RHYTHMKRAFT

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I. INTRODUCTION

RhythmKraft promises to have a bright future in the drum pad app space. It is positioned as a useful tool for both musicians and music aficionados because of its realistic drum sounds, user-friendly interface, customisation options, and possibility for integration with music production tools. Maintaining the app's long-term survival and performance in the competitive marketplace will require constant improvement, efficient marketing, and attentiveness to user input.

II. APP FEATURES

Currently the app is limited to a few drum pads, but the full fledged version of the app has potential to reach the masses by providing a large number of drum pads, possibly up to 16 pads and can have interchangeable drum sound, with possible recording capabilities.

Age Group: Users of the app will more than likely fall into the range of 10-60, a wide range and for a variety of reasons.

Background in Music: While a significant amount of users will have background in music, owing to the nature of the app, there will be a set of people who lack knowledge in music but use the app as a way to get into music or entertain children

Professional Usage: The app is designed as a starting point for people to delve into percussion and can be used for educational purposes but less likely in a studio setting.

Accessibility and User-Friendly Features: The significance of the application's accessibility and user-friendly features in enhancing user engagement and satisfaction will be emphasised by users.

III. APP DESIGN

The primary purpose of RhythmKraft is to simulate a drum pad setup, allowing users to play four different drum sounds: Kick, Closed Hi-Hat, Snare, and Open Hi-Hat. Each drum sound is associated with a specific pad, and users can trigger the sounds by interacting with the corresponding pads through touch gestures.

The application uses the AudioKit framework to synthesise audio. The main component in charge of controlling the instrument (AppleSampler) and the audio engine (AudioEngine) is the DrumClass. The fact that RhythmKraft loads the drum instrument from an EXS file is what sets it apart. This enables a more adaptable and dynamic method for creating authentic drum sounds.

We shall go through the design, bit by bit, as we go:

Fig. 1. RHYTHMKRAFT

A. *EXS file format*

The EXS file format is a sampler instrument file commonly used in music production. It contains samples of individual drum sounds, each mapped to specific MIDI note numbers. This format allows for easy organization and retrieval of drum sounds, making it suitable for drum pad applications.[1]

I made the particular choice of picking an exs file as it allowed me to assign certain samples o a specific instrument file that can be manipulated on Logic, creating potential to expand and add more instruments and sound packs as the app develops.

B. *AudioKit*

For iOS, macOS, and tvOS, AudioKit is an open-source framework for audio synthesis, processing, and analysis. It makes it simpler for developers to create music, sound effects, and other audio-related features by giving them access to a robust collection of tools and APIs for working with audio in apps.

C. *Apple Sampler*

Working with sampled audio in real-time apps is made easier with AudioKit's Apple Sampler, a robust and adaptable tool. Its ability to load dynamic instruments, adjust pitch and time, and integrate with Core Audio make it an appealing option for developers making games, music apps, or any other application where expressive and responsive audio playing is crucial. Although merely importing WAV files could be appropriate in some situations, the Apple Sampler provides further features and optimisations that improve the audio production process overall.

D. *Drum Class*

The central component of the application is the DrumClass class, which uses the ObservableObject interface to provide data binding. Via the playing array, this class controls the audio engine, instrument loading, and the status of every drum pad. By using @Published, it is ensured that updates to any linked views occur when the playing array changes.

E. *Drum View*

A single drum pad is represented by the DrumView struct. Because it complies with the Identifiable and View standards, it may be quickly recognised and displayed in a SwiftUI view hierarchy. Touch interactivity is enabled by the Gesture modifier, and the audio playback logic is managed by the onChanged and onEnded closures in response to user input.

F. *ContentView*

The 'ContentView' struct is the main SwiftUI view that orchestrates the arrangement of drum pads. The use of a 'ZStack' positions a 'RadialGradient' as the background, creating an aesthetically pleasing visual environment for the drum pads. The 'HStack' containing four instances of 'DrumView 'creates a horizontal layout of the drum pads.

By combining these different components, I could synthesise a basic drum pad app, providing the foundations to improve and grow the app with even more features, provided with more time and effort.

IV. Market Testing

A. *Hypothesis*

The app aims to be a go-to platform for drumming enthusiasts, providing a seamless blend of functionality and creativity in the realm of digital music creation. Majority of the users will fall in the age group of 18-60, with a large percentage of them having a background in music and will use the app to make music, educate others in music, use it as a play app for little children and so on.

B. *Assumptions to Test*

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Through market testing, I have come to the realisation that an app such a RhythmKraft is nowhere ready to be in the market right now, but it has so much potential and ease of improvement, which can lead it to be an industry giant in the music app industry

Superior drum samples add to a true-to-life and genuine sound experience. The software should offer a wide variety of percussion sounds that accurately depict the subtle differences between various drum parts, such as cymbals, kicks, and snares.

Testing shows a great response to how people are willing to spend money on a good app that can not only deliver quality content but provide features that can be added on easily.

There is competition in the drum pad app market, with many apps providing comparable features. RhythmKraft has a distinct advantage and is more viable because of its unique features, like the use of EXS files for instrument loading. RhythmKraft stands out due to its customisable drum kits and instructional possibilities. It can set itself apart from rivals with future development and upgrades.

Retaining user interest and making sure the app stays relevant in a changing market requires regular updates, adding new features, drum sets, or responding to user comments. User engagement may be improved by the possible incorporation of community and sharing tools. Making it possible for users to interact, share their work, and view other people's content may prolong the life of the app.

With targeted marketing and advertising, excellent PR strategies and creating brand relationships are key to promoting and commercialization of this app. For artists and producers looking for a portable and adaptable drum pad solution, RhythmKraft is a compelling option. It's a

useful tool for making music because of its customisation options and interaction with AudioKit.

V. Future Developments

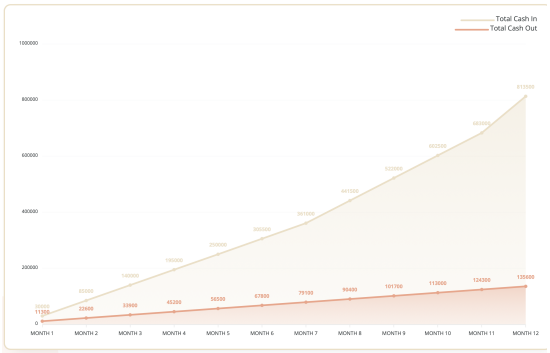

Fig. 2. Simulated Projections of Revenue

With acquisition of resources and personnel, more development can be conducted and it will lead to exponential growth of RhythmKraft. Expanding from a simple drum pad to something way bigger can be daunting but it's fathomable to plan ahead and grow

We can expand beyond regular drum kit sound, and go into fields of other percussion instruments, to provide a wide range of sounds that can be used to produce music and even expose non-musical people to something completely new. We can even go to the realm of other instruments, and expand into vocal lines and synths and other instruments that can be sampled.

Providing recording capabilities can be a huge advancement in the development of RhythmKraft. Especially if we can provide multitrack recording, especially on a portable device such as an iPhone or iPad.

Introducing community hubs can also be a fun feature for budding artists that can provide the go-to area to possibly meet other artists and students, collaborate and create something completely new. It's exciting to even think about it!

References

[1] N. Blagus, L. Šubelj, G. Weiss, and M. Bajec, "Sampling promotes community structure in social and information networks," *Physica A: Statistical Mechanics and its Applications*, vol. 432, 2015.