

Generative spatial montage with multi-layered screens in “Lost Fragments of the Night”

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Abstract

‘Lost Fragments of the Night’ is a poetic documentary film that utilizes an algorithmic generative editing system to preselect shots to be rendered over four screens arranged in layers. The artwork’s subject is the chaotic and paradoxical sensation found by night in the city of Seoul. These author themes of disconnected and paradoxical images in urban public spaces resonate with the concepts of the multi-layered screens and generative editing system. The fragmented images are distributed over layers of screens to emphasize a chaotic and simultaneous sense of fragility that nevertheless together forms a whole. Designed for large-scale installation in urban public spaces, our artwork has been prototyped via a physical miniature, projecting by rear diffusion onto four layered screens constructed of grey sheer fabric. The audience can appreciate the montage from different angles and positions in a public space to produce different layering effects not possible in traditional 2D cinema. The generative editing system uses a dynamic Bayesian network constructed according to scene and narrative timeline tagging. Audience members can actively contribute to the direction of the montage through a web interface, so the artwork creates different meanings by embracing the role of the audience in every screening.



Figure 1. Photographs of the ‘*Lost Fragments of the Night*’ miniature.

1. Introduction

The contemporary city is a megalopolis full of asynchronous forces and paradoxical multiplicities of separation and coexistence. The process of integrating such disconnected and transitory stimuli in the city may also be likened to the construction of montage in cinema. Walter Benjamin said that juxtaposing the fragments of city images is a process to connect different existences that break down the isolation between them and can be considered as a montage technique. [1][2]

Nowadays, we are surrounded by fragmented and simultaneous images of large information densities through digital media, which now employ multiple screens, windows and mobile devices, and we are becoming increasingly required to connect these disjunct images in order to find relationships between them. From these contexts, the environments of creating and appreciating montage are expanding in spatial dimensions especially in urban spaces. [3]

‘Lost Fragments of the Night’ is a poetic documentary film that applies a new non-linear digital display that generatively selects from author-tagged shots, and renders them over four layered in physical public space. The artwork’s material is the fragmented and paradoxical images found by night in the city of Seoul, and its themes of disconnection and heterogeneity in urban public spaces resonate with the concepts of the generative editing system and multi-layered screens. The fragmented images of diverse locations, people, and objects in Seoul are distributed over layers of screens to emphasize the chaotic and simultaneous sense of fragility that still forms a whole when composed together. The generative editing system has an internal logic, but creates unfixed and constantly differing montage through its database, emphasizing the countless possibilities of coexistence and separation in a major urban complex.

‘Lost Fragments of the Night’ grants roles to the audience as a part of the artwork. The audience can appreciate the montage in public space from different angles and positions to produce different layering effects not possible in traditional single-screen cinema. Furthermore, audience members can have a role beyond

that of a viewer through actively contributing to the direction of the montage by using the interactive editing system. From these contextual variations, the artwork develops different meanings by incorporating the contribution of the audience in every screening.

2. Related Work

2.1 Public Space and Cinema

Cinema has historically captured and revealed the spatial and social dynamism and complexity of urban spaces. [4] The relationship between cinema and urban public spaces goes beyond content. Cinema and urban environments have structural and functional similarities. Fundamentally, the modern metropolis itself might be a medium that mediates and creates relations among different things. A city can be considered as an archive with continual accumulation as well as destruction and subtraction, which are temporary and void but preserve the past as constantly reconstituted memory. In other words, urban public space embodies historical memory and continually generates temporal images and relations. [5] Cinema is both medium and archive, as it is a way of recording and sharing historical memory by containing past existence within moving images.

Public art is required to provide ideas and concepts of public space and life, which are dynamic, temporal and unfixed experiences. [6] There have been many attempts to converge cinema with architectural installations such as public art. The geographic narrative of cinema in physical space is similar to urban rhythm which is random and mobilized assemblage. With cinema in dynamic environments, audiences are physically traversing the montage, mentally processing its visual language as is done with imagination and memory. These kinds of cinematic experiences offer critical questions and insights for urban public life. [7]

Walter Benjamin made a connection between the perception of a city and the appreciation of cinema. Modern city is an assemblage of absurdities, and remains fragmented and unconnected. Montage is not only the technique of film editing for juxtaposing separated shots but also a conceptual process for linking separated images. [1][2][8]

2.2 Spatial Montage and Multi-screen

Editing in film is the connection of different shots to create a whole and can sequence events to draw stories effectively. [9] There are editing conventions that are primarily concerned with consistency and maintenance of natural visual sequence and narrative flow such as “continuity editing”. However, breaking the conventions of consistency may intensify emotional rhythm and shows the complexity of events. This is called “complexity editing”.

[10] Therefore, editing is also considered as the choreographic shaping of physical rhythm in film. [11]

Montage literally means “setting together” or “assembling”. Eisenstein said that the juxtaposition of two separated shots is qualitatively different from that of each image viewed individually, which is dialectic form. He also portrayed montage as a counterpoint that coordinates multiple voices over time with parallel structure. [12]

The concept of montage is changing and expanding in the digital age with high information densities and multiplicity of images. Lev Manovich suggested the concept of spatial montage, which is the juxtaposition of images of different size and proportions. It shows a simultaneous relationship between separated images, which can be alternatives to traditional montage in a single screen. [3]

It is also convenient to use multiple screens to convey a maximal amount of information with minimal time. The form of images in multi-screens can be compared to music that seems boundless, multi-directional and simultaneous, following Eisenstein’s metaphor of counterpoint. [13]

There have been many trials to use multiple screens for cinema, especially in the avant-garde and ‘expanded cinema’ movements such as the Labyrinth production at Expo’67. [14] These types of films did not develop into mainstream cinema because of the distractive environment and non-linear narrative. However, the characteristics of digital media with multiple windows and database logic correspond to the idea of avant-garde movements with multi-screen. From these contexts, the border between avant-garde and mainstream in cinematic experiment are starting to blur. [15]

2.3 Database Cinema and Generative Art

Database means a structured collection of data. Computers can search and retrieve data effectively in such structures. A database can be the center of a creative process that makes unfixed and generative artworks with dynamic fluctuation. For example, Lev Manovich created database cinema with computer in the *Texas* soft cinema project. In *Texas*, each video clip in the database is described by some parameters, which are used by the software to assemble clips together; montage is created by similarities between these parameters. [16]

There have been many attempts to use databases for open-ended, unfixed and generative effects, thus database cinema can be understood as a generative cinema that creates cinematic experiences through the execution of computational algorithms. [17][18] However, there remains great potential for deeper explorations with generative processes as seen in other areas of generative art.

Computer generative art is created by computer programs with minimal intervention from humans, and focuses on processes that can generate multiple outcomes.

[19] Generative art challenges the traditional concept of authorship and intention, adopting autonomous processes and randomness as methods for making artworks. [20] However, the generative approach has been relatively less examined for cinematic applications; the use of computer generative systems for making art have been predominantly directed to computer graphics and music, generating new images and sounds. There has been research in generative video editing, but the emphasis is more on technical editing rather than montage construction and aesthetic effects. [21] [22]

3. Lost Fragments of the Night

3.1 Overview of the Artwork

‘Lost fragments of the Night’ shows fragmented and paradoxical images found by night in Seoul, a capital city full of complex phenomena, juxtaposing contradictory values and dislocated images created through an extremely compressed and uneven modernization. Often called ‘the city that never sleeps,’ Seoul epitomizes the paradoxical and chaotic coexistence of heterogeneous and fragmented images in contemporary life. [23]

The simultaneous relationship between fragmented elements in the city is related to the media requirements of the multi-layered screens and generative editing system. The separated images, which are presented over four layered screens, emphasize the paradoxical relationship between different elements with collage aesthetic effects. The tag-based generative editing system generates different montage while following its own structural logic, revealing the unfixed coexistence and separation in a metropolis caused by modernization.

142 original video clips, shot by night in Seoul, are used as source material. The author tags clips with keywords, and then sets a running time and creates a narrative timeline using the same tags. Between each screening, the generative editing system selects appropriate shots for each of the four screens according to probabilities based on their relevance to the narrative flow, their association with previously displayed clips, and any pre-defined system-wide structural constraints.

‘Lost Fragments of the Night’ is intended to be installed in urban public spaces such as streets, parks or subway stations. The contexts of artwork can be various depending on the space and positioning of the audiences. Furthermore, audiences can change the tags and timeline for constructing different montage by using a simple web interface. By these environments and conditions, audiences can be the active participants of artworks to generate the meaning of artwork in every screening.

3.2 System Configuration

We made a virtual simulation model for the installation in public space (Figure 7), and built a physical miniature display system as a prototype model (Figure 3). Two projectors are set from the bottom, projecting by rear diffusion onto four layered screens, and grey sheer fabric is used for the translucent screens.

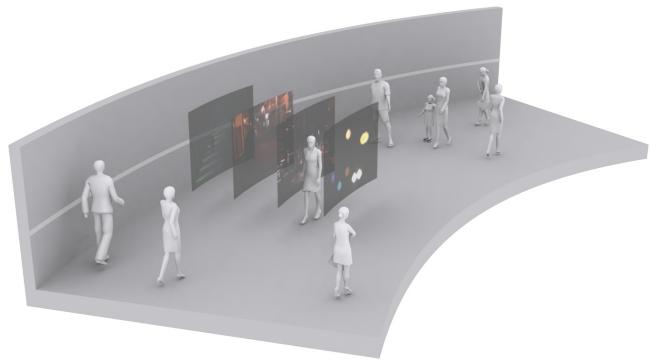


Figure 2. Rendering of the proposed architecture of the final display.



Figure 3. Photograph of the display miniature infrastructure, used for evaluation purposes.

We designed a generative editing system that selects clips for each of the four multi-layered screens within narrative, time and effect guidelines set by a human editor. Narrative guidelines are set using a manual content tagging system for each movie clip and for a montage timeline. A playlist for each screen is generated using a dynamic Bayesian network to select clips.

The process is generative because each clip is selected with probability based on their utility for the specific requirements and the selection of each new clip is dependent on previously selected clips. The human editor

guides the narrative flow of the montage but the number of possible generated outcomes can be vast. The system is implemented using two computer tools. One, which is installed with the screen installation, contains the playback engine. The other is a portable interactive editing tool.

A user can access the interactive editing system with a mobile device, create tags for each clip and give them weighting values between zero and one. Every tag is then added to the Tag Library for the montage construction. There are some predefined montage effects, such as forcing a clip to only play when the other screens are empty, and to be played with an echoing effect across multiple screens. Once the user has described each clip with suitable tags they can create a visual timeline to represent the narrative structure of the montage. The user can set the desired runtime and use any tag from the Tag Library to set target values at any desired keyframe points on the timeline.

To work with interconnected tags, clips, screens and weighted probabilities changing with time, dynamic Bayesian networks were utilized. A time slice is created whenever a new clip is needed for one of the screens and each slice includes tag values for the clips and the target values at that time. Target values at any points in time are calculated by linearly interpolating between the target values at keyframes that were created by the user. The rendering engine uses Max/MSP/Jitter, a commercial audio-visual programming package, to render the clips for each projector. The video files that the editor uses should be on the computer running the rendering engine and on the web server for watching during editing with the web interface. The tagging and timeline data is downloaded from the web server to the local machine and used as the inputs for the Bayesian network which is used to produce a playlist file that is used to call the clips. When a time signaled in the playlist is reached, the appropriate video file is played and projected onto the multi-screen installation.

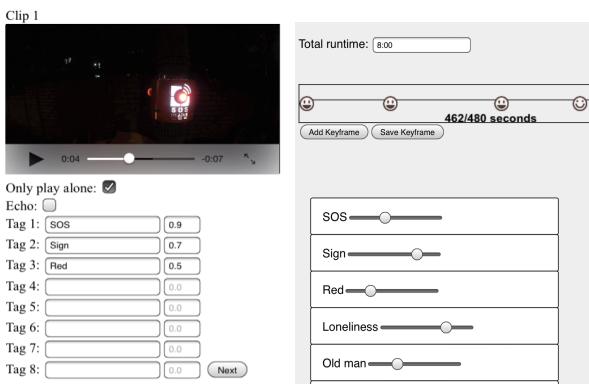


Figure 4. The web interface of the editing system.

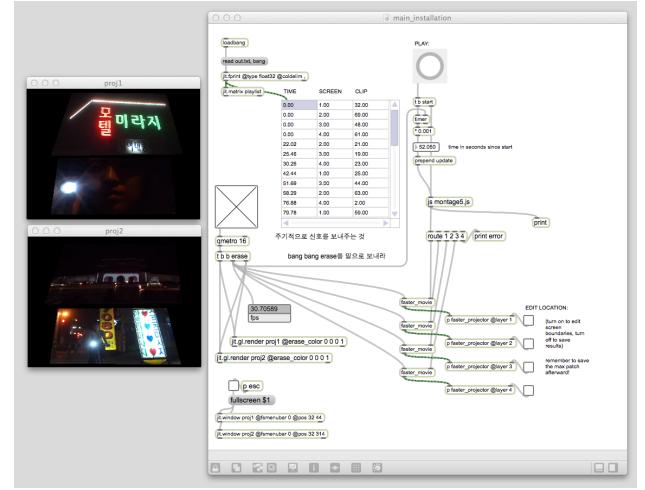


Figure 5. The rendering engine using Max/MSP/Jitter.

3.2 Aesthetic Effects

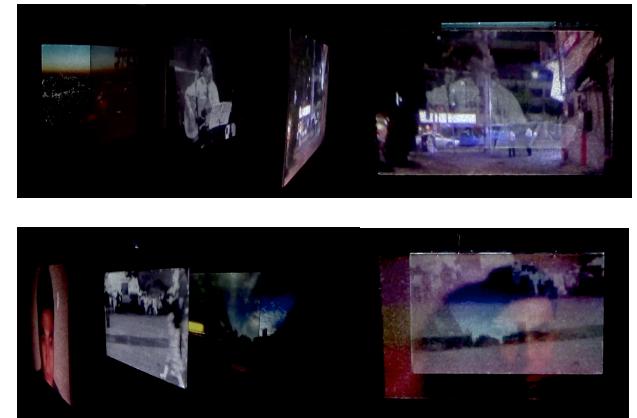


Figure 6. Viewing the multi-layered screens from different angles (showing the same clip materials in left and right photographs).

The multi-layered screens present various aesthetic effects. Separate shots on overlapped screens lead to a sense of connection from fragmented images to their unification such as collage effects. However, the screens are layered with depth, so viewers can also perceive each image independently. Images are seen in various ways depending on the audiences' position and movement. Therefore, multi-layered screens show not only the individual images but also their combination at the same time.

In these contexts, the poetic impact of the documentary film might be intensified by layered display. The poetic mode is a way of documentary filmmaking that breaks traditional narrative form and expresses visual association,

patterns and rhythm. These techniques are related to modernist avant-garde documentary making that favored radical juxtaposition of time and space. They shattered and subverted the coherence of images to show the traumatic reality of modernization. [24][25]

Poetic effects in film are considered as the metaphoric concept of the vertical by Maya Deren: The vertical means the poetic expression to reveal central emotion and thought implicitly, and the horizontal means the construction of storyline. It is related to the vertical montage of Eisenstein, which emphasizes harmonization with various senses and images just as with counterpoint. [26][27] Thus, multi-layered screens enable the construction of vertical montage with associated poetic effects.



Figure 7. Screenshots of the virtual simulation.

The generative editing system is operated by tags created by the author and utilizes a programmatic associative network. This echoes association by metaphor in human memory. The program ‘remembers’ which shots were already shown before and which shots were shown together to build connections between clips that contribute to their probability of future selection. Human memory is similarly conformed by unfixed and metaphoric association in network. In this system, tags have metaphoric, condensed meanings, and the process of montage

construction is the networked connection between metaphors such as with mental association. [28]

The overall narrative flow and authorial intentions are not lost because tagging and narrative timeline construction provides an overall direction, yet unexpected effects may arise from the randomized selections. When unexpected shots are shown, it tends to create a conflict montage, intensifying the chaotic or absurd sensations of paradoxical coexistence.

3. Conclusions and Discussion

We created a poetic documentary and new media artwork ‘Lost fragments of the Night’, utilizing a tag-based generative editing system and multi-layered screens about the disconnection and fragmented images of Seoul by night. The purpose of the artwork is to help viewers feel the disconnected and fragmented aspects of Korean society by showing various images at the same time. It challenges viewers to draw connections between the fragments in order to understand an overall theme: a montage with four surfaces of images containing a theme with a single vision.

However, montages are randomly generated in every screening. Although author can constrain the montage construction with the tag-based editing system, it is impossible to control every assemblage.

Computer generative montage has countless possibilities for juxtaposition with many variations. Because there are not strong and central themes designed by the author, viewers are able to focus purely on the images that are part of the montage and draw connections between them.

The video clips depict images of everyday scenes that we slide by without much attention. Drawing connections between different images is an act of bridging the gap of our isolated and fragmented realities in cities such as Seoul by night. In some unexpected montage, paradoxical meaning can be elicited by absurd assemblages, which may break stereotypes held by viewers.

This artwork has not yet been displayed in public space. A miniaturized model has been produced for initial evaluation, however, people’s reactions toward the full artwork have not been assessed. Our next steps will include a full size display of the artwork and its evaluation of the audience’s response in a public urban space.

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