

ELE00083M Swift/IOS Report

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Introduction

The subject of IOS as a tool for music creation can be documented extensively in both professional and educational institutes. The ease of interface and the quantity of sounds available to a user is incredible. It allows for a one device system of multi-timbral musical expression through the use of 'Apps' available in the 'App Store'. Apple has placed itself inside the market of creative professionals with their first party creative products rivalling Avid, Steinberg and Adobe. GarageBand was developed and released early 2004 as part of their iLife package, giving the tools to create music to everyone on MacOS. [1] Further than this though the same company developed 'Logic Pro' a fully fledged DAW which uses a similar format to GarageBand. The port to a portable device was not until 2011 for the iPad. In a recent video Benn Jordan a Music Educator said that production on the iPad was "fun and exploratory, rather than grinding away at a DAW." [2]

Creating a music application for the IOS and iPadOS system requires understanding of core digital audio concepts. Audio Kit allows for this process to be streamlined, allowing for more time to be devoted to creating the user experience and the sound engine which the app would output.

Limits of the Platform

I wanted deep gestural integration much like how the 'Roli Seaboard'[3] uses pressure in addition to what amounts to an XY pad on each note. However, the screen on the iPad is not pressure sensitive and instead a constant pressure. This limits the expressive capabilities available to the user, not allowing velocity expression means that the overall performance can be hindered. However the XY pad on each note is possible as tracking position from a point is very possible.

Synthesisers in the real world often use knobs as a parameter control interface. These are intuitive and tactile to use as we can physically grip the control, these types of controls have also been used in everyday objects which we interact without questioning the interface such as: cookers, washing machines, lighting dimmers, or car controls. Although the operating system does allow for a 'pinch' and 'rotate' gesture, they never feel correct to use in place of a one-dimensional movement such as an up/down or left/right. Because of this I chose to use sliders for the main interface.

The final limitation is the flexibility of AudioKit, although it allows new coders to create effects chain and utilise pre-built components it struggles in comparison to SuperCollider, another C based music coding language. The inflexibility of the modules mean that the generation of sound is linked directly to the parameters given to you by the developers. Deep sound generation is handled by 'AKOperationGenerator' where you're able to specify the exact method of sound generation, however, the documentation of this is lacking and all information surrounding this is much older than the current version dating back to 2015.

Initial Concept

The purpose of this app was to give sound design possibilities to the user allowing them to create a range of different sounds with easy access to modulation capabilities. It was also to offer an expressive interface allowing for the user to change parameters through the use of gestures.

The Market

Sound design covers a wide gamut of applications within the 'AppStore'. With larger developers such as 'Moog' releasing recreations of their classic 'Minimoog Model D'[4] and more expansive options such as the 'Moog Model 15'[5] fully modular synth. A lot of these companies use the term 'virtual analog' to draw the customer in this is potentially due to the promise of audio buzz words like 'warm' or 'transparent'. Smaller developers are using the Xcode tools to create sound packs a format much like the 'Novation Launchpad'[6],

these apps usually consist of sound clips that are triggerable or sequencable. Often these apps are aimed towards a specific theme such as 'Dubstep' or 'Christmas Sounds'. It seems that the market can be split into three different sections, recreations of vintage gear, synths that have far too many controls to make music quickly or 'soundboard' style apps.

The Niche

The aim of this app is to fit into sound effect design, specifically expressive sound effects such as alien or mechanical cues in other forms of multimedia. It is designed for you to be able to get your desired sound quickly, with the simplified control it allows users to sketch ideas while they are doing something else such as referencing footage. The market of 'Sound Effect' apps are primarily in the 'Soundboard' style. Although modular synthesis can serve this purpose with the sheer variety of sound that is capable on these machine. However, these are often difficult to understand. The Niche I am attempting to fill is a synthesiser that specialises in Alien/Mechanical audio cues.

Description of the App

Simple Sounds is a sound design app targeted towards expressive drone effects generation. It focuses speed and results oppose to deep control, allow the user to be given results immediately instead of trawling through menus and hundreds of parameters that they don't need. The intuitive design sections out each part of the sound engine. Generator, Filter, Envelopes and FX, feature as a 4 parts.

The emphasis in the Generator section is the frequency modulation, a technique which can create a diverse range of sounds from a roaring bass to a soft bell. The 'FM Wave' helps to diversify the timbre at lower frequencies. The filter allows for smooth changing of 'Cutoff' while the 'Resonance' allows for the user to seek out a frequency and hone in on its content. Envelopes allow the sound to evolve over time, featuring ADSR it allows for many combinations. A high 'Resonance' and slow 'Filter Envelope' synergise to create a filter sweep, coupled with the expressive FM opportunities it allows for a huge range of tone. The effects section is simple to use but broad in its application. The 'Reverb' allows use of a freeze function with the space slider set to full. This allows the 'Reverb' to smear what ever sound you put through it to create an ambient sound scape. The 'Delay' allows you access from 0.01 seconds to 1 second, this means it is possible to create micro delays adding some metallic flavour to the sound.

The keyboard is comprised of 12 buttons amounting to the 12 tones of the western scale. The most unique section of this app is the fact that an XY pad lies underneath the key-bed which detects the users XY translation from the point where they touch their finger down. Due to this I chose for the emphasis on being a single note played, allowing for the expression to come from modulation instead of polyphony. This allows new opportunity for musical expression much like the 'Roli Seaboard'[3] or other hardware interfaces such as the 'Embodme Erae Touch'[7]. The X axis is mapped to FM amount and the Y axis to the filter cutoff, this allows for more expression when playing a single note.

The combination of oscillator, effects, envelopes and expressive interaction allow for an easy to pickup and play tool for the modern production house. The versatility of the 12 tone scale means that the application can used differently to suit a musical situation or as a live instrument.

Utilising Audio Kit

Looking at the 'AKOscillator' blocks showed me the limits of the inbuilt sound generation. None of these fitted the flexibility that I wanted to give the user. The Oscillation blocks gave the user the option of an AKFMOscillator or a AKMorphingOscillator, not a mixture of the two. This function is useful as changing the modulator wave in Frequency Modulation allows for octave jumps with the Square wave or even a pitch ramp with the Sawtooth wave. This benefits the user by giving them more options to create and fine tune the timbre of the sound.

Another reason behind using AKOperationGenerator is the advanced parameter mapping, creating variables that are called only in 'methods' means that there is no need to create a unique identifier for each variable in each module in your design. This compacts and makes the code more efficient. In addition to this, it also allows additional 'AKComputerParameter' extension methods to be called on top of the parameter.

References

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