



How to write a paper




The basics — writing a solid paper
Different communities/Different standards
Common errors






Resources



Raibert's essay
My grammar points
Article on "a" vs. "the"
Bugs in writing





Goals

Clarity


Conciseness

Calling out the contribution — very clearly






Sections



Abstract
Introduction
Background
Overview
Method Sections 1-N
Results
Discussion
Conclusion



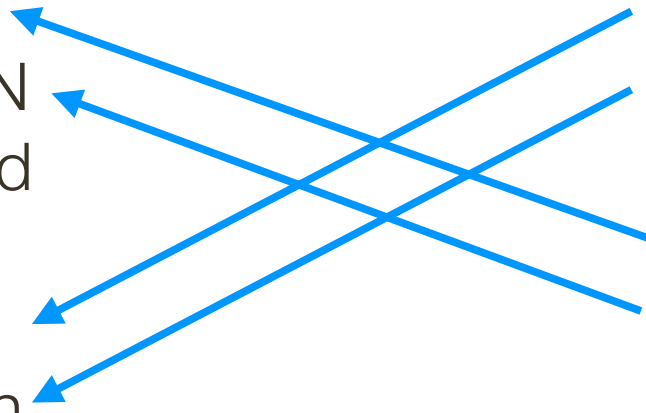
Sections

Order of writing

Overview
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Order in paper

Abstract
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Write an Outline first


Topic sentence for each paragraph for the whole paper or a list of points that you want to make in the paper, assigned to sections.
Sketch out all the figures

What are the contributions/key idea?


What is the graph that would convince me that that is true?



Title



Convey what the paper is about
Branding from a catchy title
Should turn up in a search of keywords





Abstract Introduction

Motivation: why did you do this work?

Method: What did you do? (key idea)

Background: Briefly situate work

Results: How demonstrated?

Discussion: Evaluation



Abstract

Designing a unified framework for simulating multiple human behaviors has proven very difficult. In this paper, we present an approach for control system design that can generate animations that closely resemble a diverse set of captured reference motions: walking, running, and gymnastic behaviors. We achieve this generalization with a balancing strategy that relies on an enhanced inverted pendulum model, which we call the momentum-mapped inverted pendulum model (MMIPM). Unlike a traditional inverted pendulum model, this model handles flight phases when no foot is on the ground and takes into account the momentum of the system. We analyze the reference motion in a pre-processing step to compute the motion of the MMIPM. At run-time, the controller uses the current estimate of the pendulum state and a predicted pendulum trajectory to create a character that dynamically balances, changes speed, makes turns, jumps and performs a backflip. The initial controller can be optimized to further improve the motion quality. We demonstrate the power of this approach by generating controllers that produce natural looking animations and are robust to changes in the environment, a variety of user commands and external disturbances.

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Designing a unified framework for simulating multiple human behaviors has proven very difficult. In this paper, we present an approach to control system design that can generate animations that closely resemble a diverse set of captured reference motions including walking, running, and gymnastic behaviors. We achieve this generalization with a balancing strategy that relies on an enhanced inverted pendulum model, which we call the momentum-mapped inverted pendulum model (MMIPM). Unlike a traditional inverted pendulum model, this model handles flight phases when no foot is on the ground and takes into account the momentum of the system. We analyze the reference motion in a pre-processing step to compute the motion of the MMIPM. At run-time, the controller uses the current estimate of the pendulum state and a predicted pendulum trajectory to create a character that dynamically balances, changes speed, makes turns, jumps and performs a backflip. The initial controller can be optimized to further improve the motion quality. We demonstrate the power of this approach by generating controllers that produce natural looking animations and are robust to changes in the environment, a variety of user commands and external disturbances.

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Introduction

Motivation: why did you do this work?
Motivation: why is this a hard problem?
Method: What did you do? (key idea)
Background: Briefly situate work
Results: How demonstrated?
Discussion: Evaluation
Discussion: Limitations
Contributions






Background



Opening paragraph on topics to be covered
Series of paragraphs on each topic
Relate to your work
Do not slash and burn
Make sure that you actually understand the work (and have read the paper!).



Background

Opening paragraph on topics to be covered

Our work builds on control algorithms developed in both robotics and computer graphics. In this section, we cover inverted pendulum models for both tracking and control with a particular emphasis on those that have been extended to include additional dynamic terms such as momentum.


Inverted Pendulum Models for tracking
Inverted Pendulum Models for control
Extended Inverted Pendulum Models



Background

Relate to your work but do not restate what you did repeatedly

X demonstrated that an IPM could be used effectively to do ... We build on their work by adding a momentum term to the calculation of the IPM, thus enabling a much wider variety of behaviors.



Background

Do not slash and burn

X were the first to do

X created the first proof of concept that ...

In an impressive piece of work given the compute power available at the time, X...

NOT:

X's work is limited in that...

Although unsupported in the paper, X claimed that...



Overview

Outline of method in logical order.

Sentences or paragraphs should correspond directly to the sections to come in Methods.

Roughly one paragraph for each sentence about the method in the intro.





Method

Follow order from Overview

Be clear about what is new and what is from the literature (dynamics, for example).





Results

If the material is better represented in video, just put a few figures into the paper

Make all your figures first and then just describe them

Do make sure that you list all the test cases that you have.





Evaluation

Try to hold yourself to the same standard that we have used in the debates!

Make sure that you believe your stats are good measures

Compare to previous publications where possible using their code or their input files






Discussion

First paragraph can be a summary


Call out limitations here

Try to step back and reflect on the work


- worked on well-composed images only
 - optimization would be intractable for long sequences
- 



Conclusion



Yet another summary of the paper
Make sure that it differs from the abstract
If it doesn't add value, you can skip it






Figures and Video

Put in the time to make them consistent and legible (not just cut/paste from Matlab)

A video with a good explanation of the algorithm can really add to the paper





Different **Communities**

CV and systems: related work sometimes at the end

CV: code on the web is almost required

Robotics: papers are much shorter and more incremental

SIGGRAPH: always have a teaser image





Common **Errors**

Read your prose aloud
Reviewer management

Spell check!

“This” should always be followed by a noun

Proper use of articles

Since vs. because

Forms of the verb “to be” don’t get colons

Sentences should be complete without the references

