

AUSTRALIA NATIONAL UNIVERSITY

An evaluation of touch-based music sequencer apps on iPad

by

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degree of Bachelor of Advanced Computing(Honours)
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Declaration of Authorship

I, Ke Ding, declare that this thesis titled, ‘An evaluation of touch-based music sequencer apps on iPad’ and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

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“We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run.”

Roy Amara, leader at the Institute for the Future

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Abstract

ANU College of Engineering and Computer Science

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With the rapid development of technology, mobile devices have become the new ground for musicians to express themselves. With a variety of sensors, as well as the exponential growth in the processing power, iPad offer an attractive platform for music performing. Thousands of music applications have been developed for the iPad. Music sequencer applications, as one of the major category of music making applications, have seen a lot of derivation and innovation

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The acknowledgements and the people to thank go here, don't forget to include your project advisor...

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Abbreviations

NIME New Musical **I**nstrument **E**xpression

Physical Constants

$$\text{Speed of Light } c = 2.997\,924\,58 \times 10^8 \text{ ms}^{-\text{s}} \text{ (exact)}$$

Symbols

a	distance	m
P	power	W (Js^{-1})
ω	angular frequency	rads^{-1}

For/Dedicated to/To my...

Chapter 1

Introduction

As shown in [\[Müller et al., 2012\]](#).

1.1 Background

1.1.1 The development of NIME

1.1.2 iPad: a new playground for musicians

The iPad, a tablet computer with touchscreen display, has quickly occupied the market all around world since it's first release in 2010[\[Nguyen et al., 2015\]](#). The emergence of iPad have provided a new platform for users to explore digital world [\[Müller et al., 2012\]](#). After 7 generations, the usage of iPad has shifted from the extension of iPhone to a powerful prductivity tool. In this shift, thousands of applications which was designed to utilise the larger touch screen has emerged. According to Daniel, there are over 1.5 million apps are currently hosted in the App Store and more than half of those apps are specifically designed for iPad[\[Nations, 2017\]](#).

1.2 Related Work

1.3 Research goals and motivation

1.4 Structure

The research project was divided into two consecutive studies()

Chapter 2

Literature review

2.1 Mobile Music

With the increasing popularity of mobile device such as smart phone and tablet, a new research field called Mobile Music emerged [Flores et al., 2010]. According to the definition by Gaye et al., *Mobile Music* with employing portable technology does not only include the scope of playing music, but also involve music composing, synthesizing and sharing[Gaye et al., 2006].

In the last 15 years, there is a growing number of researchers start concerning the development of applications in mobile devices. This new trend was first highlighted by John after analysing 98 NIME proceeding papers related to mobile music during the period from 2002 to 2012[John, 2013].

The expanding capabilities of mobile devices inspired researchers to exploit the new features. The wireless network ability of mobile device is the first area attract researchers' attention. TunA is the first practice of building connection among PDA users through wireless network[Bassoli et al.]. By accessing the playlists of nearby users, TunA help users in same network to exchange their music. Tanaka extended Bassoli et al.'s work from music sharing towards collaborative musical creation [Tanaka, 2004]. Tanaka proposed a system which exploits ad-hoc wireless networks to allow a community of people using their PDA to work on the same piece of music [Tanaka, 2004]. Some research started from a different approach by investigating the possibility of utilizing the touch screen on the mobile devices. Geiger designed a paradigm for using touch screen on mobile device like iPaq [Geiger, 2003, 2006]. MoGMI, which stand for Mobile Gesture Music Instrument, is a research project focused on using the accelerometer inside the mobile phone to perform music. Through examining three different axis mapping models, Dekel and Dekel

explored how to turn mobile phone into a standard instrument. Smule Ocarina is the most successful mobile musical artifact, which take advantages of the global popularity of iPhone [Wang, 2014]. It leveraged the microphone to take input from breath, and combined with command from the multitouch screen to mimic the physical interaction of ocarina. Besides, Smule Ocarina also utilizing the GPS module to connect users all around the world and create a new social experience [Wang, 2009].

2.2 Musical Interaction Patterns

Chapter 3

Study 1: Classification of music sequencer

A quantitative study was conducted to create an interface taxonomy of current music sequencer apps on the iOS App Store. In total, 55 music sequencer applications on App Store have been examined (see Appendix [A](#)). Several search criteria are implemented to locate music sequencer on the App Store (see Section [3.1.1](#)). After analysing those music sequencer apps, we proposed classification criteria based on the design of the user interface (see Section [3.2](#)). The 55 music sequencer applications were classify into 3 major groups according to the classification criteria (see Section [3.3](#)).

3.1 Method

3.1.1 Search Criteria

3.2 Classification criteria

3.3 Results

Chapter 4

Study 2: User Study

Following the first study (See Chapter [3](#)), A laboratory study was conducted to justify user experience on different design patterns of music sequencers. Base on the previous work of evaluating music instruments, a questionnaire was designed to measure muscians experience (See Section [4.1.1](#)).

4.1 Method

4.1.1 Questionnaire

4.1.2 Interview

4.2 Participants

4.3 Results

4.4 Discussion

4.5 Summary

Appendix A

App Store Music Sequencer Applications

App Store Music Sequencer Applications			
Application Name	Description	Seller	Link
Music Pad	dj player remix electronic music beat	Xinggui Zhang	https://appstore/au/_Dkmeb.i
Volotic	N/A	Scott Garner	https://appstore/au/-WW64.i
Beatwave	N/A	collect3	https://appstore/au/UzERv.i
EGDR808	Drum Machine free	Elliott Garage	https://appstore/au/rPfX0.i
LoopStation	N/A	Rene Zuidhof	https://appstore/au/UzMw7.i
Noise	N/A	ROLI Ltd	https://appstore/au/Zzkr8.i
Music Strobe Starter	N/A	Arun Bab	https://appstore/au/y4NFQ.i
Beatbox Looper	N/A	Pierre Guilluy	https://appstore/au/Sfk6R.i
Dubstep Invasion	Music And Song Hit Maker	Jochen Heizmann	https://appstore/au/0ane3.i

App Store Music Sequencer Applications(Continued)			
Application Name	Description	Seller	Link
Remix Pads	make groove beats record music app	Alexey Natarov	https://appstore/au/R7_pdb.i
Music Touch	Make Mix Music DJ Beats	Qiao He	https://appstore/au/D_ZTdb.i
Loop maker	Amazing music maker	Miguel Saldana	https://appstore/au/MpDthb.i
Drum Pads Machine	Beat maker dj music studio	Alexey	https://appstore/au/JZ9adb.i
Drum Pads Machine 2	Beat maker dj music app	Alexey Natarov	https://appstore/au/c5DZdb.i
MIxpads	Virtual dj pads sampler free app	Alexey Natarov	https://appstore/au/CPj1eb.i
Loopacks	Music Maker Loop Machine DJ Beats	Hernan Arber	https://appstore/au/oXKt1.i
Dubstep Dubpad 2	Electronic Music Sampler	FAD Games LLC	https://appstore/au/mCRXO.i
NOIZ	Make Epic Music	Studio Amplify	https://appstore/au/KK9Uab.i
Blocs Wave	Make Record Music	Novation	https://appstore/au/LOMTab.i
MIxpads 2	Dubstep Trap drum pad sampler for DJ	Alexey Natarov	https://appstore/au/oH_ffb.i
Polyphonic!	NA	Flip Studios LLC	https://appstore/au/u_PhS.i
Steve Reich's Clapping Music	Improve Your Rhythm	Amphio Limited	https://appstore/au/R-JA4.i
Music Pad	remix electronic music beat	Xinggui Zhang	https://appstore/au/_Dkmeb.i
Loop Community	NA	Loop Community	https://appstore/au/VyLNN.i
LP-5	Loop-based Music Sequencer	Markus Waldboth	https://appstore/au/Z6EDN.i

App Store Music Sequencer Applications(Continued)				
Application Name	Description	Seller	Link	
Dubstep Song Construction Kit	NA	Jochen Heizmann	https://appstore/au/KndOI.i	
Dubstep Filth Factory	Sampler and Loop Machine	Ben Frost	https://appstore/au/iHnUX.i	
Monolith Loop	Relax Meditate Sleep Zen	Monolith Interactive Inc.	https://appstore/au/vfGDy.i	
Theremin Synth	Loop Record Download	Luke Phillips	https://appstore/au/gJI2bb.i	
Music Makr JAM	Create remix share your music!	JAM just add music GmbH	https://appstore/au/EXEG0.i	
Novation Launchpad	Make Remix Music	Novation	https://appstore/au/QNk1I.i	
Multi Track Song Recorder	NA	Derrick Walker	https://appstore/au/Ygbsx.i	
Triqtraq	Jam Sequencer music making on the go	Zaplin Music	https://appstore/au/G8XhD.i	
Trigger Box	NA	Justus Kandzi	https://appstore/au/j4Hn1.i	
Composer's Sketchpad Lite	NA	Alexei Baboulevitch	https://appstore/au/nWJO_.i	
Orbita for iOS	NA	Keijiro Takahashi	https://appstore/au/kBIaN.i	
S.A.M.M.I.	NA	Christopher Ayles	https://appstore/au/YDMeY.i	
ScratchVOX	NA	ScratchVOX	https://appstore/au/e4aX0.i	
Oro	Visual Music	Light the Music LLC	https://appstore/au/d6px5.i	
Poly	NA	James Milton	https://appstore/au/LFspN.i	
Mutone	NA	william LIND-MEIER	https://appstore/au/IkoJM.i	

App Store Music Sequencer Applications(Continued)			
Application Name	Description	Seller	Link
WR6000	NA	WEJAAM	https://appsto.re/au/pM3E3.i
SoundZen HD	NA	Tapbox LTD	https://appsto.re/au/dHrZB.i
SoundGrid	NA	Vitaly Pronkin	https://appsto.re/au/fSB3s.i
Visual Beat	Interactive Music Video	Max Moertl	https://appsto.re/au/B-8l6.i
MINI-COMPOSER	NA	Masayuki Akamatsu	https://appsto.re/au/Ar8Ez.i
Loopseque Lite	NA	Casual Underground	https://appsto.re/au/BTm8x.i
Bass Drop	Deep House Electronic music sampler and synthesizer	Ben Frost	https://appsto.re/au/k3rp0.i
Beat Boss	Electronic Dance Music Sampler	Ben Frost	https://appsto.re/au/DWLyU.i
TonePad	NA	LoftLab	https://appsto.re/au/n0x1s.i
Navichord Lite	intuitive chord sequencer	Denis Kutuzov	https://appsto.re/au/kTci2.i
EasyBeats Drum Machine Free MPC	Hopefully Useful Software	Christian Inkster	https://appsto.re/au/gJ10t.i
Fifth Degree	MIDI Sequencer	Bernie Maier	https://appsto.re/au/qFZM1.i
Light Medley	NA	Tek Min Ewe	https://appsto.re/au/FU06hb.i
Medly	Music Maker	Medly Labs Inc	https://appsto.re/au/CP1c4.i

Appendix B

Questionnaire

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Questionnaire

App: _____

Type: _____

Date: _____

**Please indicate how strongly you agree or disagree with all the following statements which apply to you by selecting a number from 1 (strongly disagree) to 5 (strongly agree).*

Question #1: **The instrument allows me to be creative.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #2: **The instrument responds well to my actions.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #3: **I can rely on the instrument when playing it.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #4: **I have fun playing the instrument.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #5: **The instrument allows me to express myself.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

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Question #6: **I can control the sound appropriately.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #7: **The instrument pleases me sound-wise.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #8: **I feel the urge to play the instrument again.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #9: **The instrument allows me to be engaged when I'm playing it.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

Question #10: **I can recognize that the instrument responds well to my playing.**

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

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