Inspirations

Performances are art forms of expressing human emotions in different ways. Sometimes, they are showcased in the form of a dance by using body movements as means and sometimes in the forms of expressing it through music. Traditional instruments were usually the source of music creation. While there is a certain amount of skill needed in order to understand playing the instrument, and indeed music, through theory and practice, new musical interfaces look to fill the gap by allowing people with no musical background or understanding to create music easily. The following are some inspirations that were considered prior to conceptualizing SoundScape.

MozART

MozART is an interactive installation developed to create music by using Spandex as a medium to create music. MozART was created for the 2016 iPad Ensemble for their coursework at the University of Queensland. The purpose of this installation was to push against the cloth with two hands to generate sound to showcase newer forms of musical interfaces. Mozart's goal was to create an experience for people with or without musical backgrounds to create an exploratory experience of music creation.

The interface combined visualizations sounds to create a visual display of the sound generated. The dramatic fluid visualizations were utilized to provide people with a sense of feedback to the interactions they made with the interface. The sound produced by the instrument is ambient in nature and could be changed based upon the interactions people made to create newer experiences of creating music.

The technical workings of MozArt entailed an Xbox kinect to detect people's hand movements, a projector to project the visualization and Spandex, which was used as a surface for people to interact.

While this installation was conceptually sound, the limitation of MozART is that it created ambient noises that was not in tune with scales and chords. The sound produced was more ambiguous given the open-ended nature of the installation. Additionally, the nature of the installation disallowed people from maintaining a sense of predictability in terms of music creation and its tenets.

Image:

Link: https://uqmozart.github.io

Cinimod - Fire & Ice

The Fire & Ice installation was launched by Cinimod, a company that specialized in producing interactive light installations and interactive lighting. The installation used interactions, in terms of people's arm movement, as a basis to generate new and unique visualizations depending upon people's arm movements. Fire & Ice produced two distinct colors of visualizations depicting the red of 'fire' and the blue of 'ice'. Upto two people can each choose 'fire' and 'ice' respectively and use the visuals as means to compete against each other.

People's actions were supported by a dramatic fluid display that allowed people to create fluid shapes with the visuals and gestured to push it towards their opponent and vice versa from the opponent's end. As the visualization collide they create an amalgamated visual representation of 'fire' and 'ice' blending with each other.

The installation purely produced visualizations and was not supported by music given the objective of the installation. Fire & Ice was supported with a Kinect to map people's movement. A large screen was also utilized to display the visualizations. Additionally, there was no interface that allowed people to touch and physically interact with the installation but the screen itself was the interface by creating a frame of reference for people to track their interactions. The success of Fire & Ice relied on instantaneous feedback offered by the system by maintaining negligible latency between action and reaction by the visualizations.

A positive aspect of this installation was to enable people to play with the visualizations in an unconstrained open-ended manner. However, a limitation of this installation was to only accommodate 2 people to simultaneously at one time.

Link: *http://www.cinimodstudio.com/portfolio/fire-and-ice/*
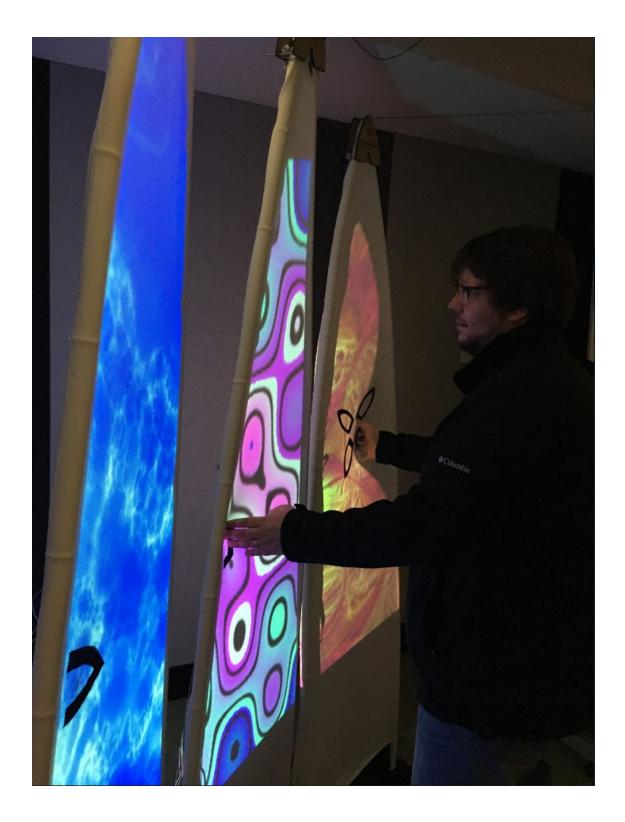
SoundGarden

SoundGarden is an interactive installation that enables people with no musical background to create music with the use of gestures as means produce music. SoundGarden was created as a part of the Interaction Design coursework in the University of Queensland in 2017. The interface itself was made by stretchable material that enabled people to gesture around the material to produce a number of combinations of sounds.

The installation entailed a total of 4 sails, each sail representing a component of music, that of melody, harmony, lead and percussion respectively. The nature of the installation allowed people to slide their arms, around each sail to manipulate musical loops. Each sail enables people to push the cloth and move their arms around the cloth to manipulate the loops. Each sail encompassed a different visualization that is synonymous to their individual component to create an association between the instrument, visual and the loops created. At the bottom of the sails, pedals were present to change the genre of music.

SoundGarden supported a total of 4 people to represent people in a band to collaborate and create music together. The installation as a whole comprised a band setup to create a holistic experience for people to create music together.

SoundGarden used the stretchable cloth as the interface for people to push against and move their arms around the cloth. The visualizations were produced using projectors. Sensors were placed embedded within the sails.

SoundGarden set out to combine different loops of music to enable people to play music without having any prior knowledge to play instruments or even the theory. While the prototype was conceptually sound, people found it hard to maintain a sense of predictability, mostly because of the lack of visual cues and feedback.

Link: https://shorthand.uq.edu.au/small-change/building-by-imagination/

Iteration

Initial prototype

On conducting an extensive research, SoundScape developed their first prototype. The prototype was built to test the effect of the cloth used as an interface to explore interactions with music students from the School of Music from the University of Queensland. The prototype utilized flex sensors along with stretchable fabric, an Arduino and Ableton software.

Flex sensors over Kinect

Whilst Kinects were used in MozART and Cinimod's Fire & Ice and kinects can be utilized at the moment with SoundScape. Looking forward into the future, Kinects

support and production has been stopped and will become a technology that may not be usable in later versions of the prototype. As a result flex sensors were utilized as a replacement to the Kinects. Apart from stretchable cloth, other materials were explored such as conductive material and conductive thread. However, their incompatibility resulted in making use of lycra stretchable material.

Final Prototype

The final prototype of SoundScape entailed 4 large interactive surfaces, with each surface comprising of a component of a band performance allowing 4 performers to simultaneously interact with the system. SoundScape was tailored specifically to the performers from the School of Music. The objective of SoundScape was to replace the iPads as a medium to create music for the iPad Ensemble at the University of Queensland. Each interactive surface was designed to accommodate lead, bass, harmony and percussion in separate panels. Under each panel, each specific instrument hoisted filters for performers to manipulate. Additionally each interface held a different visualization synonymous to the instruments played. SoundScape utilized 2 projectors for the visualization that was programmed in Unity. The sound and the filters for the sound utilized Ableton software to compose music. The flex sensors produced variations in the music as performers interacted with the surface.

Performance

The iPad Ensemble is a performance where students from the school of music use iPads to compose and collaborate to produce music. SoundScape worked closely with 4 musicians to tailor the design in preparation for the performance. The performers had planned to make a staged entry as to walking from the audience to add layers of music one by one.

Looking at the performance from a designer's perspective, the setup had efficiently produced desired results in terms of functionality, visual feedback, and feedforward, and music reproduction and manipulation. From the perspective of the 4 musicians who performed, the setup provided the capability to maintain a sense of predictability and accurate feedback where performers could maintain a sense of control over the sound produced and the extent to which they could manipulate music. From the audience perspective, SoundScape produced a visual spectacle by also showcasing a novel way of interaction to produce music and visualizations.

While SoundScape was designed for the students by constantly factoring their feedback into the design, there are shortcomings to it when it comes to people who have no past experience in using the interface. This was highlighted after the performance when people found it a little ambiguous to interact with the system. Having said that, instructing them aided in learning the interactions easily. Additionally, people who had no experience who used the system had no prior knowledge of the position of the effects, given that the system had 8 flex sensors on each panel. The panels were designed to fit the individual performers needs rather than produce a generic effect across all interfaces.

Feedback

School of music students

Initial interrogation with the students from the School of Music entailed their need to use manipulations as means to produce varied forms of sounds using a base sound. The students wanted an organic visualization as opposed to having traditional bar visualizations. In terms of interactions, the novelty of the interface took

Feedback at later stages was ascertained in terms of exploring and crystallizing gestures, visual feedback from the system to people, and establishing feed-forward mechanisms. Questionnaires and semi-structured interviews were utilized as means to gather feedback about components of the installation, music composition, and performance.

The placement of flex sensors on the final prototype was positioned based upon the participant's gestures. Each participant's gestures were individually observed in order to affix positions of the sensors and assigned features. In terms of feedback and feedforward mechanisms, the visualization was broken down to individual system states to ascertain the functionalities of each system state.

SoundScape was part of the Innovation Showcase in the University of Queensland. This gave more opportunity to gain open ended feedback from people. While SoundScape was designed specifically for students who used it for the performance, some people in the innovations showcase were hesitant on pushing cloth and were uncertain on how the system could be interacted. Some people hovered their hand over the visualization while others caressed the cloth. On instructing people to push against the installation, people became more familiarised with the interaction. Additionally some people were interested on how the system was developed, and some participants were musicians and were curious to know what else could be made.

Future work

Mizaru

"Mizaru, Kikazaru, Iwazaru", a common phrase which translates to speak see no evil, speak no evil and hear no evil is a performance inclusive of both dance and music to express death and its perceptions by people. The performance entailed music and dance. The music created utilized two interfaces that were made up out of stretchable fabric where performers utilized it to gesture around and produce sound in addition to the visualizations creatively being used to depict different phases of death.

The performer would not only play music by pushing and gesturing around the interactive surface, but also dance in front of the visualization to manipulate the visuals and create a dramatic silhouetted performance.

The role of the interface is to be an instrument when needed but also be a prop when needed to depict aspects of the performance thereby delivering a more rounded off experience in terms of its flexibility. The two interfaces have specific defined roles in the performance.

One interface hosts a visual of vertical strings where performers would be able to interact around the interface by pushing and moving their limbs and body over the screen, the interface itself plays a piano as an instrument. On an untouched state, a monotonous piano tone is played. On pushing the interface, and the extent to which the interface is pushed and gestured, the piano's, scales and tempo are changed to manipulate the sound and visual effect.

The second interface focuses more on the visual aspects. On an untouched state, the interface displays small thin static lines. However on touching, pushing and the extent to which a push is performed, bits of the string break into pieces and fall to the ground to create a dynamic visual performance.

The following visuals showcase the first and second interface respectively.

Link: *http://aaron-sherwood.com/works/MIZARUperformance/*

The vision of SoundScape, similar to Mizaru, looks to support performances by offering dramatic visualizations and music through human interactions. While SoundScape was a prototype, there is much more it has on offer as it progresses to become a full installation. In order to achieve this, SoundScape intends to test the prototype further with more participants with and without musical backgrounds to produce more compelling interactions and visualizations.