

**PROPOSAL:  
HUMAN GUIDED ITERATIVE TRAINING OF  
DYNAMIC MOTOR SKILLS**

A Thesis Proposal  
Presented to  
The Academic Faculty

by

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy in the  
School of Computer Science

Georgia Institute of Technology  
April 2014

**PROPOSAL:  
HUMAN GUIDED ITERATIVE TRAINING OF  
DYNAMIC MOTOR SKILLS**

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Date Approved: 1 July 2010

## SUMMARY

We propose a human-in-the-loop (HITL) system to develop dynamic controllers for virtual characters under the guidance of a human coach. The user only needs to provide a primitive initial controller and high-level, human-readable instructions as if coaching a human trainee. The virtual character interprets the provided instructions, accumulate the knowledge from the human coach, and iteratively improves its motor skills by optimizing control parameters. To facilitate the mapping between high-level instructions and control variables, we introduce a new representation of motor skills, the “motor tree” which hierarchically organizes the skills from the low-level motions to the complex ones. The hierarchical structure enables flexible re-assembly and efficient re-optimization by preserving the invariant features of motor skills. Further, the optimization process is accelerated by several techniques such as utilizing the failed previous trials or exploiting the idling time of optimizer. With the propose framework, the human coach can design complex dynamic controller for virtual characters intuitively and interactively.

# CHAPTER I

## INTRODUCTION

Every dissertation should have an introduction. You might not realize it, but the introduction should introduce the concepts, background, and goals of the dissertation.

### ***1.1 Structure***

haha

## CHAPTER II

### ITERATIVE CONTROLLER DESIGN

Resembles learning by demonstration,

#### ***2.1 System Overview***

coaching and training

#### ***2.2 Controller***

Our controller produces a torque

#### ***2.3 Instruction***

our instruction are following:

## CHAPTER III

### TIMELINE FOR PROPOSED RESEARCH

- 2014, Apr: present proposal to committee
- 2014, Apr - May: setup a virtual/real robot
- 2014, Sep: submit the first part to ICRA
- 2014, Sep - Oct: re-formulate the research problem
- 2015, Feb: submit the second part to IROS
- 2015, Feb - May : write thesis
- 2015, May: defense thesis

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