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Italian Polka

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Italian Polka

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Abstract

Italian Polka

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Italian Polka is an experiment that builds a bridge between Music and the field of Costume Design. It explores the new relationship of integration and artistic possibility between Music, Costume Design, Dance, and Digital Art. This is also an attempt to participate in a new form of performing art: a combination of a live concert and a costume show.

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Chapter One: Background

There were two projects that have deeply inspired my attempt to undertake this exploration of integrated art. Four years ago, I went to a music concert performed by Mannheim University of Music and Performing Arts in Mannheim Germany, the musicians produced music by beating and rubbing on their own bodies. They developed the piece systematically into a musical score for a "Body Instrument". Their show had, moreover, a very high visual and aural quality and their movements were like a dance. I was very impressed by their attempt to create a new pattern for music. Another inspirational project to me was the Skin Probe Project, Bubelle- Blush Dress by Philips Design in 2006. The project examined an analog of phenomena such as emotional sensing, and explores technologies of costumes to be "sensitive". This wearable prototype was designed to respond to a human body directly and to create a visual representation of one's emotions. The sensor mounting on the costume could sense the temperature and sweat of the skin, which would then change the color and lighting pattern of the costume. These two examples of creating a new pattern of music and digital costume technology propelled me toward a project that begins to examine the idea of an integration of music and dynamic costume design.

As contemporary artists and designers, we are devoted to new ways for creating new patterns for art and to vitalize the existing art forms. It is an unavoidable artistic responsibility to make our art and culture grow stronger and more significant. Being a costume designer for the performing arts, I have been thinking about using a different inspirational source and approach to costume design that enables it to cross the traditional boundaries. Generally, costume designers conduct their design work based on visual research. It seems that the audible elements like music have often been excluded in our

design process. So I began to engage in this interdisciplinary experiment as a search for the accessibility and integration between music and costume.

Chapter Two: Introduction

In this project, I chose a piece of music as the topic of the show to design and fabricate a real costume based on my design theory. There will be a dancer wearing the costume and engaging in an experimental performance.

In order to connect Music and Costume, the Digital Art will play a critical role. I plan to create a way to design costumes that are digitally responsive to music. So this costume will become a soft wearable computer. In the presentation of this project, the dancer wears the costume and dances to coordinate with the style and tempo of the music and the digital response that happens on the costume. When we add the choreography, we make this wearable computer apply to the performing art practically and push it into an advanced integrated level.

The Goals that the project attempts to achieve are: building a bridge between music and costume design; exploring the integrating possibility of music, dance, costume design, and digital art; and participating in a new form of performing art that is a combination of live concert and a costume show.

There are also some issues and concepts to be explored in this project as the costume is designed and fabricated based on my design theories. The theories include: establishing the essence of Dynamic Design and extending Static Design in the field of costume design; and experimenting with the establishment of a design method that maps an audible subject resulting in a dynamic visual costume.

Chapter Three: Research and Theory

DYNAMIC DESIGN AND STATIC DESIGN

In the process of exploring the use of music as inspiration and the subject for costume design, I began to develop a theory of design based on an audible motivation. Generally, most methods and forms in costume design transfer the abstract feeling into a substantial design through imagination and visual research, but even though the costume design is created, it hardly reflects or presents the diversity of emotion and features present in music. Due to this limitation or static feature, developing the dynamic feature of the costume was a necessity for me. Dynamic Costume Design is able to address the complexity of different rhythms, textures and intensities within a piece of music.

Here are my arguments for finding the definition of Dynamic Design. The first point is the addition of the concept of time. The second is the purpose the Dynamic Design serves as the central subject of the show and the costume as an artifact itself. The last point is that the design itself changes over time.

In these definitions of Dynamic Design that I talk about it is not only the physical movement of the costume but also the function of time within the visual experience of the costume. The concept of time is included in our design process, as a primary approach to presenting the variation of design. If time is not present in the visual experience then we could categorize the costume as a static design or one that does not change in the course of the performance. Time does not mean in this case the historical period background of the costume, or the characters' age, because this kind of time indicates a concept of "storytelling", the purpose that it serves is for the narrative. The costumes in a period historical costume drama might serve as an example of static design. In this project, time serves the substantial changes of the design by allowing us to experience the costume

differently from moment to moment. I propose that Dynamic Design serves as the primary subject for the performance and also serves as a costume artifact *(Fig.*1*)*. The design will be presented wholly only over a specific length of time. The design cannot fully be understood or experienced unless the viewer sees the entire performance thus making time a necessary and complicit partner in the design.

Generally, dynamic design is like lighting design or projection design, it utilizes time to generate focus and narrative. Costume design is historically static design. However, if we could say that the Dynamic Design of a costume is activated by actors or a human body, such as the performer's movement influencing the fabric movement physically, if an actor moves quickly or a dancer twirls in a circle then the fabric moves in space in a way that is dynamic. In this case, the costume design contains the attributes of Dynamic Design, but those dynamic moments are short and hardly keep changing over time in response to each moment in an entire show. In this project, I intend to find the advanced interaction between costume and the concept of the performance in search of a way to make the costume totally present with the music. The changing of the surface design of the costume over time in response to a particular piece of music allows us as viewers to experience a dynamic costume design. Dynamic Design is an integral part of achieving my goal for using music to design a costume.

The costume of this project will be designed and fabricated based on the three points of arguments above for Dynamic Design. Due to the developing potential of Dynamic Design in costume, we can explore the diversity of expression in music as it relates to costume.
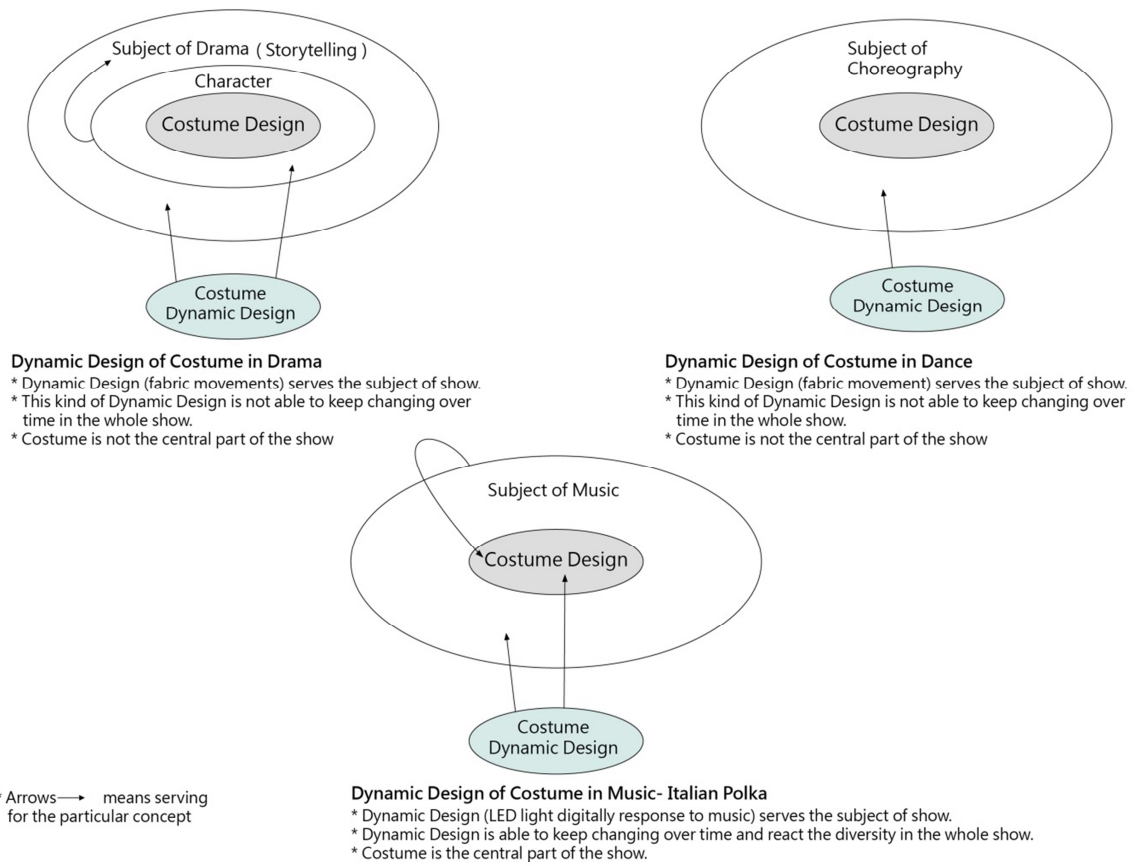
Subject of Drama（Storytelling）
Character
Costume Design
Costume Dynamic Design

Dynamic Design of Costume in Drama
* Dynamic Design (fabric movements) serves the subject of show.
* This kind of Dynamic Design is not able to keep changing over time in the whole show.
* Costume is not the central part of the show

Subject of Choreography
Costume Design
Costume Dynamic Design

Dynamic Design of Costume in Dance
* Dynamic Design (fabric movement) serves the subject of show.
* This kind of Dynamic Design is not able to keep changing over time in the whole show.
* Costume is not the central part of the show

Subject of Music
Costume Design
Costume Dynamic Design

* Arrows—→ means serving for the particular concept

Dynamic Design of Costume in Music- Italian Polka
* Dynamic Design (LED light digitally response to music) serves the subject of show.
* Dynamic Design is able to keep changing over time and react the diversity in the whole show.
* Costume is the central part of the show.

Figure 1: The relationship between Dynamic Design of costume and performing arts

DESIGN METHOD AND MAPPING OF DYNAMIC COSTUME DESIGN FOR MUSIC

A simple mapping system of the music became my guideline for the execution of this costume. This is my first attempt to design a costume by using audible research. Specifically, I will interpret a specific piece of music using the LEDs (Light Emitting Diode) as a medium that reacts to the music. The LEDs will be receiving the music signals from a MIDI instrument. When the instrument is played, the signal is sent to the LEDs presenting a variety of planned lighting patterns in the costume.

In the design process for this project, the support of visual research will be no longer the main source of inspiration. The design will be more abstract instead of a specific form that springs from a particular object, pattern or image. When designing this costume, I will use a design skill of transferring abstract or shapeless concepts into the visual form of art. Compared to other theatrical designs, this method is similar to Lighting Design.

There are two points' similarities and differences between Lighting Design and this project- Dynamic Costume Design. The first point is that the design transfers abstract emotion and feeling for a particular object into a specific color, pattern, and even picture. The second point is that the feature of design changes over time.

The color strategies used in this project revolve around the use of the 24 musical keys, with different moods and emotions programmed for each key. When composers make music, they use the "rule of emotion in 24 keys" as a reference in making a variation for a piece of music; for example, G Major is calm and satisfied passion, E Major is pleasure. The chromatology also indicates the connection between different colors and different emotions (Fig.2). I intend to extend the color connection between the 24 keys. This will create a systematic color method for these 24 keys (Fig.3). In this way

way I incorporate both color and the musical keys to express my chosen piece of music. This methodology will help me develop the visualization of music and design through the careful mapping of this project.
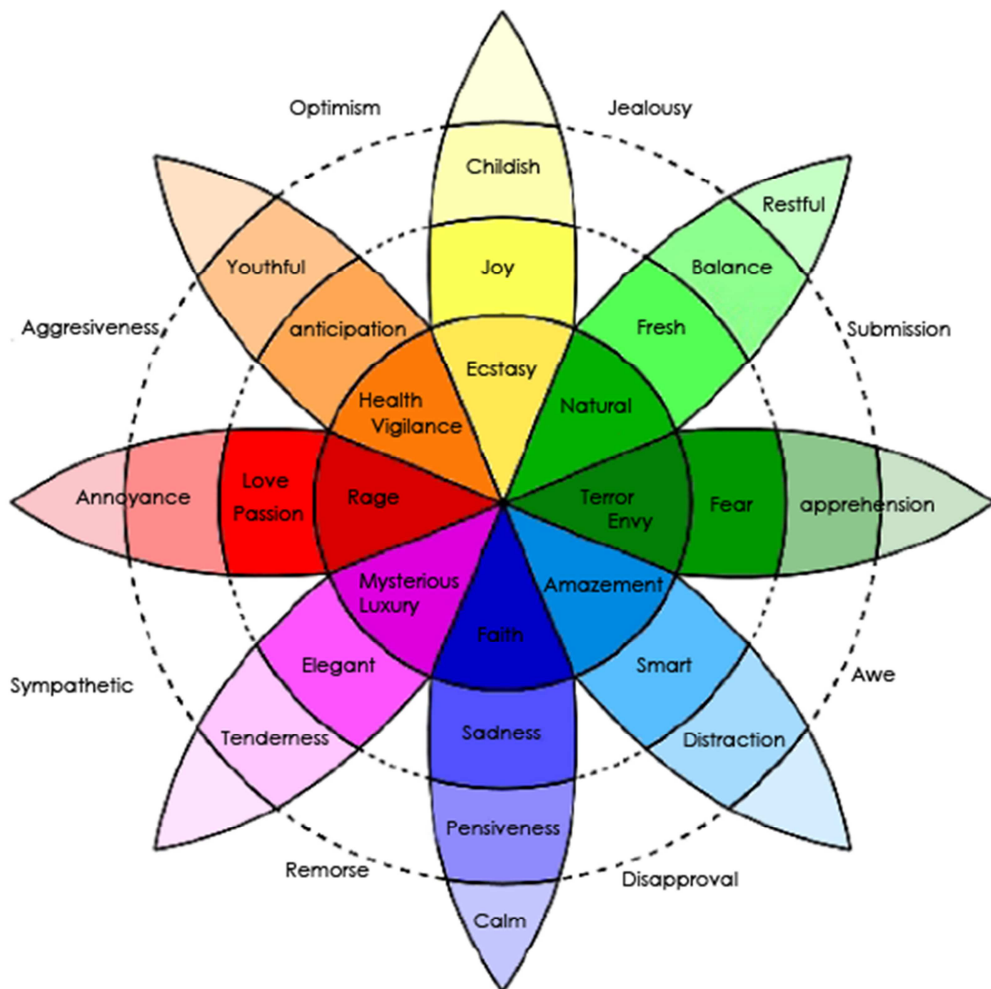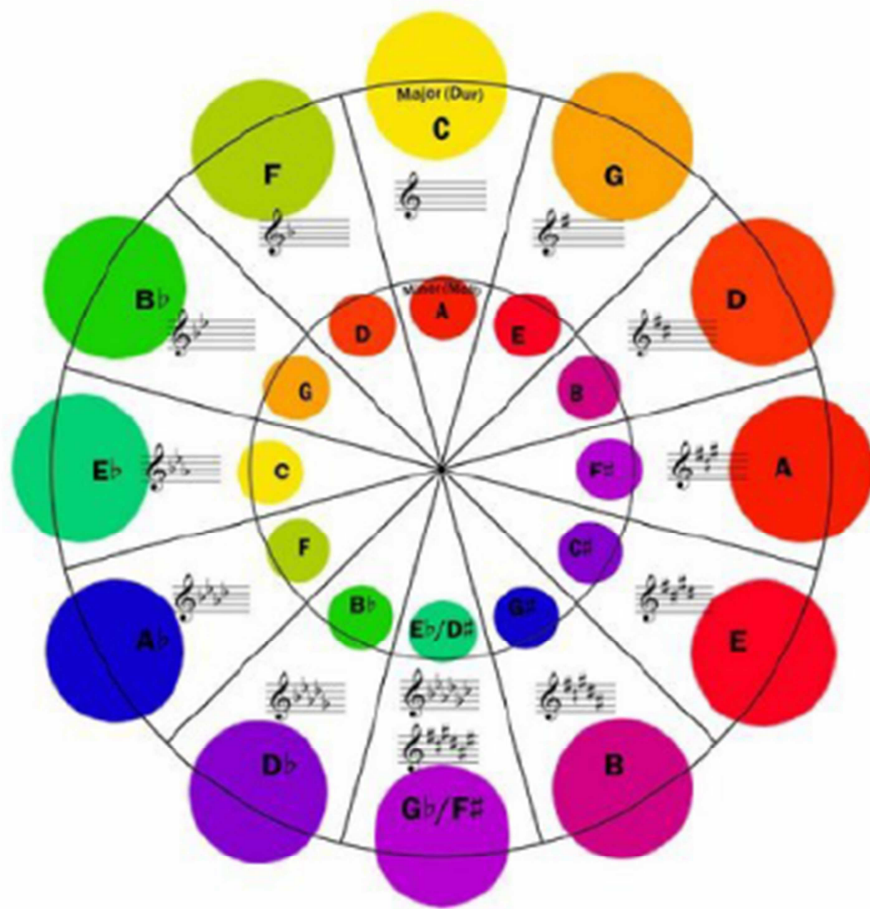

Figure 2: Chromatology of Emotion via Wikimedia Commons

Fig.3 color wheel of 24 keys

Figure 3: Color wheel of 24 keys via Xenophilius.Wordpress

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Chapter Four: Method/ Approach

MUSIC RESEARCH

The major objective of this project was to complete the basic integration of music, costume design, and digital art. The experimental performance included one dancer, one costume, and one musician. The piece of music as a topic to be played is *Italian Polka.* It is composed by Russian composer Sergei Vasilievich Rachmaninoff *(*Сергéй Васи́льевич Рахма́нинов *,1873– 1943). Italian Polka* is characterized by fast beats and a variation of tempo. It starts with a slow tempo then increases faster and faster until the end. The structure of the music contains rich performative features that will be good for this experimental project. The difference between *Italian Polka* and other dance music is that the style is more lovely and lively, and emphasizes the beats. The music is staccato rather than a legato or flowing rhythm, so we can address each note to experiment with the pattern.

MIDI INTERACTIVE PROGRAMING / MUSIC VISUALIZATION

In this project, I use the LEDs as the visual reaction to the music. The Arduino board is the main medium tool. Arduino is an electronic board microcontroller intended to make the application of interactive objects or environments more accessible. I designed the program enabling the function of direct interaction between MIDI (Musical Instrument Digital Interface) piano keyboards and LEDs mounted on the costume. MIDI is a technical standard that contains a description of protocol, digital interface and connectors and enables electronic musical instruments, computers and other related devices to connect and communicate with each other. Within this connection, there is an issue concerning the conversion from musical notes to a digital signal. To resolve this

problem, the Arduino must be connected to the MIDI shield, then the commands that MIDI instruments make can be successfully received by the Arduino. When the musician musician presses the key, the signal is conveyed to light the LEDs. In other words, the music is able to activate the costume design (Fig.4).
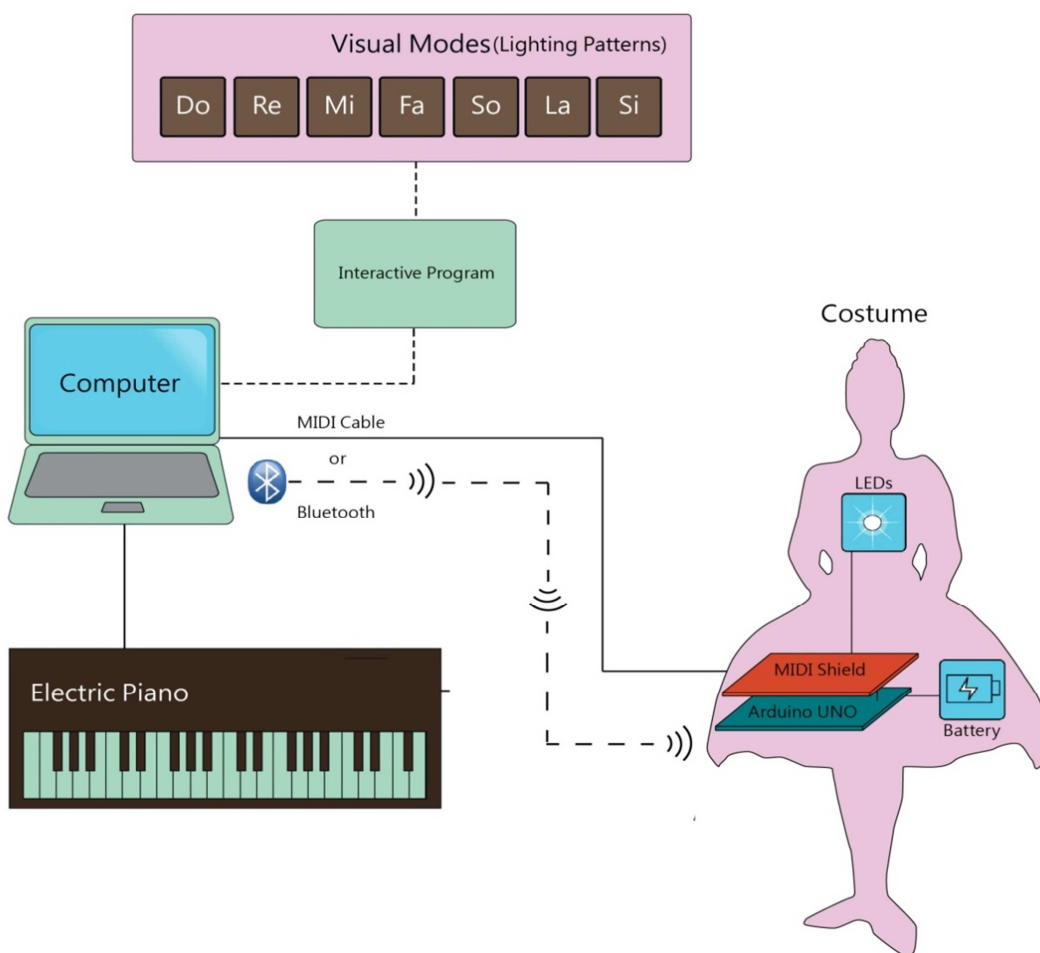

Figure 4: The Map of Integration

My ideal digital pattern design would be organic and would avoid an unwieldy and mechanical feeling. To achieve this, I chose the individual LED instead of LED tape to make the lighting pattern. Depending on the design rendering, I made a schematic design to support the Dynamic Design (lighting pattern on costume). I used conductive thread and paint to build each circuit, then twisted the thread onto snaps. The female snap connects to the ten patterns of LEDs on the dress layer (outer layer), and the male snap connects to the electronic board and battery (the engine is set on the bustle) (Fig.5). When the dancer puts on all of the costume layers, then just snaps it on, all of the channels will connect to the power and the commanding center of the wearable computer.
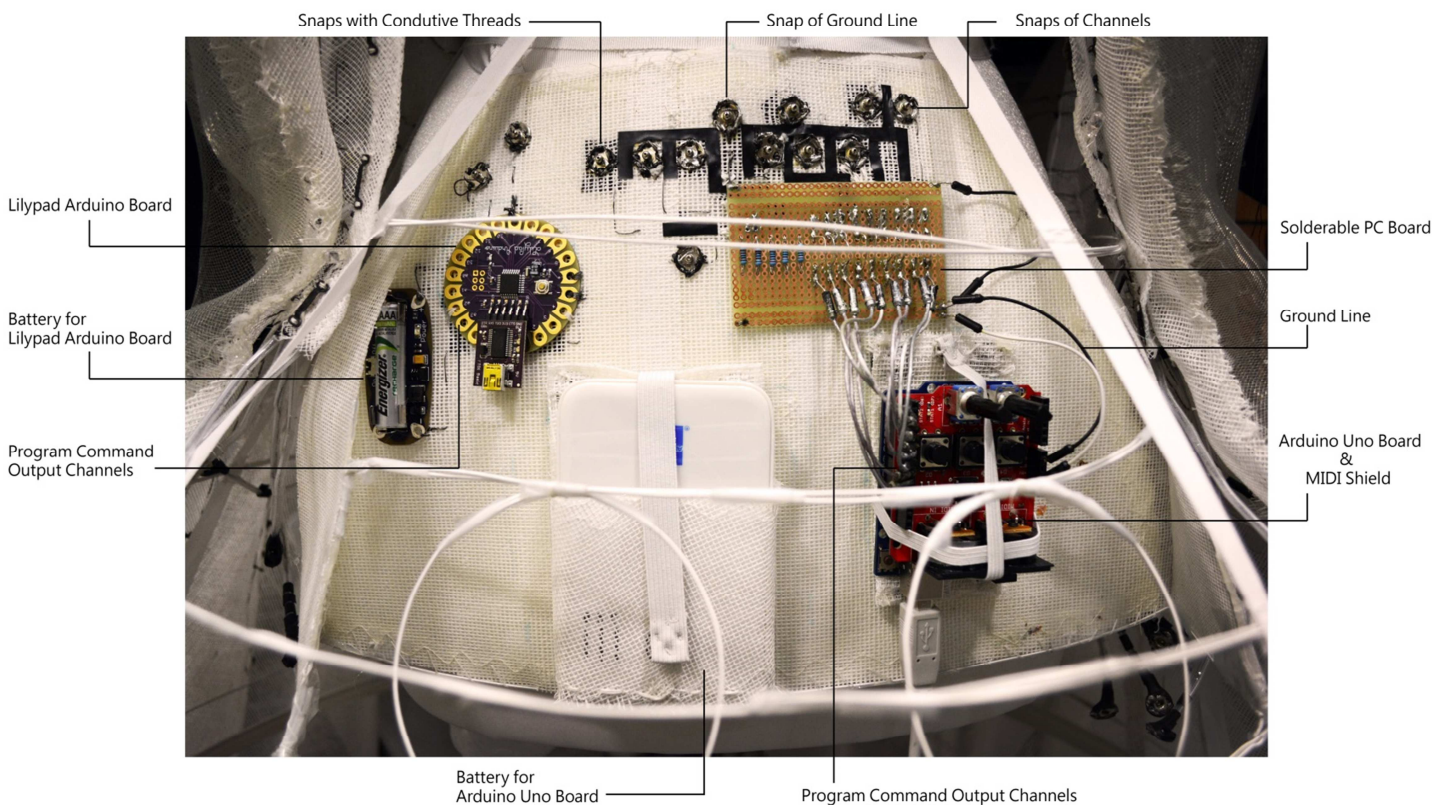
Wearable Computer Engine (The Bustle of Costume)

Figure 5: Wearable Computer Engine

WEARABLE COMPUTER DESIGN AND DYNAMIC DESIGN

When building this costume, it was my goal to try to paint the costume with light. This idea drove me to search for the best material to interpret this concept. Through many tests, I finally chose horsehair and buckram. They are transparent and white, having the features of flexibility and lightness. The texture makes them easy to catch the light.

This costume has four layers (Fig.6). The first is a unitard which is the basic costume and protects the dancer from accidental or unexpected electrical exposure. Basically the electricity output is five volts, not harmful to human skin. The second layer is a bustle; it is a framework to contain the electronic board and batteries (Fig.5). The third layer is a petticoat to support the dress layer and protect the engine area. The last layer is the dress containing the schematic design and LEDs (Fig.7).

First layer: Unitard

Second layer: Bustle

Third layer: Petticoat

Last layer: Neck Piece & Dress
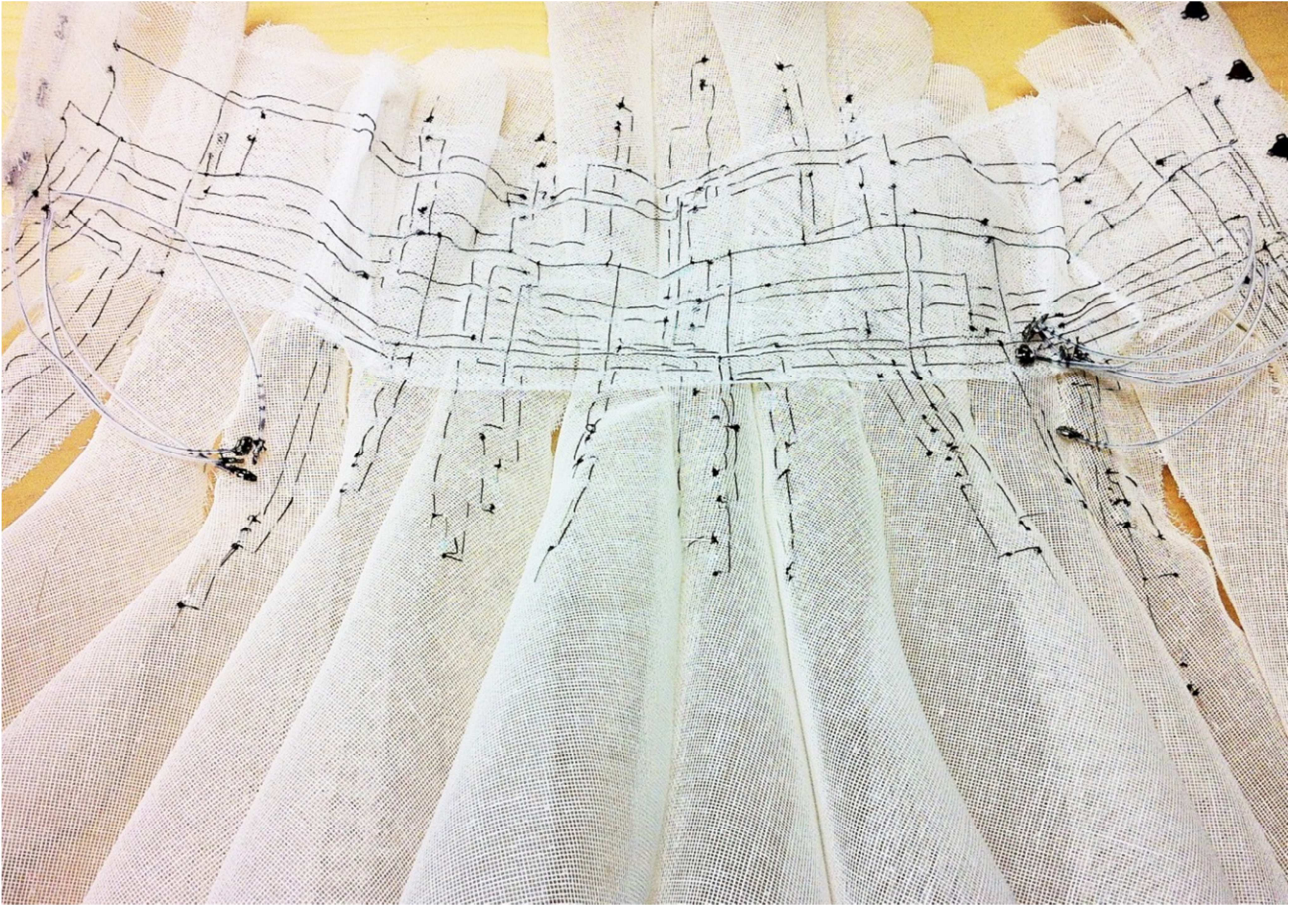
Figure 6: Layers of Costume

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Figure 7: Dress layer and schematic design

When I developed the Dynamic Design, there were ten output channels on an Arduino board. I designed ten lighting patterns for each channel representing the style of the music. Then I designed the pattern for each note according to the details, tempo, and emotion of each phrase. According to the ten available channels of lighting patterns, I designed the fourteen note pattern by using either one channel or two to three channels for each note. For example, MI is channel 5; RE is Channel 10 and 7 (Fig 8).
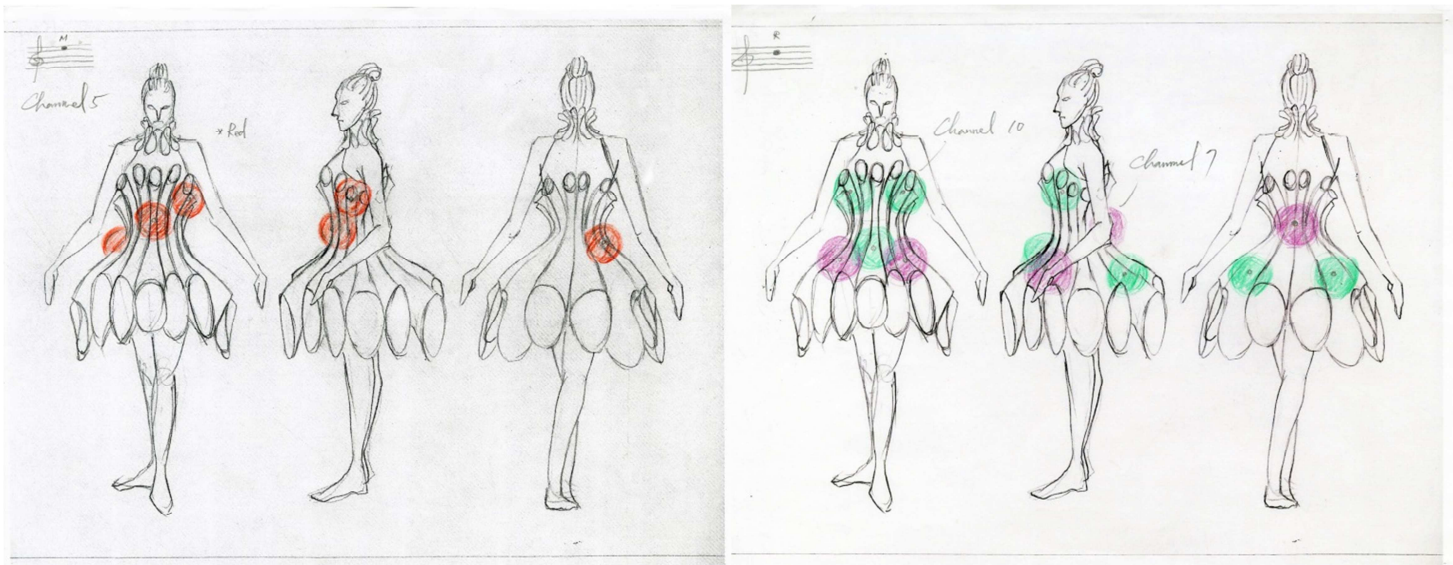
Figure 8: Sketches of MI and RE patterns

I separated the Italian Polka into three sections according to the tempo and emotion. I use the different program codes to express each section. In the middle of the second section and third section, the tempo runs faster, there are six to eight notes in just two beats. From the perspective of performance, if each note keeps sparkling with this fast tempo the costume would look chaotic and interrupts the fluency of the visual melody. To avoid this situation it is necessary to eliminate some lighting note patterns from the program. The feature of the second program is less busy (less note commands in the program) and with yet another function some of the lighting patterns keep the same pattern but change the color as different keys are pressed.

On the whole, Italian Polka is in G Major, so most of the lighting color on the costume is purple, then changing into E Major in the second section, so the green would be activated at that time.

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INTEGRATION WITH CHOREOGRAPHY

When we developed the choreography for the music and the costume, we tried to think carefully about what will happen in the performance. My performer/choreographer and I collaborated as a team to determine the best performance style integrating the features of music, program code, costume, and choreography. We knew *Italian Polka* was emphasizing the beats, so we tried to figure out which kind of dance was able to match the feature of the interactive function of the program code. When the pianist presses the keys to light up the pattern on the costume the longer the finger stays on the key the longer the pattern stays lit. There was a problem if the style of music was too flowing in nature or played with a fast speed the lighting pattern tended to sparkle in a chaotic way. We also felt that if the dance style was also flowing or fast that it might make chaos in the performance. Our ultimate goal always was to integrate the style of the music, light, color and movement with the tempo and quality of the music. To achieve this, the choreography had to emphasize the beats, so we came up with an idea of a doll in the music box. The movement style was more like robotic and jerky like a doll. The movements would match the twinkling of the light patterns.

The style of the *Italian Polka* is a very lovely and lively music. It is elegant and ethereal in the way that it states its' purpose. Therefore, the doll-style choreography seemed the best interpretation for the music and the design. To make this choreography more complete and to be able to highlight the style of dance and music, we added some balletic dance movement which is very elegant and emphasizes the body moving with music and light sparkling at the same time.

Chapter Five: Result

The experimental performance took place and filming in March 12th 2014 (Fig.9- 11).

Figure 9: Purple lighting based on G Major

Figure 10: Green lighting based on E Major
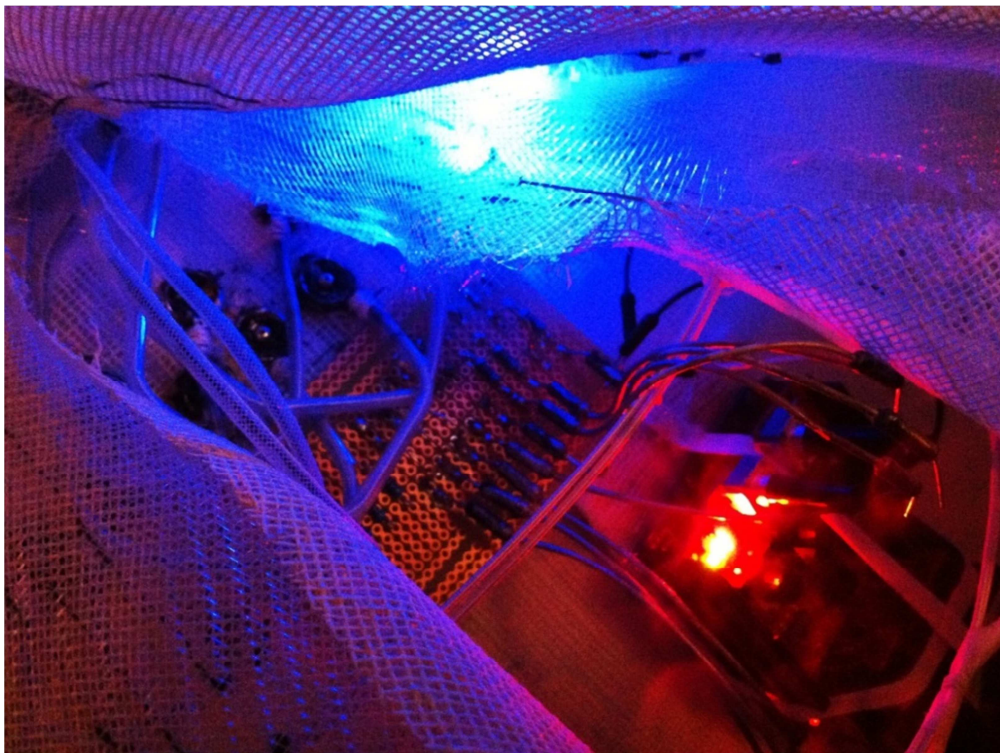

Figure 11: Engine

The exhibition opened on March 12th 2014 (Fig.12).

The collaborating team:

Project Director / Costume Designer: Chin-Hua Yeh

Choreographer / Dancer: Kelsey Oliver

Pianist / MIDI Music Editing: Kuo-Chuan Wang

Makeup Specialist / Project Assistant: Malorie Dragna

Presentation Video Link: https://www.youtube.com/watch?v=l-p-ipWrW4U

Figure: 12: Exhibition Poster

Chapter Six: Conclusions

The costume- Italian Polka is an experiment to demonstrate the theory of using music as a design topic. This experiment enables the musician to make a more direct interaction with the costume by the rhythm and tempo of a musical performance.

This was a challenge for me because computer programming is not my focus; even if I have some knowledge in music and piano, I am not a professional musician by any means. But the biggest challenge was the integration of the music and the costume. The integration needed to include the application of audible research and a development of Dynamic Design. The technology, which includes interactive MIDI programing and wearable computer materials to support and complete the concept, is just the beginning of an exploration in costume surface manipulation. Everything was new for me and every step required constant testing many times to make sure it worked.

In order to complete this experimental performance, it was necessary to work with a musician and choreographer closely and to try many different tactics discovering the best and proper way to interpret the music, dance, and costume for the show. I am glad to have Kelsey Oliver and Kuo-Chuan Wang as my working partners to create this project and I appreciate their contributions.

This project was completed only at a certain level, even if it was not perfect, but it contains larger potential for growth. This start reveals an expected possibility between the music and the costume. I wish to keep developing this research in the future in order to make an innovative contribution to the performing arts. The idea that the surface of a costume fabric might change color, texture, character or quality as we watch it progress is a fantastical dream. This rustic beginning to that goal gives us a glimpse of possibilities for the future.

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