Tiny trainable instruments

by

Aarón Montoya-Moraga

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

Submitted to the Program of Media Arts and Sciences
in partial fulfillment of the requirements for the degree of

Master of Science in Media Arts and Sciences

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

July 2021

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

Tiny trainable instruments

by

Aarón Montoya-Moraga

Submitted to the Program of Media Arts and Sciences
on July 2021, in partial fulfillment of the
requirements for the degree of
Master of Science in Media Arts and Sciences

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

Contents

List of Figures

List of Tables

Chapter 1

Introduction

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam quis sollicitudin metus. Quisque quam ex, tincidunt et porttitor quis, tincidunt faucibus quam. Nulla facilisi. Nam a libero posuere, mattis leo ac, ultrices est. Nullam auctor lacus eu metus venenatis, gravida consectetur felis laoreet. Nam non ante felis. Maecenas id dignissim turpis, eget pulvinar nisl. Cras nec mauris feugiat, aliquam elit ac, blandit ex [1].

1.1 Section sample 1

Ut hendrerit risus egestas, sollicitudin mauris sit amet, fermentum ipsum. Donec vulputate enim in justo pellentesque rhoncus. Nunc a dui condimentum, egestas ipsum eu, fermentum enim. Duis condimentum iaculis luctus. Nam sodales pellentesque luctus. Aenean tristique ante mattis tellus tincidunt, vitae mattis nunc tristique. Ut nec mattis ante, eu sodales ex.

1.2 Section sample 2

Sed vel lectus ut dui tempor molestie. Suspendisse blandit sapien posuere quam tempor lobortis. Duis sollicitudin tincidunt dui, at aliquam lorem dictum sit amet. Aenean congue nibh lectus, ut faucibus turpis facilisis quis. Ut aliquet magna at plac-

erat ultricies. Mauris convallis, risus efficitur gravida dapibus, lacus lorem malesuada ligula, eget porta diam felis non turpis. Nulla sed sem finibus, vehicula quam at, vulputate tellus[1]

1.2.1 Subsection sample

Pellentesque ac leo eget lorem vulputate mattis eu a nisl. Duis elit erat, consectetur vulputate ullamcorper a, finibus quis turpis. Vivamus tincidunt dui id purus bibendum malesuada. Fusce accumsan, ipsum quis feugiat sodales, enim est aliquet leo, ut ornare justo mauris quis ex. Sed eros magna, suscipit et blandit non, pretium id felis. Praesent a vehicula tortor. Donec blandit dolor a ipsum sodales, eget aliquet nisl fermentum.

1. Item 1.
2. Item 2.
3. Item 3.

1.2.2 Another subsection sample

Sed quis dapibus libero. Curabitur id finibus nulla, sed semper felis. Proin dapibus nulla interdum, bibendum tortor et, blandit sapien. Etiam pretium tristique tortor non lacinia. Aliquam dapibus turpis lorem, sit amet porta ex dignissim vitae. In neque felis, sagittis sed ullamcorper lacinia, lobortis ut turpis. Nam quis aliquet justo. Nam eros mi, aliquam vel massa ac, ornare dignissim erat. This is done by using some combination of

$$\begin{aligned} a_i &= a_j + a_k \\ a_i &= 2a_j + a_k \\ a_i &= 4a_j + a_k \\ a_i &= 8a_j + a_k \end{aligned}$$

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

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

Chapter 2

Background

Chapter 3

Early experiments

Chapter 4

Tiny trainable instruments

Chapter 5

Project evaluation

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

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.