

# Tiny trainable instruments

by

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Submitted to the Program of 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<sup>1</sup>

#### 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

$$a_i = a_j + a_k$$

$$a_i = 4a_j + a_k$$

$$a_i = a_j \ll mshift$$

---

<sup>1</sup>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

### 2.3 Machine learning

### 2.4 Digital rights





# Chapter 3

## Early experiments

### 3.1 Microcontrollers



# Chapter 4

## Tiny trainable instruments

### 4.1 Design principles

1. Cheap
2. Privacy

### 4.2 Technology



# 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





# 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.