Exam no: Y3858557

iOS Audio Programming Assignment Report

Introduction

The goal with this app was to create a fun bassline sequencer that inspired creativity and experimentation. To achieve this, it had to have a nice clean interface with popping colours, and an interface that could be used by anyone with no instructions, all the user needs to do is start pressing buttons and full, dynamic sound would come out. This app could be used by anyone because the interface is so simple, however it could particularly resonate with lovers of dance music. Dance music is all about beats and basslines so to be able to combine them in a way which invites creativity is of paramount importance.

The Design

It is strictly a mono step sequencer that has the built in capability of playing seamlessly with preset drum loops. There is a 12x8 grid that represents the sequencer front and centre. The rows represent keys on a piano for pitch. The columns represent where in the bar the beat lies (position). When the user presses one of the cells, it turns from red to green to signify note on. To get sound out of it, the play button must be pressed. Because this is a bassline sequencer, mono functionality was a crucial part of it because basslines are nearly always mono. The implication of this is that only one button can be green in any given column. So when the user selects a cell in a given column, if another cell in the same column is selected, the existing cell deselects and the newly selected cell becomes selected. The process of selection and deselection is more complex than what is presented to the user. Selection involves checking the other buttons in the column to see if one is enabled. If the column is empty, the note is added to the sequence. If the column is occupied, the note residing must be removed from the sequence and turned off (red) before the incoming note is added.]

The sounds generated from the sequencer come from 4 oscillators of different waveforms. ADSR control is applied across all of the oscillators. Changing the attack of the overall synthesised sound can be used to give expression. Decay and sustain can be changed to give the sound a more percussive feel. Release can be changed dynamically to aid playing with expression.

The 4 oscillators have their own dedicated mixer to give the user as much control over the bass sound as possible. Each waveform (sine, saw, triangle, square) has its own sonic characteristics, so to be able to blend between them gives the synth a wider prospective range of timbres.

The drum loop bay houses buttons for 6 original drum loops and one killswitch "no drums" button. The current implementation of how the loops play with the sequencer is that a loop must be pressed before pressing play to trigger the "drumLoop" Boolean variable. That in turn means that If already playing a sequence without drums, the sequencer must be paused (then loop pressed) before drums can sound along with the synth. This implementation could certainly be improved.

The top right is home to two sliders for volume control of the oscillator bank and the drum loops. When playing around with the amplitude of oscillators it is helpful to have this additional general control because in the current implementation, the range of volumes that come out of the oscillator mixer is probably too large. This can make the synth overpower the drum loops, so giving the user control over the general levels is also necessary.

Design

The app consists of a main view controller which controls the GUI elements and how they interact with the other source file "SequencerInstrument", which is where the audioKit functions operate. All of the audio processing was aimed to be done in the SequencerInstrument file, to keep to MVC protocols and for ease of understanding. The design started with getting the button grid to control the sequencer. Once that functionality was there, a function to make it behave mono was added. Initially, the sequencer was going to be based off samples, but a synth implementation was always desirable. The synth implementation gives the app a nice distinctive sound which wouldn't have been achievable if just raw samples were used. The drum loops were all made in a DAW. The sequencer tempo is set to 120BPM, all the beats were made in the same tempo to ensure seamless integration. Some of the loops are 4 beats long and others are 8, they loop at equivalent times. The background image that makes up the GUI was designed in Inkscape.

Improvements

There are many aspects of this app that could be improved. As previously mentioned, if the drum loops could initiate mid sequence that would be ideal. Also, their current implantation graphically leaves something to be desired, they could be highlighted with a button press. The volume controls and initialised volumes are slightly "janky" and would benefit from a more considered approach because the levels can be unpredictable.

The biggest improvement for this app would be a 16-step sequencer instead of an 8 step. With only 8 steps the rhythmic potential of the system is limited. Having a resolution of ¼ steps instead of the current ½ would allow for more funky and expressive basslines to be created. Additionally, velocity controls could be added. A great implementation could be a drag action on the cell to adjust its velocity, and its colour shifts accordingly. In a similar vein, a scrollable sequencer to allow for higher notes could be implemented, or at the very least a pitch shift function.

A clear function would also aid usability, having a button which would erase the current pattern at once. To compliment this, a save function for saving the current sequence/parameter set would be ideal.

Greater control over the individual oscillators could be implemented through individually assigned ADSR envelopes, however this would mean 16 additional sliders, which would affect usability.

Marketing Strategy

I believe that this app could be sold for a price of 79p. The target market for this product would likely be dance music enthusiasts or music producers and songwriters. Targeted adverts on YouTube videos concerning anything to do with music production or dance music in general would be a good starting point. Channels like "Boiler Room" for example, where people go to watch DJ sets. This app could stand out by providing a user-friendly dance music production experience that required no prior knowledge of music theory, "just start pressing buttons and listen".

The advertising itself would likely have to be a short and slick video where the sound of the Bass Bazuca shines through. An emphasis on it being usable by anyone would also be appropriate, as there are likely many people who engage in dance music and dance music culture who don't produce any music themselves but want to experience the doing without necessarily the huge commitment to learning music theory and using a DAW.

In app purchases could include selling different packs of additional bespoke beats that were suited to a specific subgenre of dance music.