrapped due to scarce support. Even for PDAs, the Windows OS is more popular than Linux-based platforms. The application was developed for both laptops and mobile devices in .Net Framework and is comprised of two main components — one integrates the mobile device and the GPS (to obtain coordinates) and another plays the corresponding movie clip in an embedded movie player. An interactive interface was designed to allow the selection of any preloaded movie. Each GPS film is associated with a specially formatted text file consisting of the various zones, their coordinates and the corresponding clips. An installer was also developed so that the application can be conveniently installed on any computer.

The device

The original plans to design and manufacture a device specific to playing GPS movies proved unnecessary — the recent rapid advances in mobile hardware suddenly offered several players with GPS capabilities. The ASUS MyPal 696 GPS PDA was selected due to its appropriate design — the GPS antennae was subtly incorporated, the stainless steel case was slim and durable, the 3.5 inch screen was anti-glare. It also ran on Microsoft Windows

Mobile 5.0...an easy next phase in the application’s development. A 2gb SD card was added to allow for the storage of the film clips.

Determining the zones

The team walked all of downtown Singapore to determine the best delineation of zones for storytelling, for timing, and for most commonly travelled routes. Once the nine zones were selected, Google Maps was used to get precise coordinates, both longitude and latitude, of the borders of each zone.

The programmers developed a procedure for the device to recognize the zone in which a user is traveling. Once the longitude and latitude of each zone’s corners are established, the location of the user is determined by successively calculating the angle subtended by the user at consecutive pairs of vertices of all the zones in counter-clockwise manner. Dot products of vectors were used to determine these angles. If the angles total 360 degrees, the user is inside that polygon. This mathematical formula is based on the fact that the sum of consecutive angles subtended from a point within any polygon (rectangles, pentagons, triangles or any arbitrary shape) to all the edges is always 2 pie radians or 360 degrees. Conversely, if the user is standing outside the polygon, the sum of the angles cannot be 360 degrees. The algorithm throws an exception when the user is exactly on any vertex — the exact line between zones — and additional code was written to adapt to this situation. As soon as it is known that the user is in a particular zone, the corresponding video is played. When the user is outside of the entire navigation area, the device plays a generic promo for the film.

Summary

People now watch movies on trains, in taxis, on buses. Our new-found mobility is changing how we enjoy cinema. And because of games, we’re becoming used to stories being told by exploring an environment. GPS Film takes these concepts off the computer and back into the real world. Story navigation becomes a physical, viewer-controlled experience; a journey of fiction can now be tied to a journey of fact.

The team

Scott Hessels, Design and Concept
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Patent pending, Nanyang Technological University and Scott Hessels