

# Tri-Story as “Intuitive Cinema”

## Interactive Storytelling based on Physical Action for Multi-Screen

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### ABSTRACT

This paper proposes “intuitive cinema” – a new form of interactive storytelling, which emphasizes user motive and viewpoints, and implements its cinematic expressions based on immersive quality and audience’s viewing methods. We use the quality of physical action that is made possible through a multi-screen system, and use it to approach a novel interactive storytelling method. From this concept comes “intuitive cinema”, that allows its viewers freedom to watch the movies from their personal viewpoints. The content consists of 3 channels of live-action motion pictures, and the system applies interactive displays to realize the content “Tri-Story” based on the concept of intuitive cinema.

### Categories and Subject Descriptors

H.5.2 [User Interface] : *Theory and Methods*

### General Terms

Design, Human Factors, Theory

### Keywords

Interactive Cinema, Multi Screen, Interactive Display, Interactive Storytelling, Physical Action, Motion Pictures, Max/MSP

## 1. INTRODUCTION

As far back as the silent movie phase, moviegoers have been submitted to a passive way of film appreciation. This attribute does not change even after the phase of cinema switches to color. Films are shot and edited, according to the will of filmmakers. All that is left to the audience is to simply sit in a chair in a movie theater, or be a couch potato in their living rooms when they are presented the films.

On the other hand, antithetical to the movies are theatrical plays. Unlike the motion pictures, stage plays allow interactions between the actors and the audience. Each audience crowd has a different reaction, and hence from the differences in their reactions actors’ performance may more or less shift in correspondence. The definition of *audience reaction* relies on each audience’s point of view and behavior. If there are 100 viewers in the room, it is doubtless to say that each audience has his/her own reason, or motif, that draws them to go to see the play, and thus each has his/her own point of view.

In addition, scenes of the theater plays interactively evolve in real-time have an *immersive* quality in themselves. The fact that theater experience obtains audience reaction, and immersive quality, makes each experience different in essence. Depending on which specific part of physical space on stage one focuses on, the personal viewpoint also changes as a term of output. Therefore, “viewpoint” plays an important as well as a dramatic role in the

essence of theater.

Contrary to theater, films are made according to the specific viewpoints of the filmmakers on a unilateral basis. Unlike theatrical performance, a film is not likely to react to its audience’s reaction. Elements of dramatic impression, such as motive and immersion; or more specifically, personal viewpoint, are all lacking in the realm of the movies. To make up the drawbacks of the movies, interactive cinema has been widely stressed over the past few decades. However, the conventional form of interactive cinema – which most commonly utilizes devices such as mouse, touch panel, remote controls, and its contents involving user intervention to change the storylines – does not give a dramatic impression strong enough to define the next generation of cinema. From the cinematic perspective, user intervention in the content only fulfills viewers’ perspective on the story, it does not fulfill the standard in terms of viewer’s watching methods, or giving viewers full and immersive quality to the story. In other words, it is a “partial” cinema, not one of the whole. Therefore, we propose a novel form of interactive cinema that innovates the essence of the cinema to a new system and form of content.

This novel interactive cinema obtains 3 elements of the cinematic impression: motive, immersion, and perspective, which as a whole establishes the foundation of our proposed interactive cinema. The most important element of the three is *perspective*. Setting up the viewing system so that viewers can watch the works in their own perspectives is what makes our system new and interactively defined. It is to this novelty that we have come to call the project, instead of interactive cinema, “intuitive cinema”.

The concept of the project is based on the new movie watching method that we propose; and according to the new method, a best-fitted system and its contents are created. The collective term of the project is called “Tri-Story”. Tri-Story consists of multiple screens and interactive displays; and its contents work from the standpoint of interactive storytelling and the new possibilities to the system – the physical actions and functions -that come from the use of multiple screens, to ensure users’ complete freedom in watching a film.

## 2. RELATED WORKS

The related works for each perspective, multi-screen, interactive display and interactive storytelling is stated with its controversial point.

### 2.1 Multi-Screen System

The most well-known multi-screen system can be said to be the IMAX system [1], for the concept of immersive display was developed with the birth of IMAX. In the order of IMAX series → OMNIMAX [2] → CAVE [3], immersion became an issue that studies sought after. The immersive multi-screen system that OMNIMAX had built also provided interactivity that CAVE obtains. In CAVE contents, which can be said to be a representative of multi-screen, cinematic contents of interactive

storytelling have not yet been utilized with the system [4][5][6]. As a whole, the multi-screen system has developed much in its immersive quality; however, the contents remain passive to the audience, and the system's advancement remains in the technological area. The contents, in other words, the unique storytelling techniques, have not yet been explored to its potential. Furthermore, due to the fact that special hardwares and large scale equipment in the system are needed to fully perform, problematic issues such as in the budget area become significant.

Of course, there are projects that, instead of large scale systems, use DVD projection or plasma displays to build a different multi-screen system[7][8]. However, these projects stress the conventional storytelling techniques and no interactive element is corresponded. Even if they use a multi-screen system, their work is essentially a movie screening, nothing more.

## 2.2 Interactive Display

Most interactive displays have built-in sensors. There are many researches that the interactive displays use sensors to detect the surroundings and to get feedback on the information in detail [9][10][11].

The existing interactive displays are all high in system quality, yet ironically low in versatility. It is impossible to apply other contents to these displays flexibly. Moreover, the contents they use are all simply demonstrational contents, not unique and/or cinematic contents to fully explore the systems. [12] uses plot-based contents to interactive displays is a very interesting project. However, it only grants feedback to a restricted viewing method, users' arbitrary viewing behavior is not made possible.

## 2.3 Interactive Storytelling

The topic of interactive storytelling mentioned in this section is based on user intervention. User intervention may involve 2 distinct devices: mouse-based interaction and physical interaction. Mouse-based interaction means user intervention takes place by using the mouse as the input device; whereas physical interaction uses GUI-based metaphoric interactions, such as the users' hands or any other physical parts of the body to operate the system.

[13] and [14] can be said to be contents which uses the former. These are typical forms of interactive cinema. Its image lies stronger in the game field rather than of pure cinema. In other words, such contents are only a user intervention storytelling technique. On the other hand, [15][16][17] and [18] can be said to be contents which uses the latter. These rely strongly on the interface of the input device. It loses focus on the contents – the interactive actions, the story development, and most importantly, users' arbitrary watching methods. However, it is worth mentioning that with both of the storytelling techniques, users are able to actively immerse into the contents. Instead of the passive movie watching provided by the conventional multi-screen system, these storytelling techniques are able to reform from the users' stand, and let the users actively participate in the contents.

## 3. CONCEPT – IT'S INTUITIVE CINEMA

Intuitive Cinema is a proposal to a new form of interactive cinema that adopts the dramatic impressions provided from film.

The dramatic impression we mention here can be defined by these 3 factors:

- Audience's motive – what motivates a viewer to watch the film.
- The immersive sensation that is made possible through real-time interactive story development.
- User perspective in terms of which specific part of the content a user watches (is interested in). This factor is, doubtlessly, based on the 2 prior factors - audience motif and immersive sensation.

The most important factor is the latter one, for it treats the first two factors as an output to serve the user perspective. The concept sets up so that viewers are given complete freedom in *how* they want to watch a movie; hence the naming, "intuitive cinema".

"Tri-Story" studies all concepts and structures of prior works, and develops a whole new set including multi-screen, interaction display, interactive storytelling; and in taking advantages of the physical actions made possible through multiple screens, we use new interactive storytelling techniques that allows users complete freedom in their personal ways of watching a movie.

The conventional multi-screen system, be it interactive, does not fully realize the essence of storytelling. In contrast to that, "Tri-Story" reconsiders the meaning of multi-screen, and applies it as a device to interactive storytelling. In other words, the system uses multiple screens, but consciously uses each uniquely and individually. From the content point of view, by using multiple screens, multiple interrelating storylines can take place at the same time.

Another key point of our multi-screen system is the factor of *simultaneity*. No matter how many stories are told in the form of conventional films, only one storyline can take place. "Tri-Story" makes multiple storylines possible by using multiple screens; in this case, 3 storylines on 3 separate screens.

The conventional interactive displays are not versatile, nor do they perform contents with utmost dramatic impressions. On the other hand, "Tri-Story" performs multi-purposes, and utilizes interactive displays to fully extend storytelling techniques in the cinematic realm. The versatility of "Tri-Story" is that it does not use special hardware, nor does it need large scale systems. In addition, it adapts easily to all genres and types of contents.

Moreover, we believe that both the contents and the system be equally important in a project as such. For instance, with the IMAX system, the current existing film shooting system does not show the system at its best. Along with a new system, a new set of contents is necessary; hence a new form of interactive cinema in whole can be made possible.

The conventional interactive storytelling uses physical actions as an interactive device. Even though users can be actively immersed into the works on screen, the quality of dramatic impression remains lacking in the contents. "Tri-Story", on the other hand, not only uses physical actions as an interactive device, it also stresses the importance of the contents, and reforms users' watching behavior from an objective point of view to that of a subjective. User freedom in subjective watching can be said to be the key to our reform.

## 4. TRI-STORY

### 4.1 Abstract

The content – Tri-Story – consists of 3 channels of live-action motion pictures, one being the metaphor of a main screen in the movie theater, and the other two the interactive sub-displays imagined to be fixed on each seat in the movie theater (Figure1). The sub-displays are interactive displays. The system does not simply obtain the "multi-screen" qualities, but each screen acts as an important part of the whole. The interactions of the sub-displays have a 2-dimensional framing function and a Z-position which controls the zooming in and out of the contents. In addition, it enables one to focus at a certain part of the content and zoom in to it specifically, in order to switch between different scenes or stories.

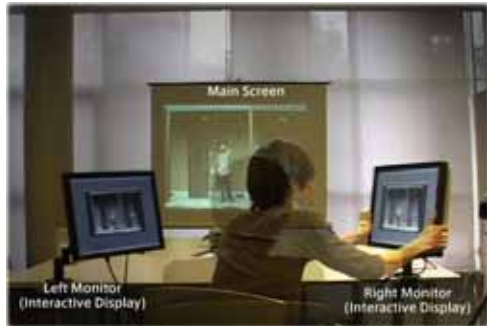


Figure1. Overview of Tri-Story

Through these interactions, viewers are given the freedom to choose how and what they want watch from the contents given on screen. They can zoom in to their favorite actor, or have their own intentions on how they want the objects to be framed in the display. By adapting to user motif and immersive perspective, the project gives viewers the space to intuitively and freely watch the movies at their own will.

## 4.2 Content

In this version, three comedy stories are told simultaneously (Figure 2). Each story stands independently, but can also be watched at the same time to get different perspectives over the storyline. Since the stories were created with the presumption of simultaneity, a new film production process is required.



Figure2. Overview of Tri-Story

The production process for “Tri-Story” contents and conventional contents largely differs in story development, shooting and acting performance. This chapter describes each difference.

### 4.2.1 The Story Development

Screenplay writing also turns on a new stand. An infinite number of stories can take place with this system. Multiple stories can be created and written into the same screenplay. On top of the story structure and character development, the screenplay needs to be written according to *time*. The keyword is the *timing* of events. Because every story is related to each other in the screenplay, interactions between characters of different stories are allowed. From their interactions come the changes in each story. The continuous “chemical reactions” between the stories forms *multiple simultaneous chain reactions*. Hence, it is not an exaggeration to say that the sense of time in the screenplays plays the most important role comparing to the other elements. And therefore, the storyboard would also be drawn based on precise timing.

### 4.2.2 The Shooting Methods

Contrary to conventional filmmaking, no angle set-up, or cuts between shots and scenes are necessary. Audience no longer has to watch what is given to them and be limited enough to accept them in whole. Instead, viewers have a choice of choosing the story to watch, or a specific character to focus on, or even the subtlest items in the scene (ie. a lamp, a chair, the floor, the poster on the wall). Because of this freedom on the viewers’ part that the project aims to achieve, a *surplus* of content is

necessary. For instance, in conventional films, a scene where two characters are having a conversation would usually involve the cutting back and forth between the characters, a close-up shot of a character’s reaction or the speaker’s facial and body expressions, a medium or long shot of both characters in sight... etc. All these shooting methods become obsolete in this content. Instead, the cameras try to catch as much information as possible, to offer viewers more than enough contents to look at. And since cuts are no longer necessary, cameras stay stationary during the whole process of shooting once they are fully set up.

### 4.2.2 The Production and Acting Performance

The acting method of this project is also different from the conventional filmmaking process. The movie content requires theatrical acting method, to exaggerate the body language of the characters. The more implausible the actions, the more it is imposed. In fact, because everything is taken in one take – no cuts, no shot changes – acting rehearsal takes up a considerable amount of time compared to the actual shooting process.

The direction, in addition, requests not only a usual movie director’s craft, but also the timing of all events in the storyline is an important element.

Theatrical acting and directing is used to produce this movie.

## 4.3 System

The system of Tri-Story (Figure 3) consists of 3-channel live-action motion pictures and 4-channel sound. One of the three channels of motion pictures is projected onto the main screen, and the other two channels are projected on the two interactive displays positioned at the left and right to the main screen. This chapter mentions the interactions; zoom-in/out, framing and sound.

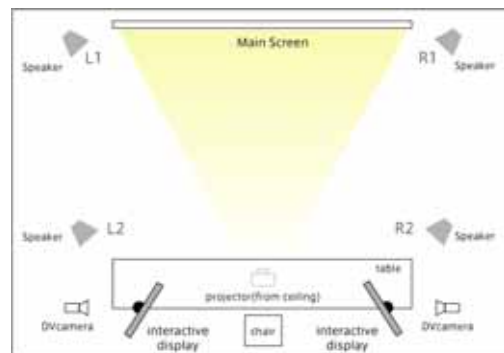


Figure3. The Setup of Tri-story

### 4.3.1 Interaction – Zoom in/out

A zoom in/out function is made possible on the 2 sub-displays (Fig 4). A digital video camera is set up at the back of the display, and an ultrasonic sensor is fixed to the upper part of its lens. This installment makes the distance between the display and the camera detectable. To be precise, the sensor detects a distance value of 0 ~ 120cm. The value is then divided into 6 segments at 20cm each, to bring out the zoom in and zoom out functions. The relationship of the assigned zoom value, the physical distance between the ultrasonic sensor and the displays, and the motion pictures on screen is shown at the table below (Table 1). To zoom out, simply pull the display out toward the user’s seating direction.

Furthermore, because all three short motion pictures run at the same timeline, a global lock is implemented at the interior of the application. When switching the contents between the hallway scene and the apartment101 and apartment102 scenes by using the zoom function, the system refers to the current value of the serial global lock to read the time code to precisely perform the picture-switching function.

**Table1. Relationship of Zoom Value, Distance between Ultrasonic Sensor and Displays, and Motion Pictures.**

distance (cm)	Zoom	Content of interactive display	
		Left monitor	Right monitor
0 ~ 20	* 3	Apartment102	Apartment101
21 ~ 40	* 2	Apartment102	Apartment101
41 ~ 60	*1.5	Apartment102	Apartment101
61 ~ 80	* 1	Apartment102	Apartment101
81~ 100	*1.5	Hallway	Hallway
101 ~ 120	* 1	hallway	hallway

#### 4.3.2 Interaction - Framing

The 2 sub-displays have a framing function by reading the X- and Y-position. At the back-side of the displays, digital video cameras are set up paralleled to the display (Figure3). Infrared radiation filters are attached to the camera lenses, to detect the infrared LED fixed at the back of the displays. The light is emitted through infrared filters unto the video camera's screen. The image analysis program is able to determine the X and Y coordinates (with a value of  $-100 < x < 100$  and  $-100 < y < 100$ ) to their exact coordinate points, and by applying these values, the specific fields of the contents can be hewed out to project on the sub-displays. In addition, the location of the infrared LED is completed with mirroring processing, so that if the monitor is moved to the left, confirmed coordinate points will automatically shift to the left and exhibit so on the sub-displays. Hence, the content itself also shifts towards the left direction.

#### 4.3.3 Interaction - Sounds

The system of Tri-Story consists of a 3-channel live-action motion pictures and a 4-channel sound. The output of the 4-channel sound changes depending on the zooming in/out functions applied inside the apartments. According to Figure3, 1 set of speakers is implemented to the left and right sides of the main screen (L1, R1); and behind the 2 interactive displays, 1 speaker each is set up (L2, R2). The correspondence of the output of each speakers to the display movement is shown in Table 2.

**Table2. Relationship of the position of each monitor and Sounds.**

display		Sounds			
Left	Right	L1	R1	L2	R2
default	default	L_main	R_main	L_main	R_main
in	default	L_main	R_main	L_102	R_102
default	in	L_main	R_main	L_101	R_101
in	in	L_main	R_main	L_102	R_101

### 4.4 Future Development

From the content's perspective, a new set of filmmaking process took place. From screenplay writing, shooting, directing and acting method, the aim of the content was to be as accurate to the system as possible. In the contents produced this time, by moving the display towards the doors, viewers can enter the apartments. From there, the system allows further zooming functions, so that viewers can freely watch any detail of choice. To allow even more viewer freedom, each detail in the production part is important. From the system's perspective, the current version is considered a prototype. The next step is to even further improve image processing based on ultrasonic sensors. In the future, improvements on the sensors will be sought in order to detect all

kinds of movements, such as tilt and pan, to allow maximum freedom on the viewers' part. A development to emphasize on viewing freedom by improving the system interactivity, and focusing on personal point of views, to find new interactive storytelling techniques is needed to be done.

The association of system and contents of "Tri-Story" is inseparable. System and contents advancement should be considered together, not separately. Their feedbacks to each other are also important factors to improve our proposal.

Finally, not only motion pictures, but contents of the theater plays can also be used. We are interested in users' response to re-innovated motion pictures with a maximum extend of dramatic impression.

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