Techniques for Creating Animation

Keyframing

Procedural Animation

Data-driven Animation

Physical Simulation
Keyframing: animation

A basic walk cycle tutorial:

https://design.tutsplus.com/tutorials/animation-for-beginners-how-to-animate-a-character-walking--cms-25536
3D Keyframing: setup

Model, rig, and animate your character in Maya

http://www.youtube.com/watch?v=rWKLPDfamm0
Keyframing = Traditional Animation

Snow White
https://www.youtube.com/watch?v=1TtQ-CTMIEI

Toy Story
https://www.youtube.com/watch?v=wmiIUN-7qhE
Keyframing = Traditional Animation?

Stop Motion
  Isle of Dogs
  Kubo and the two strings

3D Animation
  Coco and cloth simulation

BoxTrolls

https://www.youtube.com/watch?v=xCBOiaJEoFw
https://www.youtube.com/watch?v=Vhpq7-c911A

https://www.youtube.com/watch?v=NCAuK_gBStE&feature=emb_logo
Keyframing = Traditional Animation?

https://collider.com/best-animated-movies-2020/
Principles of Traditional Animation
[Lasseter, SIGGRAPH 1987]

• Stylistic conventions followed by Disney’s animators and others

• From experience built up over many years
  – Squash and stretch -- use distortions to convey flexibility
  – Timing -- speed conveys mass, personality
  – Anticipation -- prepare the audience for an action
  – Followthrough and overlapping action -- continuity with next action
  – Slow in and out -- speed of transitions conveys subtleties
  – Arcs -- motion is usually curved
  – Exaggeration -- emphasize emotional content
  – Secondary Action -- motion occurring as a consequence
  – Appeal -- audience must enjoy watching it
Procedural Animation

http://www.massivesoftware.com/

http://www.animationboss.net/behind-scenes-marvels-black-panther-vfx/
Physics-based Animation

http://physbam.stanford.edu/~fedkiw/
Data-driven Animation

http://graphics.cs.cmu.edu/
Motion Capture Lab
Wean 1334

https://www.youtube.com/watch?v=1rbgZNBGA1g

http://graphics.cs.cmu.edu/
We can capture an individual performance

https://www.youtube.com/watch?v=P2_vB7zx_SQ
What about creating autonomous or responsive characters? Motion Graphs (2002)

http://www.cs.wisc.edu/graphics/Gallery/kovar.vol/MoGraphs/

Lucas Kovar (U. Wisconsin / ILM) with Michael Gleicher
What about creating autonomous or responsive characters? Learning (2020)

Character Controllers using Motion VAEs

HUNG YU LING, University of British Columbia, Canada
FABIO ZINNO, Electronic Arts Vancouver, Canada
GEORGE CHENG, Electronic Arts Vancouver, Canada
MICHEIL VAN DE PANNE, University of British Columbia, Canada

Fig. 1. Given example data, we learn an autoregressive conditional variational autoencoder that predicts the next pose one frame at a time. A variety of task-specific control policies can then be learned on top of this model.

https://www.cs.ubc.ca/~hyuling/projects/mvae/
Dense Body Capture

Laser Range Scanning
Dense Marker Capture

Sang Il Park (CMU / Sejong University)  
with Jessica Hodgins
To be continued on Monday 😊
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