Computational Media Research

CMPM 202, W2020

Week 4, Tuesday: Deep Learning Projects

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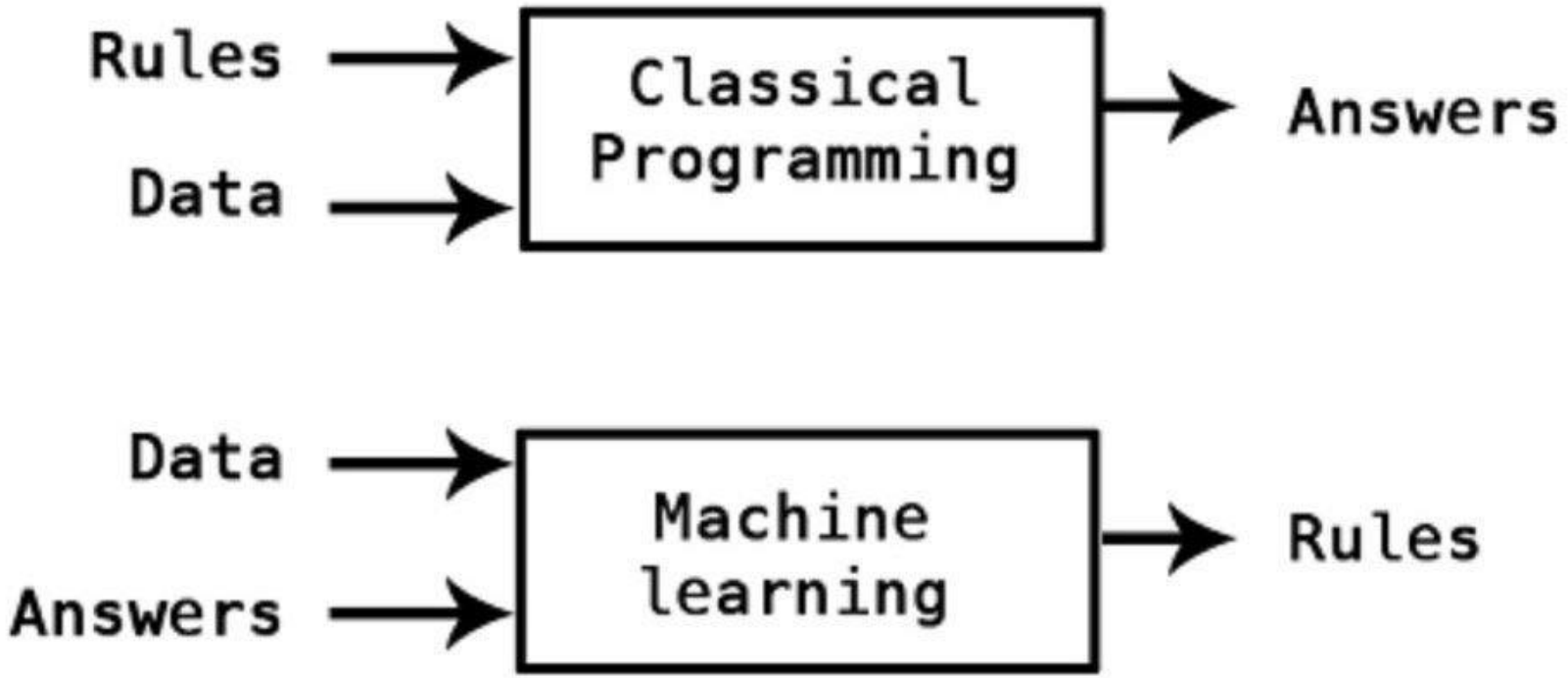
Machine learning

- Basic idea: don't tell the computer what to do, give it lots of data and let it figure it out
- Rather than giving the computer *instructions*, you provide with an extensive *training* session.
- Initial breakthroughs were in classifying data
- Inverse of classification, can be used to infer data from or generate new data with specified features


Rules
Data
Classical Programming
Answers
Data
Answers
Machine learning
Rules

Classification

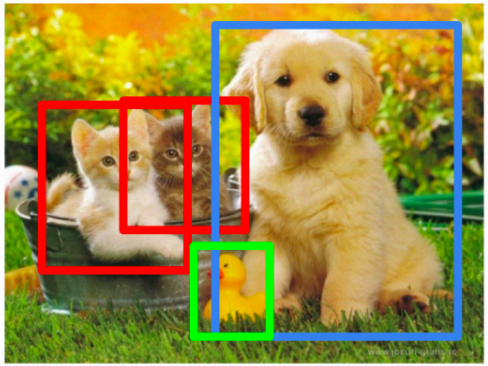
CAT

Classification + Localization

CAT

Single object

Object Detection



CAT, DOG, DUCK

Instance Segmentation

CAT, DOG, DUCK

Multiple objects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www.ambassadordublin.com


sky-other
tree
sky-other
sky-other
house
tree
elephant
fence
person
bush
grass
wall-concrete
stone
sand
umbrella
light
tree
building-other
car
person
person
car
textile-other
sky-other
clouds
structural-other
sky-other
mountain
sea
person
sand
textile-other
chair
bottle
platform

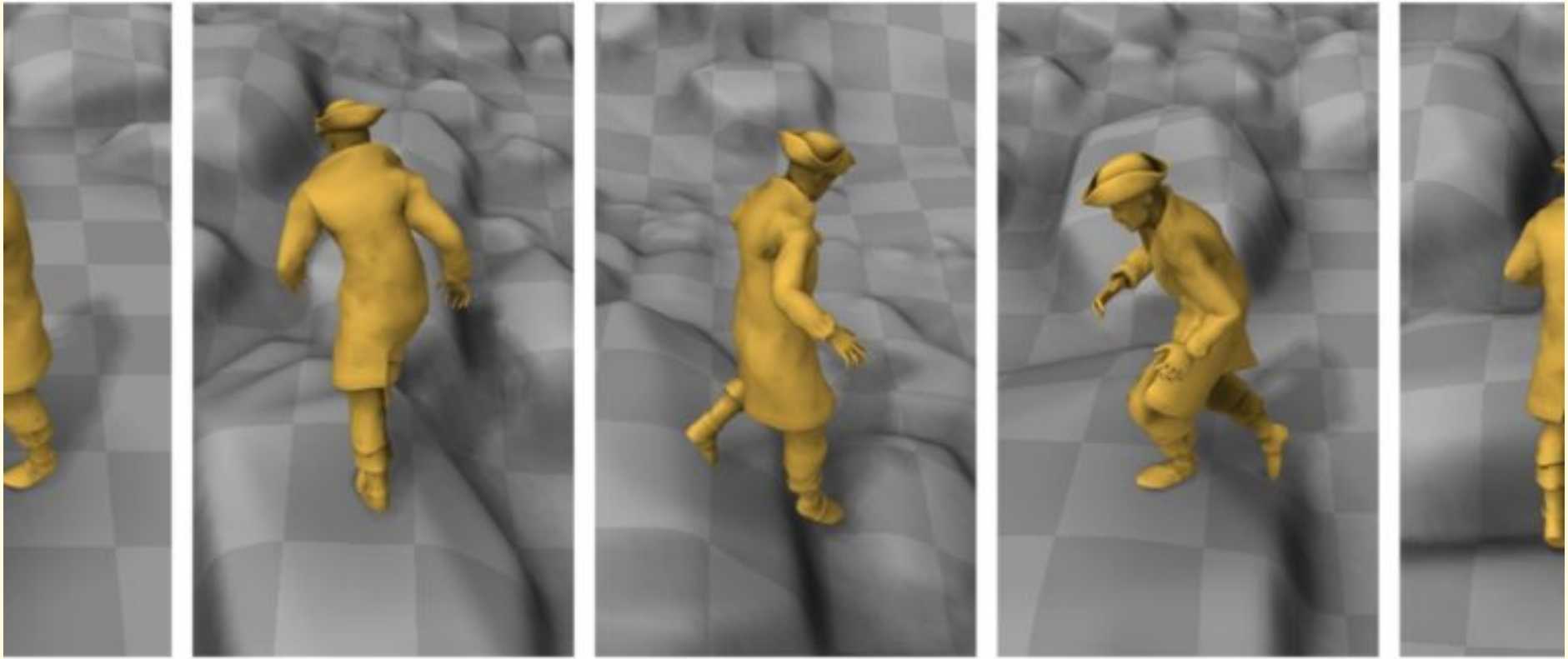

1.00

Generating motion

- Generating realistic motion in new environments

- Generating appropriate motion planning for specialized environments (eg, rockclimbing, soccer, fighting games)

- Generating crowd simulations



Generating fluid motion

- Learns to generate fine details in 3D fluid flows (explosions, water, smoke, etc) from low-resolution inputs.
- Speeds up computation, enables visual effects creators to paint high quality water or smoke quickly
  - https://ge.in.tum.de/publications/tempogan/

Deep fakes

- Generating realistic video from audio/text
  - AI newscaster
  - Jordan Peele -> Obama
  - https://grail.cs.washington.edu/projects/AudioToObama/
- Face2Face real-time face swapping
  - http://niessnerlab.org/projects/thies2016face.html
- Text-based Editing of Talking-head Video
  - https://www.ohadf.com/projects/text-based-editing/
- Technology exacerbates our current inability to separate facts from opinions, to think critically, to identify propaganda, etc.


Sogou搜狗
AI ANCHOR


She sells ~~seashells~~ ice cream by the sea shore

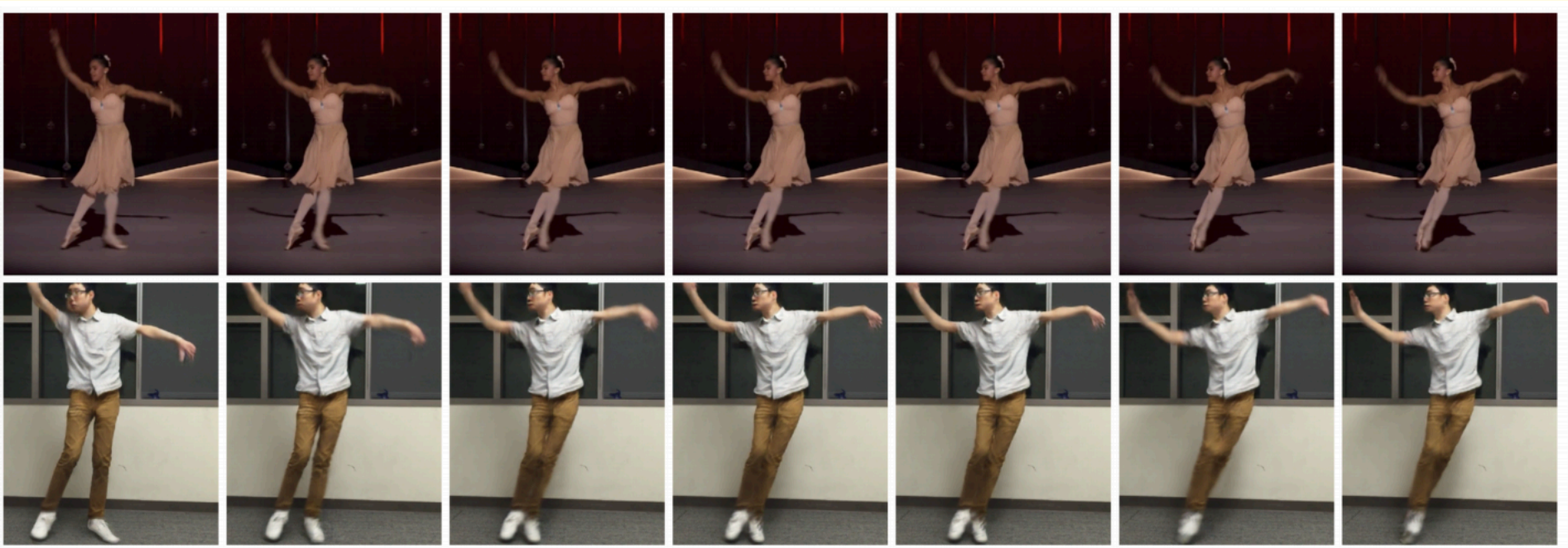


Figure 1: **"Do as I Do" motion transfer:** given a YouTube clip of a ballerina (top), and a video of a graduate student performing various motions, our method transfers the ballerina's performance onto the student (bottom). Video: `https://youtu.be/mSaIrz8lM1U`

Choreographic machine learning?
Cinematic machine learning?

- So far, ML is less successful at generating effective literary or dramatic experiences
- Why? Dance/Narrative/Cinema is inherently more complex, and we haven't figured out how to train a network to learn what makes an effective time-based art.
- Cinema and dance, for example, requires lots of elements simultaneously: lighting, editing, acting, multiple people/agents and plots, genre expectation, etc.
- Assumes contextual information which we ourselves are only just beginning to describe effectively and thoroughly.

Resolution

However, these technologies are still in their infancy, and no doubt they will continue to increase in sophistication:

- The training data will become more comprehensive.
- The sensor resolution will become more granular.
- The computational processing will become more efficient and will work on larger datasets.

Resolution

The technology already exists to replicate images and videos, and is rapidly expanding to other media data.

What happens to art when representations can be instantly replicated? To performance?

Resolution

Does the artist's role change when their work can be learned and mimicked?

What are the boundaries between what can and can't be learned? Is it because we haven't yet figured out how to learn it? Or does it resist being learned?

Resolution

There will always necessarily be data that isn't included, features that aren't learned, contexts that aren't encoded.

- What interpretations are made *likely* or made *impossible* because of technology?
- Can we develop creative tools that utilize these technologies creatively?
- What data should we collect to enable meaningful human-machine conversations?