Rythem Finder

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# INTRODUCTION

The idea behind this project is to create a children’s rhythmic learning-based game for ages 4-8. Its main focus being around timing/accuracy, the player has to play along to the sequence in time in order to progress onto the next level. Each level advances in complexity, thus engaging with the players listening skills, timing, and the ability to maintain a rhythmic pattern. There are two components in which the user interacts with the game, this being the hardware to which the player interacts which physically, these are the push buttons and the software the user interacts with via the audio and visual feedback. A major part of developing this project was in its testing, as it was based around the users experience and its functionality was dependant on it being practical. Therefore, testing was responsible for justifying if something was useful or not.

# Elements of the project

There are a few elements that make up this project which will be detailed throughout this document. The two main elements being, the hardware and the software that work together, to create the learning experience for the user. The overall intention behind the build was to create a learning tool that aids children’s skills in musical rhythm. This is an area that many studies have been carried out and, in some case, proven that rhythmic learning is link to children’s overall development. The reasons behind it being a combination of hardware/software and not just one or the other, was based around, encouraging the user to having a physical involvement in the interaction. The software side of the project is what the user gets most of the information from. For children of this age group it is ideal, as they have access to touch screen tablets. It is also a common way of interacting with information for them.

The hardware chosen to prototype this project was the Arduino Uno, wich is a common piece of hardware used for this type of stuff. It can be purchased from a Chinese manufacturer at a cheaper price than the original. The Arduino board handles, all the information for this project from analogue and digital inputs. The physical buttons serve as inputs to the Arduino configured from the breadboard. It sends the information to the pure data patch via the serial port object within Pure data. The pd patch only receives information coming in, and conveys the button presses to the user on screen. So, they can see the button when it is pressed.

As another important element of this project is timing/accuracy. It was important for the software to be able to respond quick enough to the users presses, and avoid being triggered twice. The drum rythems used for the software, were based around simple 4/4 timing and 170bpm resolution. This was done as it seemed to be easily recognisable by this age group. It is easy to use and provides enough difficulty to engage the user. The drum patterns them self-contain only kick, snare and hi-hat. The choice to do this was based on the user’s physical capability. The game doesn’t require the user to have any musical knowledge at all.

The visual aspect of the software is key to the user. It is important that its not too complicated or cluttered, and easy to navigate and take in information by the user. There for the design is as such. The use of different colour, corresponded to the physical buttons helps to indicated link between them. The kick, snare and hi-hat correspond to the colours wich correspond to the physical buttons.

# Conclusion

Overall the project was successful in a number of areas and could do with improvement in some. As a prototype it demonstrates that it does works. With some further development it could possibly be something that could have some real-world application. The hardware was troublesome with trying to get all the buttons working at the same time. Only one button was working because of a unknown issue. The problem was that when, the other buttons where pressed. They would trigger the button next to it. Generating two signals from two different buttons, when only one is being pressed. After troubleshooting the issue, there was no resolution other than that, there may be something wrong with the hardware itself. If all three buttons were working it would give a similar experience to the alternative method. This was used for demonstration purposes, which was substituting the manual buttons, for the A, S &D key on the qwerty keyboard. This was the only issue preventing the hardware functioning in its full capacity.

However, the software does still present some issues. These belonging to the calculation of the difference in timing between the users’ inputs and the computer. The parameters the patch is configured to work with, seem to be troublesome for some of the midi drum sequences. As they become more advance, there are more calculations that have to be made. This may require extra trial and tweaking to further perfect. But is by far possible to have this working flawlessly with enough testing. An influence for the type of sequencing for the drum loops came from testing. At first the drum sequences were a little more complex, but after trying it to see how the experience would be, it quickly brought to light how difficult it could be for a child as young as four. Testing also helped to reveal the complication behind the simplicity of the patch. This lied mostly in making the calculations between the physical button and the computer, work with all the drum sequences. This was the area of the patch that required the most work and would bring about the most issues when testing.

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# REFERENCES