Tiny trainable instruments

by

Aarón Montoya-Moraga

B.S., Pontificia Universidad Católica de Chile (2014)
M.P.S, New York University (2017)

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Author .....
Program of Media Arts and Sciences
July 2021

Certified by .....
Tod Machover
Muriel R. Cooper Professor of Music and Media
Thesis Supervisor

Accepted by .....
Tod Machover
Academic Head, Program in Media Arts and Sciences

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Abstract

Tiny trainable instruments is a collection of instruments for media arts, using machine learning techniques and deployed in microcontrollers.

Thesis Supervisor: Tod Machover
Title: Muriel R. Cooper Professor of Music and Media

Acknowledgments

UROPs Peter Tone, Maxwell Wang

Opera of the Future

Future Sketches

Family and friends

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Chapter 1

Introduction

Cras nec mauris feugiat, aliquam elit ac, blandit ex [1].

1.1 Section sample

Nulla sed sem finibus, vehicula quam at, vulputate tellus[1]

1.1.1 Subsection sample

Donec blandit dolor a ipsum sodales, eget aliquet nisl fermentum.

1. Item 1.

1.1.2 Another subsection sample

This is done by using some combination of

$$\begin{aligned} a_i &= a_j + a_k \\ a_i &= 4a_j + a_k \\ a_i &= a_j \ll m\text{shift} \end{aligned}$$

[1]Here is a sample footnote referencing figures B-1 and B-2.

Chapter 2

Background

2.1 Instruments

2.1.1 BASTL

2.1.2 Critter & Guitari

2.1.3 monome

2.2 Education

Mitch Resnick's book Lifelong Kindergrarten

2.3 Machine learning

2.4 Digital rights

Electronic Frontier Foundation

Edward Snowden

Chapter 3

Early experiments

3.1 Microcontrollers

Arduino

Teensy

3.2 Machine learning

Class at School of Machines by Gene Kogan and Andreas Refsgaard

Chapter 4

Tiny trainable instruments

4.1 Design principles

1. Cheap

2. Privacy

4.2 Technology

Arduino microcontoller

Arduino library KNN

TensorFlow Lite Micro

4.3 Programmable / remix

4.4 Philosophy and experience

4.5 Inputs

Enumerate sensors from the Arduino Nano 33 BLE Sense

4.6 Outputs

Buzzer

Servo

Chapter 5

Project evaluation

5.1 Digital release

GitHub repository

Arduino library

5.2 Audience engagement

5.3 Workshop

5.4 Multimedia show

Chapter 6

Conclusion

This thesis project is a

6.1 Future work

6.1.1 Education

New workshops, using multimedia outputs.

6.1.2 Artist workflow

Training instead of programming.

6.1.3 Packaging

PCBs and enclosures

6.1.4 Gallery

Appendix A

Tables

Table A.1: Armadillos

Armadillos	are
our	friends

Appendix B

Figures

Figure B-1: Armadillo slaying lawyer.

Figure B-2: Armadillo eradicating national debt.

Bibliography

[1] L[eslie] A. Aamport. The gnats and gnus document preparation system. *G-Animal's Journal*, 41(7):73+, July 1986. This is a full ARTICLE entry.