

Broken Chords

Project Proposal

Domenico Poutanen - 43574218

Kevin Leong - 43554416

Bosco Bartilomo - 43568936

Aaron Curtis - 43228904

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Introduction

The following report is a project proposal from broken chords. This report will detail many aspects of Nucleus including background information on the project which ranges from audience, problem space, experiences, constraints and inspirations. A detailed explanation of what Nucleus it is and how it works will be provided with references to inspirations and diagrams of the intended project to provided better comprehension of Nucleus . Furthermore the proposal will provided information on members in broken chords and what roles each member has partaken along with a detailed project plan from broken chords on how the project will be executed in the following weeks until the exhibition.

The Nucleus

The Nucleus will be a physical installation that will require volunteer user interactions to be functional. The Nucleus is a round table with a semi-opaque markable surface at standing height. Users will interact with the table by drawing on the surface, using a variety of marker colors to represent different instruments. At the center of the table, there will be a pole extending upwards with two webcams reading the surface of the table. The webcams will read the visual data based on the drawings created by the users. The data will be processed in real time and played back as music that corresponds directly to the drawings provided. There will be a projector mounted underneath the table that will project upwards onto the surface, that will provide visual feedback based on both the sound and drawings. The projector will also display the recording line, which will rotate around the circle, indicating which part of the drawing is being processed and played at a given time.

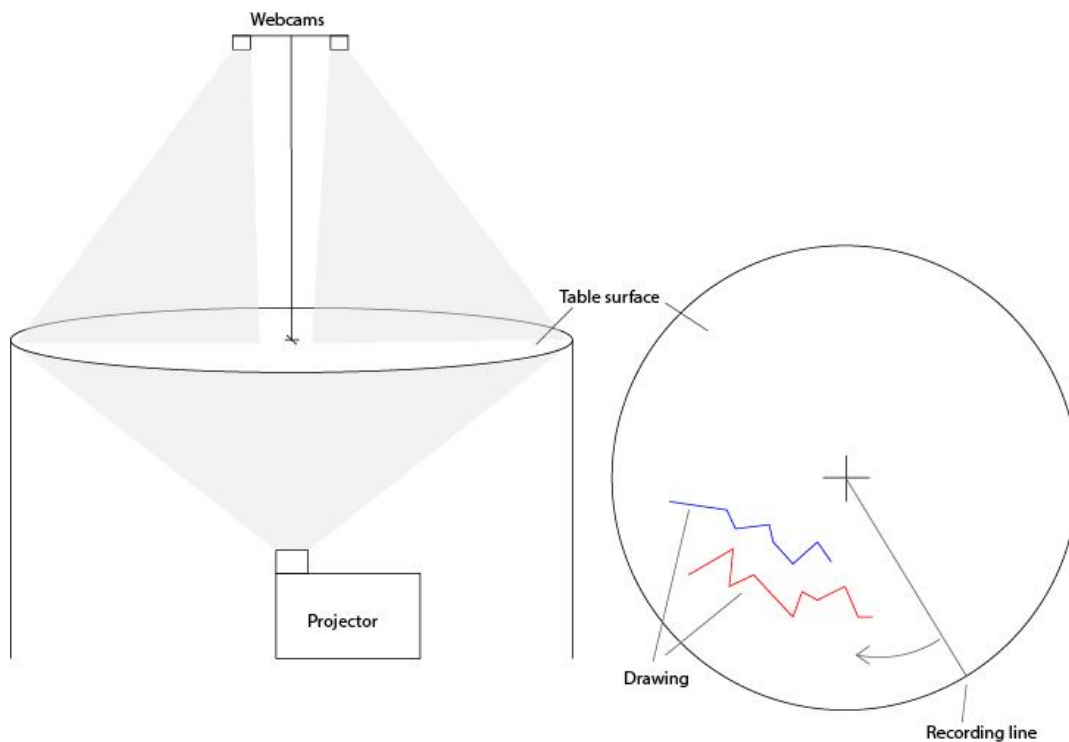


Figure 1: The Nucleus

Users will be encouraged to collaborate with others to create a musical piece that is aurally satisfying in a unique and playful way.

Background

Audience

For Nucleus, we decided to focus on novice musicians aged 14-20 as our main target audience. Young people who know a little about music, but have never really seriously attempted to create music before. As Folkestad (1999) said, “Creating music is no longer seen as reserved for musically trained specialists, but as an activity in which everyone can participate”, and we believe that to be true. Musical creation does not have to be reserved to the trained, and we hope to build a platform that allows those that have never seriously attempted to create music to express themselves, and begin to understand how it is done. We thought that we could teach this group a variety of things that they would find useful in a music creation environment. We designed learning objectives with this group in mind. Other users can still enjoy Nucleus, but they may not get as much out of the experience.

Experience

We want to create a user-driven learning tool for music creation. Musical creation has had “a shift of focus, from 'how to teach' (teaching methods) and the outcome of teaching in terms of results as seen from the perspective of the teacher, to 'what to learn', the content of learning ... how various musical phenomena are perceived, experienced and expressed in musical activities by the learner” (Folkestad, 1999). We want to create an experience for the user that adheres to this idea.

We believe that a collaborative musical environment is more beneficial than a more formal learning environment when trying to teach users of varying levels, as discussed by Sawyer R. (in press).

“An effective scaffolding activity allows all learners to participate meaningfully regardless of their level; and it is structured so that each level of participation naturally propels the child to increasing appropriation, mastery, and central participation. In such classrooms, students learn more than the mechanics of music. They learn interactional skills; they learn how to listen and to respond appropriately; they learn to collaborate; they learn to communicate in social contexts. In these collective improvisational activities, children may learn a deeper musical understanding than they would from structured activities.”

We endeavoured to create a musical installation that strives to teach users in a collaborative and playful manner about music and its core fundamentals. The learning objectives we have focused on in the process of refining this project are:

- Basic Composition.
- Musical Collaboration.
- How instruments and different styles interact within a single musical piece.

We wanted to create a project where users can achieve these goals through interaction with the device. Nucleus teaches basic musical composition through its use of sound based feedback. Users should be able to tell when their sound is off/not working, and edit their work to make something more in line with what people would consider music. We believe the target audience we have chosen will be able to actually take into account this feedback, whereas a younger audience may not care about the sound when presented with the opportunity to draw. Older users may not be as captivated and willing to learn.

The Nucleus also encourages working with others to create, something which is not necessarily intuitive. Art is usually very personal, but the skill to collaborate within art can be indispensable for some artists. For instance, members in a band all collaborate to create a unique sound. Think of Nucleus as creating a miniature band with strangers. Each user is a different instrument in the band, all coming together to make a song.

Nucleus also aims to help users gain a better understanding of how different instruments and sounds fit together in a piece. Users can explore instrument combinations, and experiment with how their instrument interacts sonically with the piece as a whole.

Inspiration

Nucleus was inspired and ideated upon several different technologies that broken chords had come across during their time researching on refining Nucleus . The following technologies were the most influential in forming Nucleus and how each feature in Nucleus was going to function.

Sequence

Sequence is a web application which takes on musical composition from a different perspective. Sequence adopts a biological theme in how they exhibit user's musical compositions for example, the user's musical composition visually, is a moving lifeform similar to living bacteria. The way these musical life forms would move depended on how the user altered the lifeforms parameters which were represented as small cubes that sit around the lifeform. As each box would light up sequentially the life form will jiggle to the direction of whichever box lights up and in slowly but surely the lifeform will move around while playing its tune.

The process that sequence wants users to utilise is that first they have the option to choose what wave form they would like to work with and then go onto alter the waveforms parameters by selecting different squares on a grid which would alters the waveforms scales and octaves. After the user was happy with the alterations they were then able to drag their waveform into the visualisation stage otherwise known as the “dish” since sequence adopted a biological standpoint. Sequence was a major influence to Nucleus for several factors. Firstly the visualisation of the musical composition was quite unique and so we wanted Nucleus to adopt a similar style of how sequence visualised their music. Furthermore the process of how users interacted with this web application followed a similar process of how we want users to interact with Nucleus. the physical design of Nucleus also took inspiration from sequence via accommodating to the process.

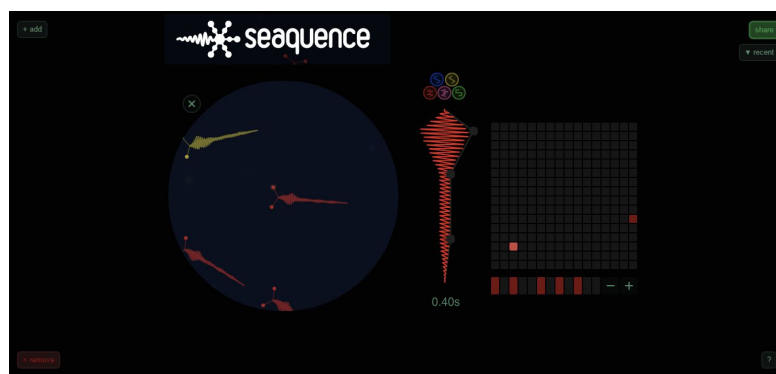


Figure 2: Sequence Website.

TuneTrace

TuneTrace is an app which scans users handmade drawings and then continues to translate the drawings into musical compositions (QM Official, 2013). TuneTrace utilise the devices camera to scan the user's drawings and then the app generates live music on the user's drawings there is also a visual aspect of how the music is traveling through the drawing via spots of lights travelling through the lines of the drawings.

This app provided us with a solution on how we wanted to implement the drawing feature on the Nucleus. We are currently following a same methodology now utilising two webcams to scan user drawings. In terms of generating the music we have looked into how TuneTrace generate music but it wasn't quite what we are after. TuneTrace is a very solid guide for us to follow when we are going to develop our sound generation.

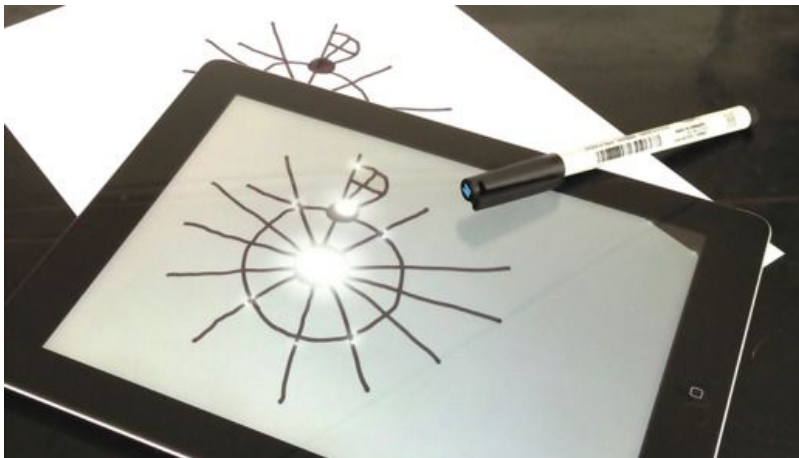


Figure 3: TuneTrace

ScoreLight

ScoreLight is a project which we found to be quite intriguing in the fact that it was considered a musical instrument. The idea of the project was that it utilised lasers that would travel around users drawings and physical objects and while it was doing so it would stream sound live (Ishikawa Watanabe Laboratory, 2010). Although ScoreLight inspiration did not manifest in our project physically the idea of using lasers to comprehend users interaction was a possible avenue to endeavour when it came to finding a solutions of implement the drawing surface of the Nucleus.



Figure 4: ScoreLight

Reactable

Reactable was a strong influence to the Nucleus due to the very physical nature of Reactable and the Nucleus. Both projects are drawn together due to similar themes and goals. When we first looked at the reactable there were immediate thoughts of similarities in terms of projects and what both do. After much conversation in trying to refine the idea we used reactable as an anchor point so to speak where we aimed the Nucleus to be above. When we reviewed the reactable we noticed that there was one key difference which was that the Nucleus is aiming for collaboration when found that the reactable only allowed it. As we strived for that, we soon let ourselves also differ from the levels of complexities substantially as our end goal was to tackle early learning while reactable although a novelty installation as with the Nucleus the reactable seemed to be quite complex just like any other instrument whereas the Nucleus plays around with basic compositions so that users could grasp the core fundamentals that entails musical composition.



Figure 5: Reactable

Constraints

The Nucleus is constrained by its physical size and lack of portability. In its current state it needs time to be set up and can not be moved around easily. This reduces the flexibility of our table and makes it more of a long term/ permanent installation.

Many of the components that make up the nucleus are also expensive, such as a close range projector and two high quality webcams. This means that constructing the table will not be cheap and it will be more of a premium product.

Technical Constraints

There are obvious technical constraints for our table. Ideally it would use a large circular touch screen as the table surface. Unfortunately touch screens like this do not exist and would have to be custom made. Touch screens we have access to are large rectangles, but we decided not to use them as they would compromise the experience and collaborative nature of our project.

Also having sensors that could have latency issues will be a minor constraint however we have already created a plan that implements a system that works around it.

Using webcams instead of direct physical input from the user means that there may be errors in distinguishing the drawn lines from the environment. We will strive to design the hardware and software in ways to help mitigate this issue. For our final product we will need a material for the tabletop that is rigid and strong, opaque enough that the projector can display through it, and able to be drawn on by whiteboard markers. We have been looking at plastics and acrylics to fill this role.

Social Constraints

There exists some social constraints that may limit users from fully experiencing the project as intended. The Nucleus is constrained by its users in the sense that the table requires exploration and creativity for the best experience. If the user is unwilling to engage with the table then the main functionality which is to provide an experience will be in vain. However the second functionality is to give a collaboration experience towards the user. This can be constrained by the users unwillingness to collaborate with strangers. Another social constraint that we will definitely be facing is users being intentionally disruptive which is something we will have a little difficulty mitigating. However social constraints can only be tested and controlled by excessive prototyping and evaluating.

Project Plan

The project will use both Waterfall and Agile based software processes. As the plan will have staged weekly plan demonstrated by waterfall. While, each plan will be dealt within a sprint and evaluation method used in Agile software processes. The following table shows a brief explanation on what the group will be focusing on in the displayed week:

Week	Plan	Deliverables
3	Team Formation	
4	Ideation Phase	
5	Work on Proposal Speech and Ideas	Proposal Presentations / Document
6	Finalize the Proposal Document	
7	Feedback Revision and Project Refining	
8	Prototype Designing and Building	Prototype Presentation / Document
9	Evaluating Feedback, Working on Feedback Documents	
10	Building Project, Refining Idea if necessary	
11	Work on Product Video.	Product Video
12	Ready Project for Public Exhibit Environment	
13	Ready Project and Our Selves for Exhibit.	Exhibit Finished Product
14	Work on Personal Portfolio.	

Seeing that the course contains 4 units, we can assume each week will contain a workload of 20hrs per week minimum. Extra hours will be considered when the deadline of a milestone hasn't been met, or refining the project to make sure other weeks are going to go smoothly.

Team Roles

Our team is very well balanced, with each of our team members being multi-talented. We will be collaborating on almost every aspect of the project, where some team members may have a larger involvement in some processes.

I, Bosco, am primarily a software designer, and will be working mostly on the backend of the project. I have also had much experience with the design process, and will be collaborating with the other team members during the design process. I will also have a very hands-on role with the physical creation of the table. My strengths include Software Development and Problem Solving. My main weakness is my lack of focus when it comes to writing, as it usually takes me much longer to write, as well as my tendency to leave work until the last minute, which I will have to overcome in this course as it is almost impossible to accomplish.

I, Domenico, will be the main software process designer and engineer. I'll be making sure the project is following the desired plan given, while making sure the other developers are in check mentally. This will include organizing a weekly stand up meeting and providing information where there is confusion within the process of building this project. My strengths include Software Engineering and Prototype building and evaluating. However, my weaknesses includes having a binary sense of motivation and work ethics. While also having the tendency to make other and myself procrastinate. Although these weaknesses are within me, i'll make sure that it'll not affect the project within the forthcoming weeks.

I, Aaron, am a more traditional designer with experience in electrical engineering. I like to physically draw plans and conceptualise this way. I am able to work on the electronics of the prototype and the final implementation. I have experience creating 2D graphics and animation. My strengths include conceptualisation, teamwork, and electrical engineering. My main weakness is being lazy and only doing the minimum work required. This is something that I'm going to combat hard in this course by going the extra mile with my work. It helps that what I'm working on is something that I'm passionate about.

I, Kevin, am a software programmer as well as a designer. I'll be working alongside the other programmers within the team to ensure functions of the project are met. I'll also be contributing with the design and also physical design of the project. My main strengths include programming and design although while it is a strength I often fluctuate in doing well in programming or designing something although it highly depends on what I'm trying to achieve.

Appendix

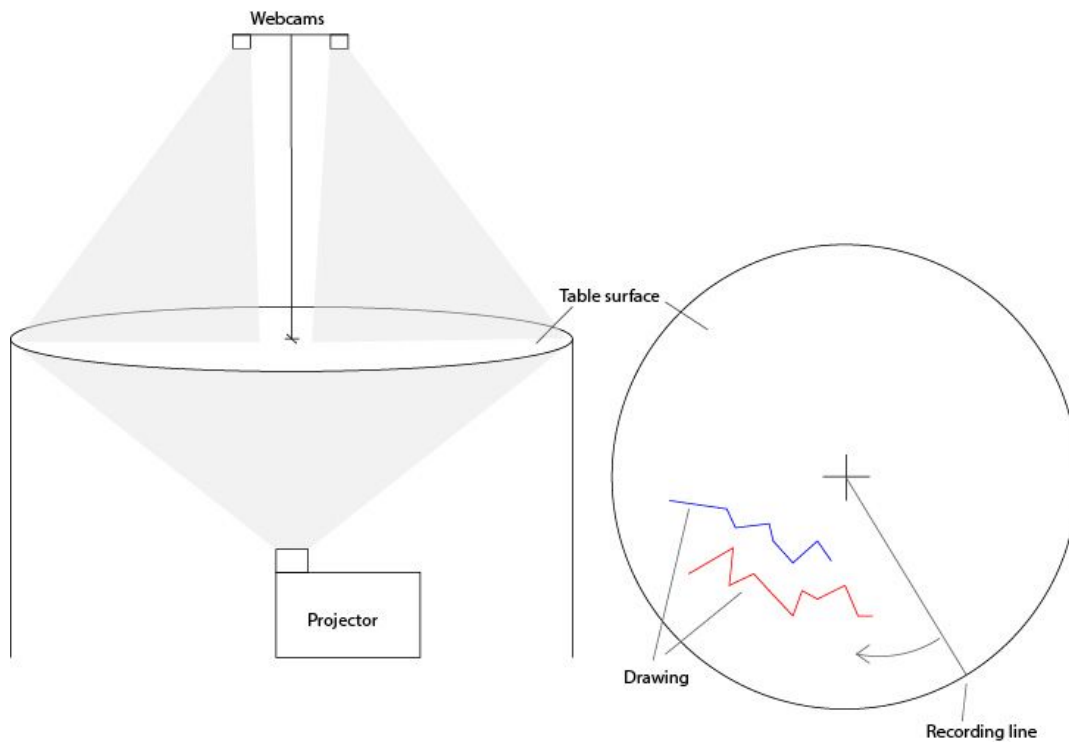


Figure 1: The Nucleus P.g.3

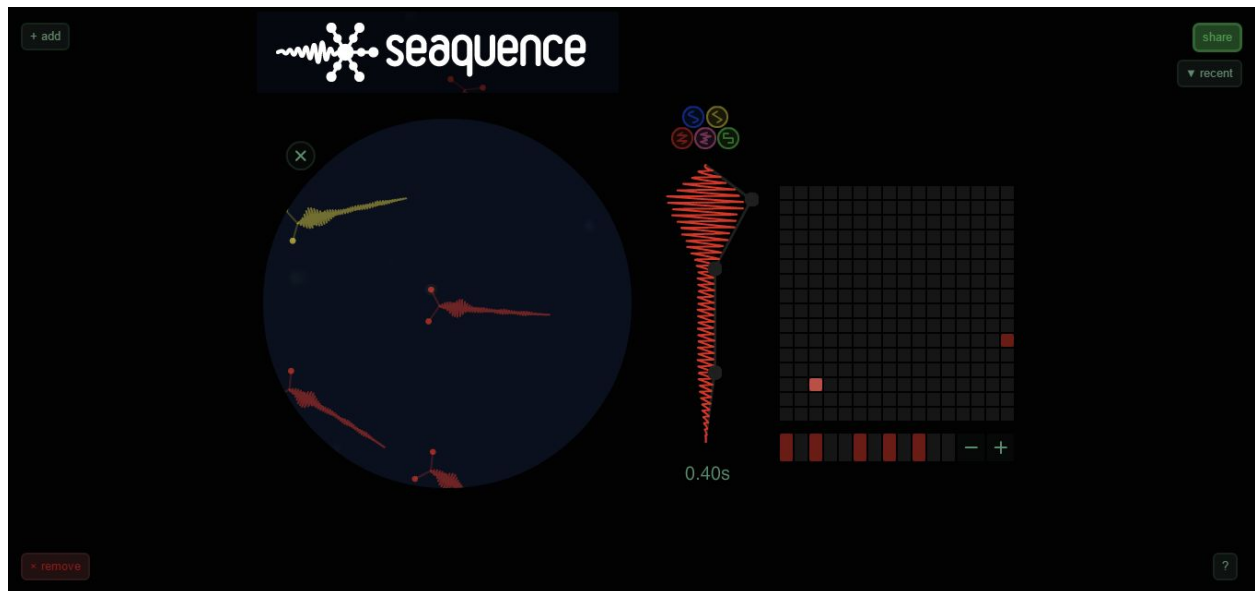


Figure 2: Seaquence Website. P.g.6

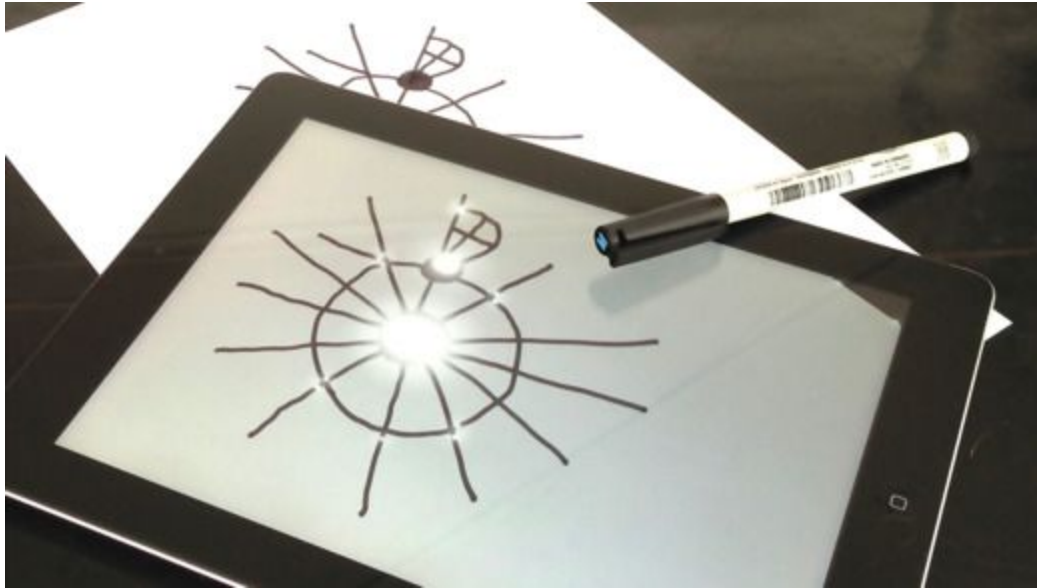


Figure 3: TuneTrace p.g. 7



Figure 4. ScoreLight p.g.8



Figure 5. Reactable p.g. 9

References

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