

SD5923 Game Development

Brainsic Development Report

Team Members:

Lichao (David) Lu 08500443G

AJ Libunao 08515315G

Antonio Jose Dimagiba y Mendoza 08500098G

Zhenshuo (Vincent) Zhao 08504491G

Supervisor:

Gino Yu

Co-supervisor:

Wilson Yuen

Introduction	3
What are the factors that will persuade a publisher to fund our game?	4
Examples of concept art and interface designs	5
Introduction Screens	5
Concept art and game interface	6
Target Demographic	7
Platform	8
Game Engine	8
Additional Software and Hardware Used	9
Production Pipeline	10
Staffing Plan and Development Strategy	11
Testing	12
Release Plan and Marketing	12
Contingency Plans	12

Introduction

Brainsic is a game employing human biofeedback detection to be launched on the Wii console with a PC prototype. Specifically the biofeedback is the human brainwave, also known as the EEG wave. The technology for detecting the players' brainwave is from a company called NeuroSky. The company have developed a brainwave detection headset that can measure brainwave in two values, concentration and relaxation. Our game is going to utilize these two values to create an interesting game play with music creation, game levels, items activation, and items collection.

At the moment there is not a lot of biofeedback game out there in the market. However, companies such as NeuroSky and HeartMath have already developed bio-detection tools and are looking for software applications to commercialize their products. These companies recognized the power of multimedia and entertainment technology. They saw the potential of combining their biofeedback technology with games, toys and other means of entertainment medium, therefore they are most likely willing to fund multimedia projects using their technologies.

At the moment, there are a few of entertainment projects using NeuroSky's brainwave technology. The Japanese game publisher, Square Enix have developed a first person shooting game using NeuroSky's brainwave headset. Toy makers Mattel and Uncle Milton have also come up with new toy products using NeuroSky's brainwave headset. So it is fair to predict that there will be a trend of entertainment combining with biofeedback technology in the next few years.

Our project try to capture is trend, but at the same time differentiate from others. We recognized music action game is currently a popular genre, and the target audiences such as families, musicians, and innovative game early adapters may have potential interests in biofeedback technology. Therefore, we decided to make a music action game with the brainwave technology.

What are the factors that will persuade a publisher to fund our game?

The publisher would fund our game mostly because our fun innovative game play using the biofeedback technology. As mentioned above, there are a few of games using the biofeedback technology and it is going to be a trend in the near future. Publishers always want to be one of the first movers and do not want to be left behind. Therefore, the main factor for us to get funding would be the technology we used in our game.

Potential publishers would be Nintendo and NeuroSky. In the case of Nintendo, they would fund us because we are aiming at the Wii platform and the NeuroSky's headset can connect to the console with Bluetooth. Nintendo is well known as innovators and first movers in the video game industry. And there is already games using new controllers such as the Guitar Hero and the Wii Fit. Therefore, with the fun innovative game play and new controller technology, Nintendo may see the potential in our game and give us the development funding.

In NeuroSky's case, the company is looking for applications to commercialize their headsets and raise the market awareness. Our game has a game play that is unique, innovative and fun. If NeuroSky sees the potential in our game, they are also willing to give funding to develop the project.

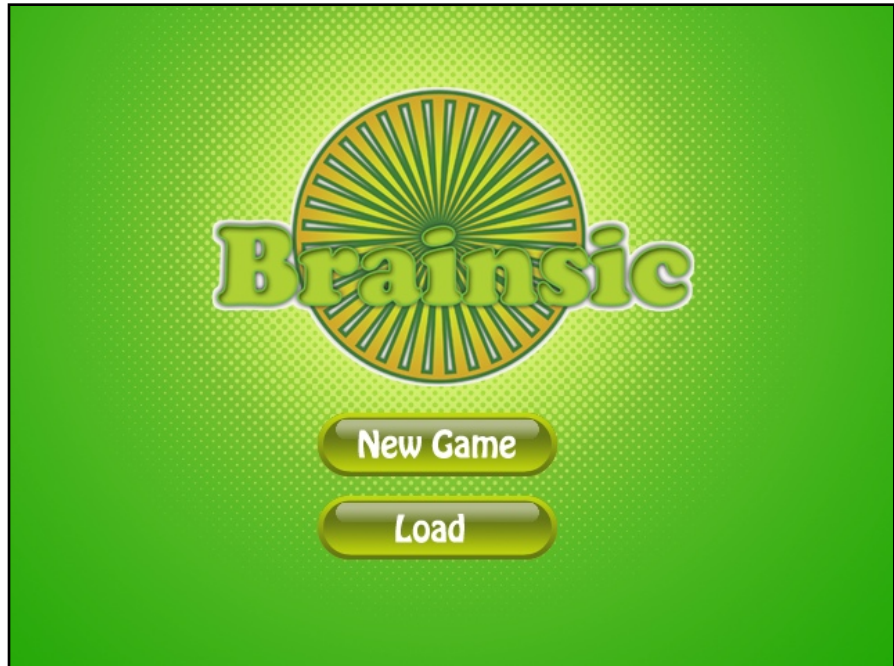
Another factor is the educational aspect of our game. Since our game play encourages users to concentrate to activate items on the screen, it can be used as a meaningful game for mental state training. Healthcare facilities and institutions might also have interests in funding our game. They can use it as a training tool to help ADD patients to cope with the concentration problem. With the training tool built as a game, it would reduce the boringness and motivate patients during the training process, especially for younger patients. Also Nintendo may also fund our game because of the meaningful game factor. With the success of meaningful training games such as "Brain Age", they may fund our game as the sequel of the game.

Examples of concept art and interface designs

Introduction Screens

I. Intro Screen:

- New Game: create new player profile, start a new game.
- Load: Download a track to play from the "Brainsic social network".

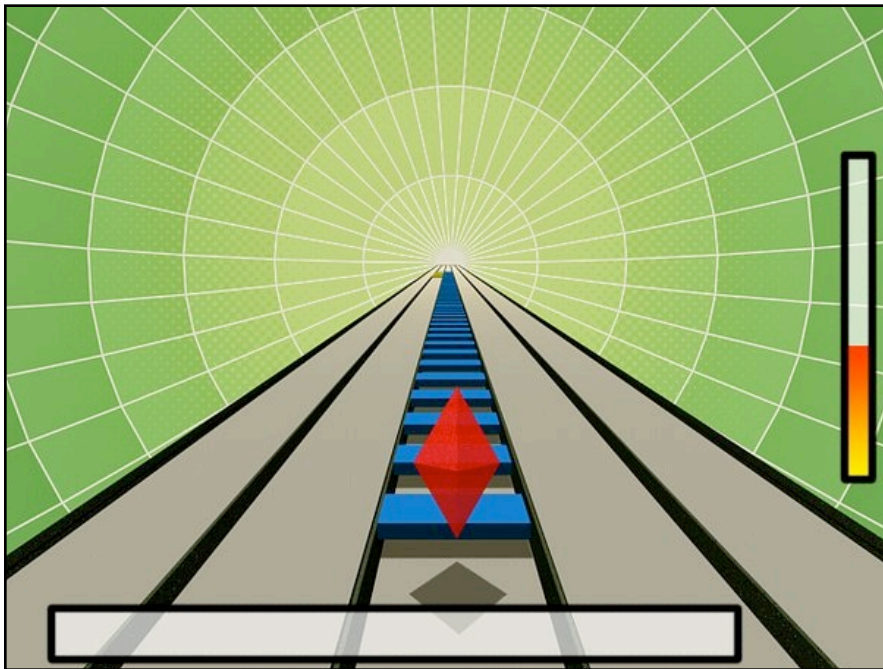


II. Creating player profile:

The image shows a screen for creating a player profile. The background is the same green halftone pattern as the intro screen. In the center, there are two white rectangular input fields with black outlines. The first field is preceded by the label "Name:" and the second field is preceded by the label "Email:". Both labels are in a bold, black, sans-serif font.

Concept art and game interface

I. Early stage in the game:



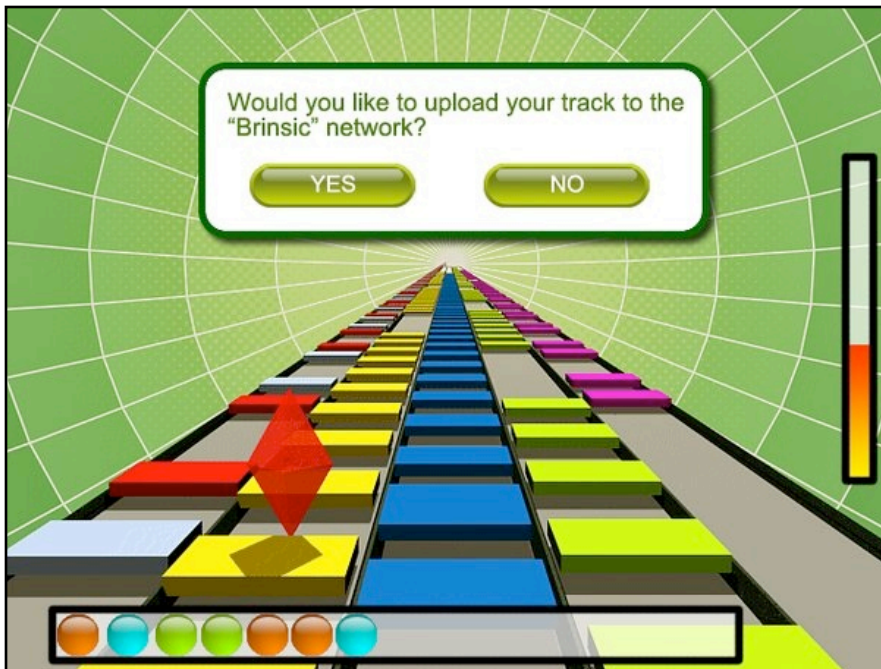
- Each track represents an instrument
- The blue track is the drum pattern
- Each block on the drum track represents a note of the drum pattern
- Brainwave bar at the right.
- Repository at the bottom for collected items.
- Now only the drum beat is playing

II. Item activation:



- Player concentrate to raise the brainwave bar level. Once the bar is high enough an item will fall from the top. In essence, items that fall are dependent on your brain bar level.
- Player move the center track to collect the item.
- Item collected will saved in the repository bar at the bottom.

III. Late stage in the game:



- Player have opened up couple of new tracks.

- More items are collected and saved in repository.

- If the player is happy with the track, they can have the option of uploading the track for others to play before ending the game.

Target Demographic

Our target audiences are mainly age between 13 and 65, ranging from teenagers to parents and elderly. They are mainly divided into three segments, family, musicians (music lovers), and early adapters.

Family members play our game mainly for socializing within the family and mental state training. Brinsic provides game play that allows multiple players to play together. One person can take control of the track selection while another player wears the brainwave headset to active items on the screen. Different players can take turns and collaborate to create music. Parents can also use Brinsic as a mental state training tool for their children, especially if the child has ADD syndrome. A music action provides a more fun experience than medical applications to motivate children during the training process. The elderly can also use it as a mind concentration training tool.

Both professional and amateur musicians can use brainwave as a new way of making music. The brainwave allows players to customize the music in game. Musicians can use their own music and mix them with their own brainwave. This concept may be appealing for musicians that are looking for innovative way of making and mixing music. The "Brinsic social network" also allows musicians to upload their music online and share their personal "brain song" with others.

Early adapters are also always looking for innovation in game plays. Those who are big fans of Guitar Hero are most likely like to try our game too because of the innovative game play and new controller. Also since biofeedback could be the next trend in video game, an early adapter would want to be the first mover to lead the trend.

Platform

Brainsic will be launched on the Wii console with a PC prototype. The reason we selected Wii as the game platform is because it fit with our target audiences and the game play experience.

Early adapters and music action game lovers are no stranger to Wii since Guitar Hero and Wii Music are already successful Wii games. They are already familiar with the Wii control and also open minded to new innovative game controls. Also our game play experience is similar to the Guitar Hero, so the player can relate to previous experiences during playing Brainsic.

Family members are also a target demographic of the Wii. The Wii is well known for discovering new market segment such as younger children and elderly with games like the Wii Fit and Wii Sport. Some of these games are meaningful games for physical rehabilitation. Similar to Brainsic, one of the objectives is to train mind concentration of the players. Wii is also well known for its socializing gaming experience. Games like Wii Sport support up to four players and encourages them to play together. It is perfect for family members to share the game play experience together. Therefore, we are using Wii as our game platform because it fits with our game play experience and target demographic.

Game Engine

We are currently using Virtools to develop the prototype of the game in PC. Virtools allows more advance scripting than other basic game engine such as Ignition. But at the same time, unlike the XNA, it does not require too much programming experiences. Therefore, it fits within the skill sets and backgrounds of our team members.

Virtools also has better looking and more varieties of particle effects, which is essential for the graphics in our game. Our game's graphic style is cartoonish, abstract and generic, therefore particle effects is important in spicing up the looks of the game.

Virtools is using Object Orientated Programming (OOP) concept. It is versatile and more robust since everything was treated as an object. It is useful to our game since we are also using the OOP approach in our game. Everything in our game is an object such as the crystal avatar, the sound bricks, and the items.

And finally, one of our team members has experiences with the Virtools engine, so we picked it as our game engine for the prototype.

Additional Software and Hardware Used

We used photoshops and 3ds Max to create the game concept arts, mock-ups, introduction menus, and some of the interface graphics such as the brainwave bar. Then we used Maya to build the actual game 3D models like the crystal avatar, sound bricks and the track. 3D models are converted into .nmo formats and imported into the Virtools engine.

For the music composition the process was all done electronically. This was the direction we decided because we needed to be able to cut each note of the melody or each note of the beat. This would've been impossible or would've given a very 'unclean' result if done with actual live instrument recordings.

The following softwares were used for the production: Propellerhead's Reason, Native Instrument's Battery and Audacity. Reason was used for all the melody, bass and synth texture compositions. We used Reason's NN-XT Advanced Digital sampler to replicate all the instruments that we needed. The melodies were then brought to the Dr. Rex device which slices a melody down to its individual notes more easily. On the other hand, Native Instrument's Battery was the software of choice for producing the beats primarily because of the software's more drum specific library of sound. Although all these note slices are pristine and clean in quality there were still 0.050-1.000 seconds of dead air space at the start and end of the notes which had to be manually cleaned and cut using Audacity.

A concern on this kind of approach of creating music with software would be the dynamic qualities of the melodies or beats. There is always a risk of music being composed by software to sound 'mechanical' or not having the proper dynamics; such as a faster or softer hit on a note or a beat or just sounding too perfect primarily because the software is perfect.

To get around this perfection we used special trigger devices such as M-AUDIO's Oxygen 8 and Korg's padKontrol (see images)



These devices have velocity sensors embedded in the keys and pads to measure the actual speed and pressure of a note or a beat being played which the software in turn applies to the sound files for that more “natural” sound. In other words, if a note was hit harder –the sound produced would be more defined. Or if a beat was gradually tapped from light to hard (fast) the corresponding beat sound would then also sound following the gradual increase of pressure.

Production Pipeline

Since we are building the game in a small scale group, our production pipeline is more dynamic, versatile, flexible, and non-formal compared to pipelines in bigger teams. Group members often discuss together for ideas and discussions, and are self organized. Base on the skill set and background of different team members, each member picks the task to make contribution to the project. Regular meetings were held once a week to follow up everyone's progress. During the meeting everybody talks about what they have done and is given updates on the overall development progress. In one word, our production process is similar to the concept of agile or scrum production.

During the conceptual stage, all the group members' ideas were heard. We used tools like mind maps and brainstorming to generate ideas. After all of the ideas were generated and collected, the game designer in the team carried out a filtering process and come up with a general game play. We held one more meeting to discuss the game play and draft the first version of the game design document.

Next we moved to the pre-production stage. Based on the game design document, the game graphic artist came up with some concept arts such as game interface and avatar. After confirming with the team, the graphic artist created a more detail storyboard. The storyboard consisted of 3D rendering mock-up made in 3ds Max and description of each rendering images. The storyboard cover scenarios from the induction screen to the end of the first level, in our case the tutorial section.

With the storyboard, the team would have a more concrete understanding about the overall game play. Then the team start to do research on tools and technology on building the game. Our programer decided to use the Virtools engine because he had previous experiences using Virtools. Our sound designer have strong knowledges in creating digital music and already familiar with the tools. So the programer and the sound designer work closely to come up with a game demo.

One of the issues we encountered was working without the NeuroSky SDK and headset. In the demo we implemented the brainwave bar by using the keyboard. After the the first milestone, all of the members came together to look at the demo. The game designer and the graphic artist gave feedback to the programmer and sound designer, and then modified the demo base on the feedback. We went through this development cycle for several of times and come up with the first version of the game demo.

Our next stage is linking the game demo with the NeuroSky headset. Some modification and fine tuning in the game play are also required.

Staffing Plan and Development Strategy

Our staff planing is based on the background skill of the four members. The roles of each team members are game designer, graphic artist, programer, and sound designer. In the later development stage, we may hire one or two extra programer helpers in the programing because our team have very limited programing background. The progra-mer in our team would be the lead programer in managing these extra programer helpers.

We are using a dynamic and flexible developing strategy because of the small scale of the team. Members are self organized and pick the task base on individual background and skill sets. Regular meetings are held once or twice a week to keep everybody up-dated. We also set up a Facebook group as another communication channel for re-search and project updates.

Testing

We are planning to have our fellow classmates, faculty staffs, and small focus group test our game. Since our classmates and faculty have basic knowledge in game design and development, they would give us valuable feedbacks on how to improve the game.

And also we will spend some on the development fees on organizing a focus group testing. We will find the tester based on our target audiences. We can ask family members, relatives and friends as the “family” demographic segment. And our sound designer have connections with other professional and amateur musicians, so we can ask them to be in our focus group. We also need to interview with focus group to perform qualitative evaluation on the game.

Release Plan and Marketing

We are going to release the game with the NeuroSky headset. The retail price is around 100 USD and distribute through the channel of publishers such as Nintendo. We are also planning to use some online platform such as Steam as distribution platforms.

Depending on the budget, we may have different marketing strategies. If the budget is enough, we can market our game toward our target demographic through magazines, store shelf spaces and websites banners. However, if we have limited budgets, we can do viral marketing on social networks such as Youtube and Facebook. For example, posting videos of the game on Youtube to generate viewings and awareness. We can also create a social network of Brainsic players to upload their “brain song”. The Brainsic network can somehow connect to popular social networks like the Facebook, or even build the Brainsic network within the Facebook.

Contingency Plans

Being not able to get the NeuroSky SDK in time is the major issue that severely jeopardize the completion of our game. Since the differentiating selling point of the game is the innovative game play using a third party hardware and SDK, the risk of not getting the third party support is very high. Although NeuroSky is planning to release the SDK in July, the time table is set by the company and could be changed anytime due to any internal reason. Therefore, we need a contingency plan to cope with this issue.

Our contingency plan is to replace the NeuroSky headset with another biofeedback device called the “emWave”. The emWave measure user’s heart rate variability, also known as the “heart rhythm”. The heart rate variability often associates with the cognitive states of human. If the person is in a relax and calm internal state, the heart rate is consistent and coherent with his or her breathing pattern. The objective of emWave is to make use of this concept and help users to relive stress to achieve internal calmness and relaxation.

Fortunately, we have a copy of the emWave kit and SDK already, and we can implement it to integrate with Brainsic. However, since the biofeedback is different, we have to change some of the game play. For example, we need to change how the item is activated using the emWave device. Instead of concentration, we will use relaxation (coherent heart rate) to activate items in game.

One problem is that the emWave device is not as intuitive as the NeuroSky headset, because heart rate variability is more difficult for human to manipulate. We may also introduce a “breathing assistant” in the game. The breathing assistant in essence is a rhythm visualizer that tells players to breath following its rhythm. It will look like a bar with a marker moving up and down in a consistent pace inside. The rhythm of the breathing assistant can also be associated with the music beats in game.

Another potential issue with the emWave is the delay in feedback. For NeuroSky that delay is about two seconds which is acceptable, however, with the emWave the delay is much longer, because the device needs to measure heart rate in a longer sample rate to tell if it is consistent or not. It contribute to fact that it is less intuitive for the user and eventually causing confusion in game play. We are still looking for potential solution to this problem.

Finally, just like any typical contingency plan, we may cut down some of the non essential features, such as less game levels or the social network idea. Although we may remove some of the features to make the deadline, we still need to maintain the same high level of quality. Removal of extra features does not mean reduce in quality and details. Every members in our group need to have good understanding about this and prevent low quality works in the final product.