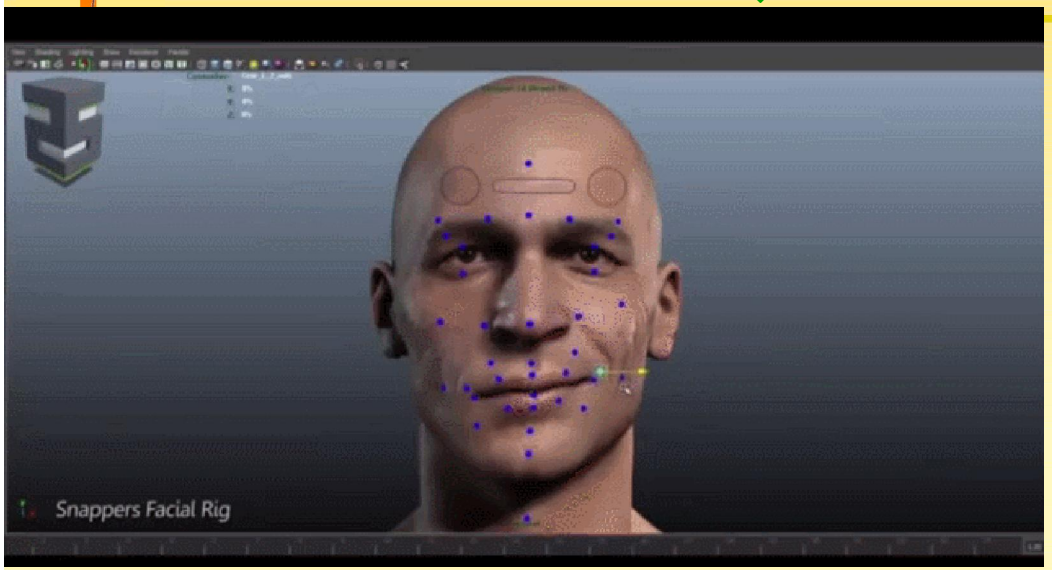
پویانمایی کامپیوتری
موارد پیشرفته و روند آتی

سید امیر هادی مینوفام
گروه کامپیوتر
دانشکده فنی و مهندسی

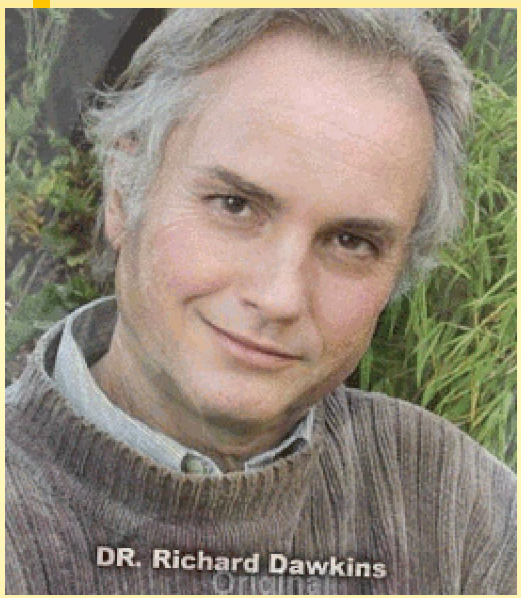
فهرست مطالب

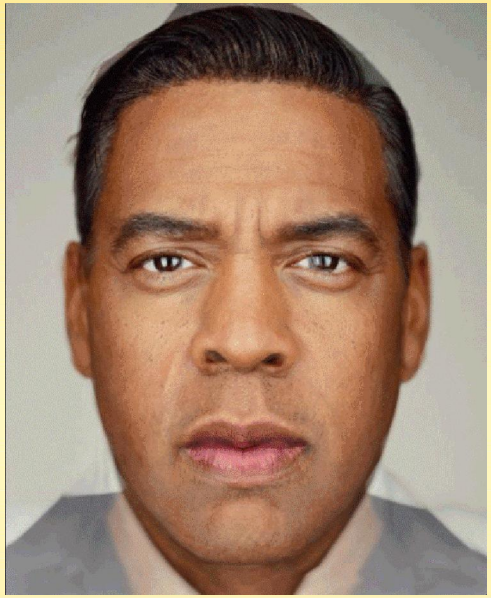


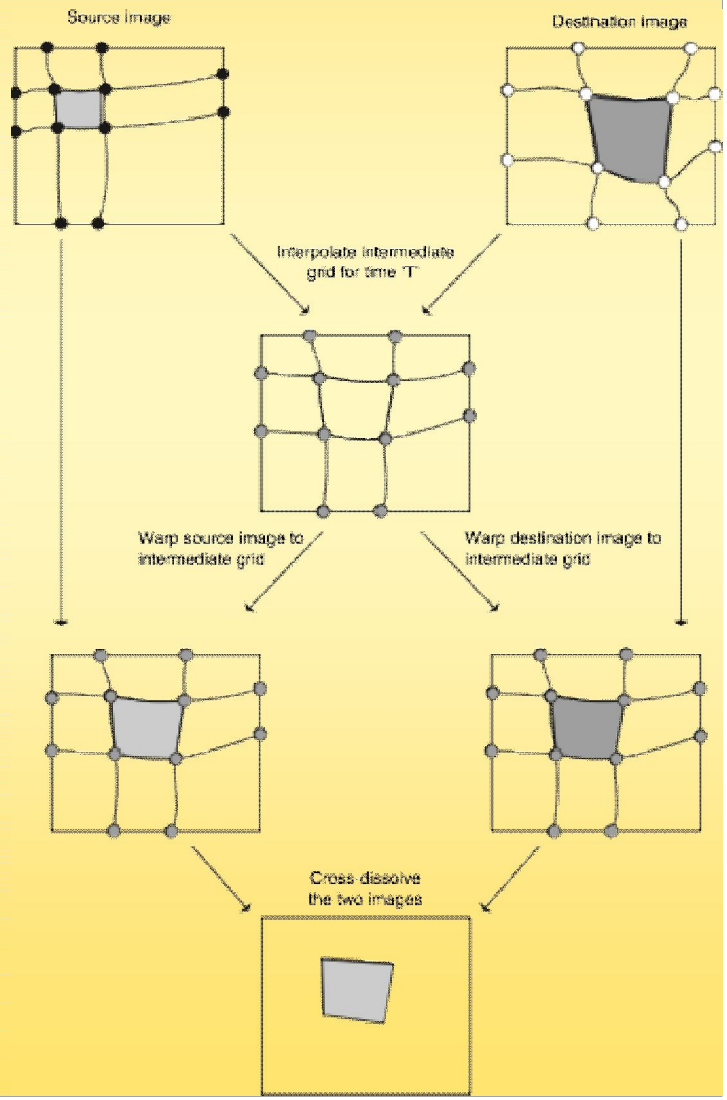
- دگرگونی تصاویر
- انسان مجازی
- لباس
- مدلسازی چهره
- همگام سازی لب ها
- انیمیشن رفتاری
- جمعیت

دگرگونی تصاویر

- Image morphing







3D Virtual Humans

Computer Games

Virtual Reality

Avatars

Films

Education

3D Virtual Humans

Realistic - physical simulation or motion capture

Controllable - real-time by using motion databases

Autonomous - <condition>-<action> rule based activity

Cost effective - hundreds, thousands of 'extras' possible

Suspendable physics - synthetic stunt doubles

Safe - can simulate dangerous activities

Virtual Human Representation

Modeling body to support movement

Special purpose programming for common body motions:
reaching, walking, etc.

Physically based coverings and accessories:
clothing and hair

Cartoons

Final Fantasy (movie)

Clothes

Constant collisions & contact

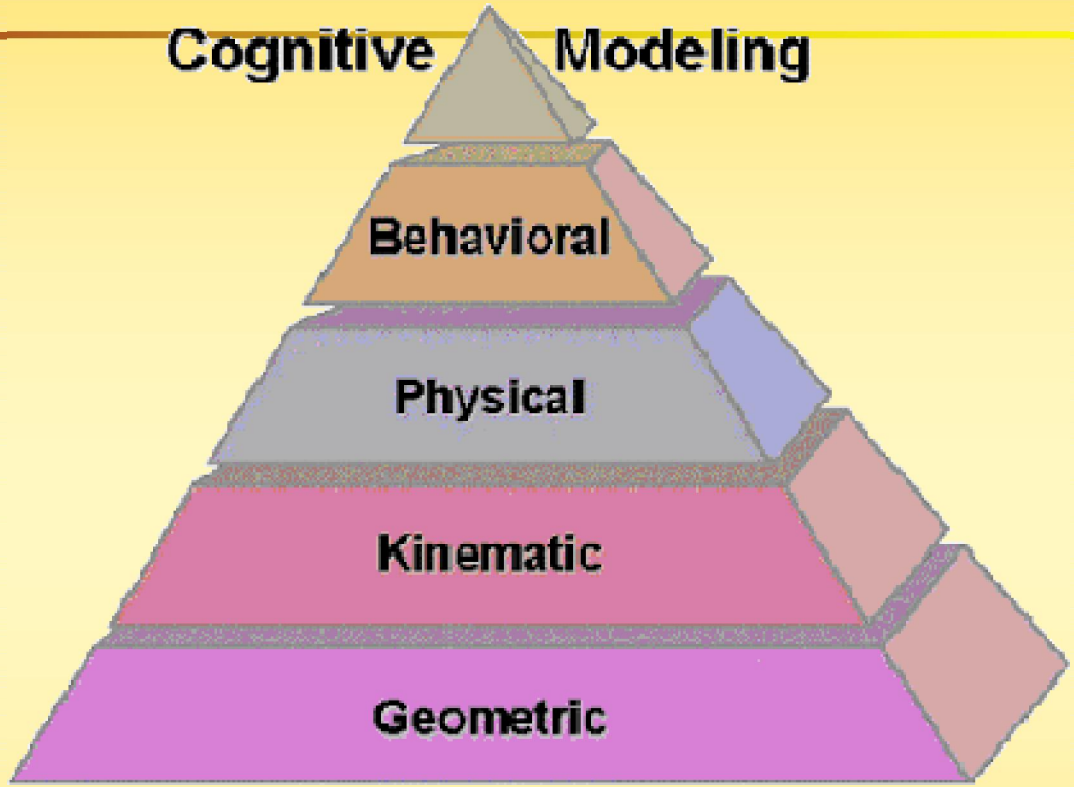
High resolution to get wrinkles, folds, fit

Often non-uniform

Issues (accuracy v. computation):
integration technique
collision detection
collision response

Clothes: Huamin Wang

(a) Gray Interlock (b) Pink Ribbon Brown (c) Navy Sparkle Sweat (d) 11oz Black Denim (e) White Dots on Black



http://www.gamasutra.com/view/feature/3405/ai_for_games_and_animation_a_.php

Behavioral Animation

Individuals	Groups
Reactive behavior	Aggregate behavior
Intelligent behavior	Crowd behavior
Personality	

Reactive Behavior

If <condition> then <action>

current conditions - usually omniscence

simple action - carried out directly and immediately

problems of scale: conflicting rules

priority selection or ordering

Intelligent Behavior

Autonomous behavior
- 'Self-animated' characters
- Perception & reasoning about environment
- Personality, emotions, dispositions

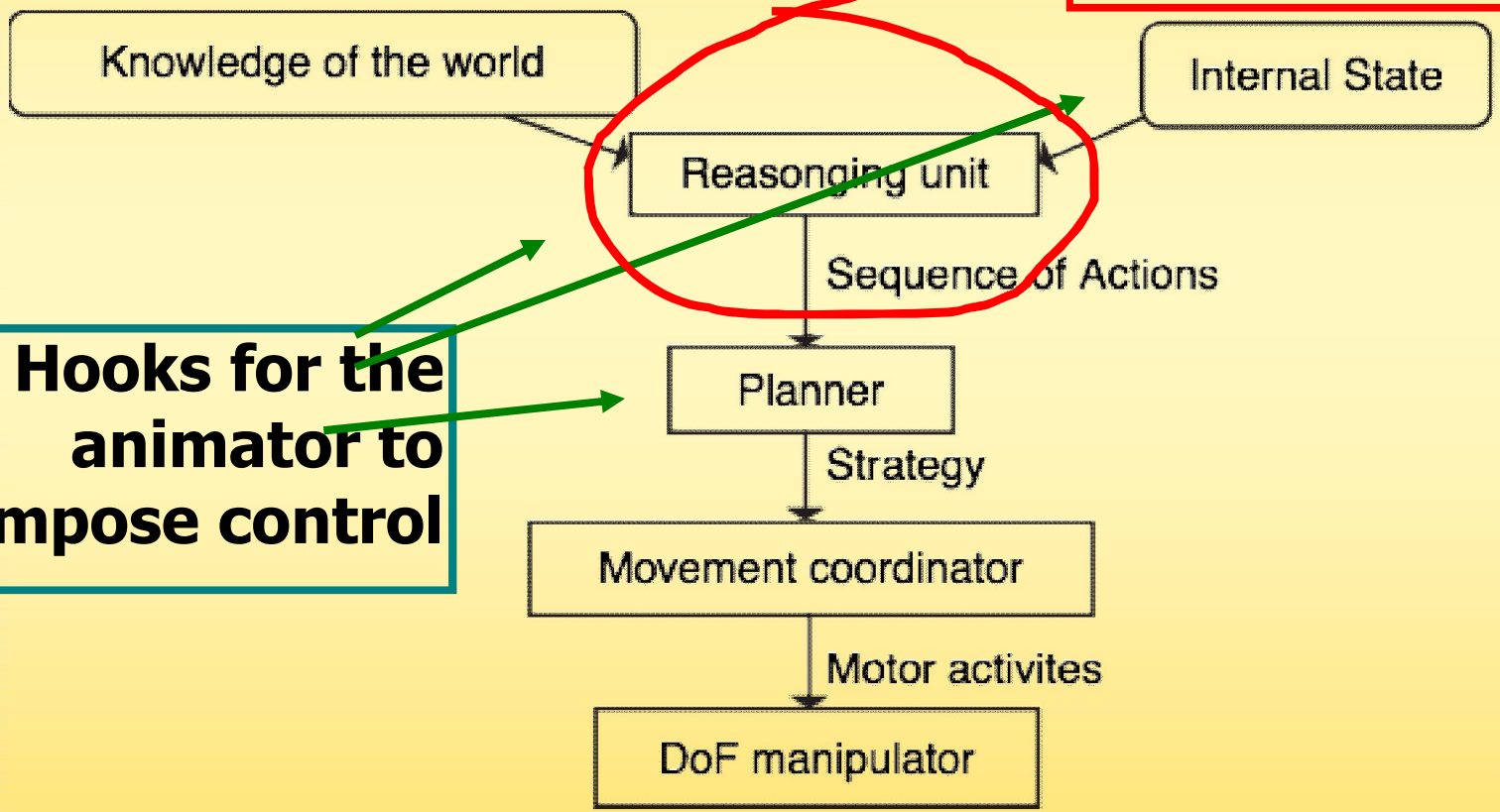
Manifestations of Individuality
- Body Expressions and Gestures

Facial expressions

Speech

Levels of Behavior

Arbitration among competing intentions

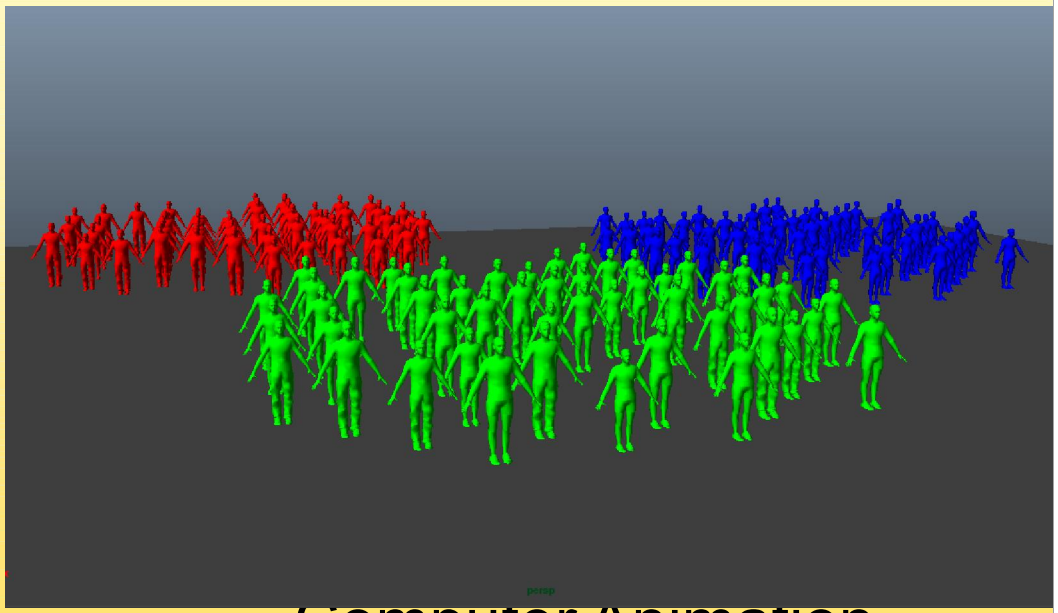


Hooks for the animator to impose control

Crowd Management

Emergent behavior
Statistical behavior v. believable individual behaviors
Homogeneous activity v. Internal structure

For evaluation
Pedestrian traffic simulation
Traffic flow
Emergency response modeling
For entertainment
Background crowds



Crowds

Emergent behavior:
similar to flocking
collision avoidance
'intelligent' paths

From a distance: statistical behavior
nonsensical detailed motion
reasonable visual effect

Internal structure
limited interaction among members
group formation