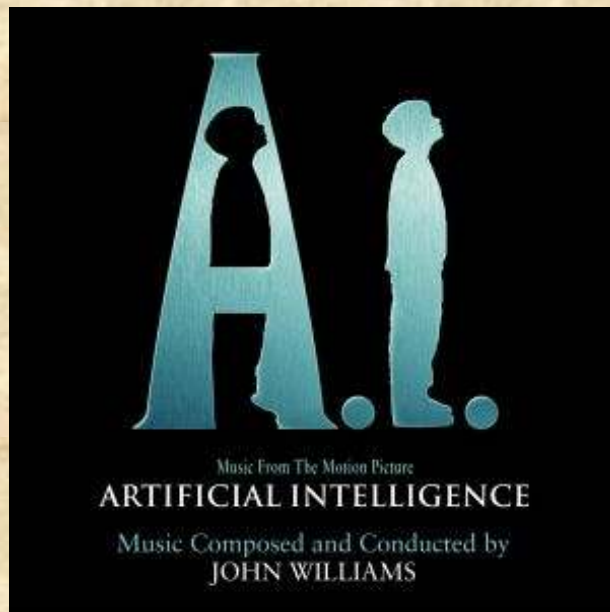


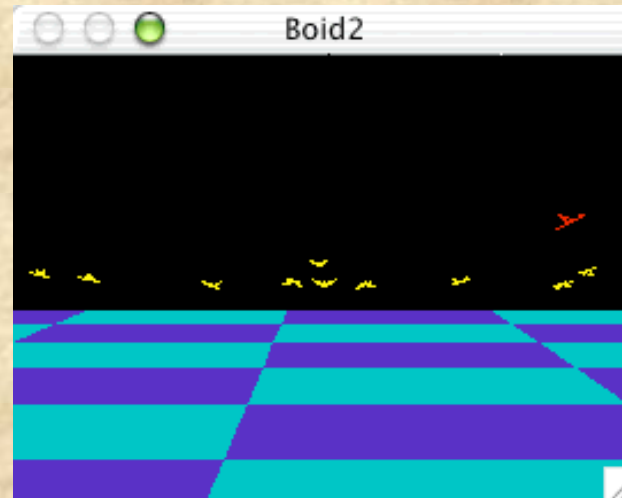
October 2004

A.I. IN MOVIES AND MEDIA

PORTRAYAL AND APPLICATIONS



Ankit Srivastava



Michael Rosiles

Richard Meth



Lingling Tong

MOVIES & TV SHOWS
PORTRAYING
ARTIFICIAL INTELLIGENCE

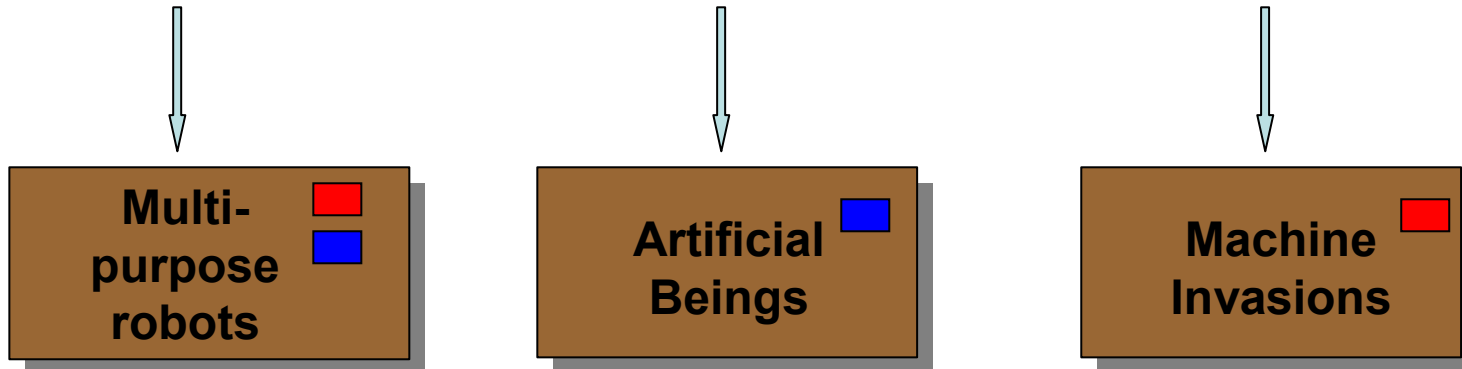
Ankit Srivastava

MOVIES & TV SHOWS



Definition of A.I. from lecture notes

Perception of A.I. in movies & television



MOVIES & TV SHOWS

Sky Captain & WOT

I, Robot

Spiderman

A.I.

Bicentennial Man

The Matrix

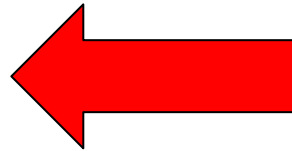
The Terminator

Star Wars

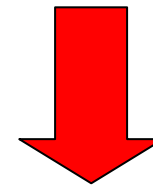
2001: A Space Odyssey



- Robots (Mechanical)
- Robots (Androids)
- Man Vs Machine
- *Brief encounters*



Themes
overlap



Star Trek: TNG

Small Wonder

Robocop

The Jetsons



**And
many
more...**

IN
DETAIL

MOVIES & TV SHOWS

IN
DETAIL



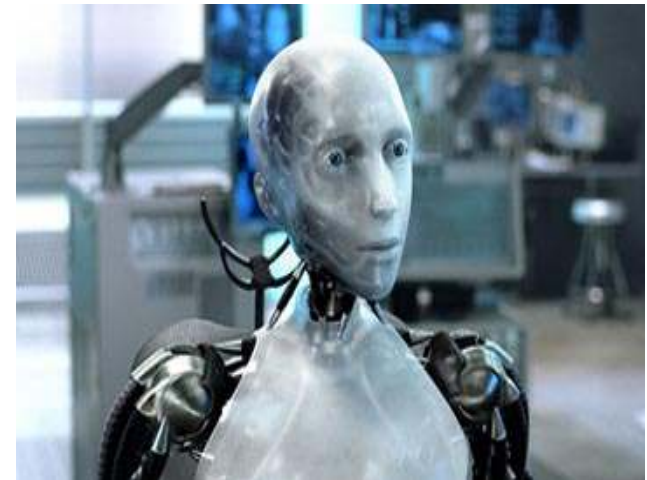
DAVID

HAL



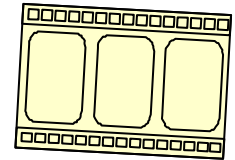
VICKI

SONNY



DAVID & A.I.

David is 11 years old.
He weighs 60 pounds.
He is 4 feet 6 inches tall.
He has brown hair.
His love is real.
But he is not.



[Movie Clips](#)

1. Trailer1
2. Dinner

- ❖ Haley Osment
- ❖ 2001
- ❖ Plot Summary
- ❖ Mecha Child

ML, NLP, KB	Love, Emotions
Motion, Speech	Dreams



HAL 9000 & 2001: A Space Odyssey

Heuristically programmed **AL**gorithmic computer



I can't do that



HAL 9000

- ❖ 1968, Douglas Rain
- ❖ H.A.L., Dr. Chandra
- ❖ Plot summary



Speech, NLP	Lip Reading
Chess	Malevolence

SONNY & I, ROBOT



Logical Reasoning,
Speech, Motion, NLP,
ML, KB

Dreams, Evolution, Revolt

Movie Clips

1. Lanning's Lab
2. This is my Dream

❖ Plot summary

❖ Dr. Lanning's theory of evolution

- ❑ A robot may not injure a human being, or, through inaction, allow a human being to come to harm.
- ❑ A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
- ❑ A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

VICKI & SMALL WONDER



[Small Wonder
Theme Music](#)



[Robotic
Monotone](#)

**She's fantastic, made of plastic,
Microchips here and there.**

- ❖ Hit TV Series (1985-89)
- ❖ Plot Summary
- ❖ Voice Input Child Identificant

ML	Evolution
NLP	Speed & Strength
Speech & Motion	Emotions

ARTIFICIAL INTELLIGENCE APPLICATIONS IN MOVIES

Richard Meth

AUTONOMOUS AGENTS

- An **autonomous agent** is a system situated within and a part of an environment that senses that environment and acts on it, over time, in pursuit of its own agenda and so as to **effect what it senses in the future** (*Franklin and Graesser 1997*).

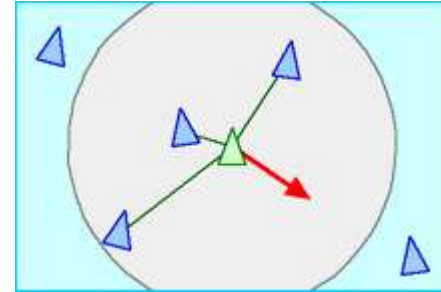
CROWD GENERATION USING BOIDS

"You used to be able to sit on the stoop like a normal person, but not any more, 'cause of da BOIDS. Dirty, lousy, stinkin' BOIDS" – The Producers 1968

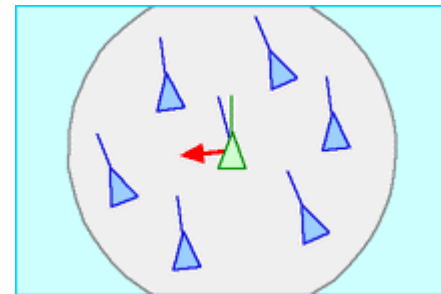
- Created by [Craig Reynolds](#)
- Presented at [ACM SIGGRAPH '87](#)

CROWD GENERATION USING BOIDS - Basic Flocking

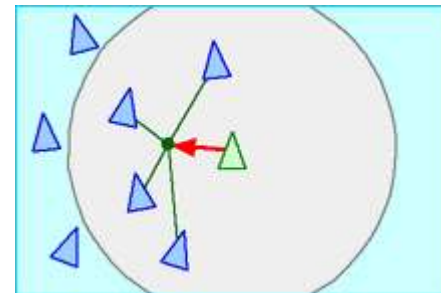
Separation: steer
to avoid crowding
local flockmates



Alignment: steer
towards the
average heading of
local flockmates



Cohesion: steer to
move toward the
average position of
local flockmates



GENERALIZATIONS OF PARTICLE SYSTEMS

- **color**, location, velocity
- **acts** based on "forces"
- used to **simulate** fire, smoke, fireworks, cloth, etc.
- Boids have direction, **interact** with other Boids

Boids contd.

SIMULATED PERCEPTION

Boids perceive a local "neighbor" (i.e. what is near-by)

IMPROMPTU FLOCKING

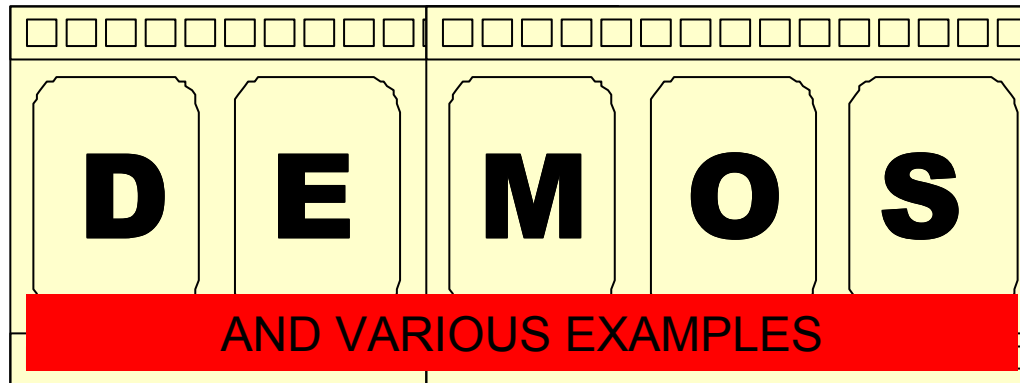
- Two flocks can merge together
- One flock can separate

SCRIPTED FLOCKING

Can direct a flock on a path

AVOIDING ENVIRONMENTAL OBSTACLES

- Boids tend to **normalize** in a sterile environment
 - Time to reach the steady state depends on **damping constant**
 - **Collision avoidance** creates a more realistic flock
 - 2 methods to **obstacle avoidance**
- Obstacles emit a repulsive force that is inversely proportional to distance
- Steer-to-avoid, only consider objects in front and use bounding boxes to steer away from them.



➤ [Stanley and Stella in: "Breaking the Ice"](#) (produced by Reynolds in conjunction with Symbolics and Whitney/Demos Productions)

➤ [Real-time](#) demo

Usage in *Batman Returns* (1992). Penguin flocks and Bat swarms used a modification of the original boids software. First use of flocking in a movie

➤ [Usage in Lion King](#) took 2 years to complete 2 1/2 minute sequence

➤ *Sharkslayer* - large schools of fish

➤ *Star Wars* - large armies

➤ *The Mummy*

➤ *Lord of the Rings*

➤ *Titanic*



MEDIA COVERAGE
OF
ARTIFICIAL INTELLIGENCE

Lingling Tong

A.I. In Media

- Overview:
 - Def: a means of mass communication, such as newspapers, magazines, radio, or television.
 - Source of general perception => influence
 - Things A.I. won't do
 - Try to take over the world
 - Try to kill people
 - Have human emotions
 - Become human
 - Applications

A.I. In News

“SPE: Industry slow to adopt downhole robotics.”

- *Oil & Gas Journal Online*. October 2, 2002
- "Joe Donovan, Intelligent Inspection Corp., Houston, chronicled the oil and gas industry's slow adoption of autonomous downhole robots in his presentation at the 2002 Society of Petroleum Engineers Annual Technical Conference & Exhibition in San Antonio today.
- Currently, his company's robot, called MicroRig, is undergoing reliability testing.
- He said the untethered, 30 ft long, 150 lb, 2-in. OD tractor tool will be capable of carrying various tools downhole and working without guidance from the surface because of the artificial intelligence built into the robot.
- Donovan attributed part of the failure of a past attempt to introduce such a tool to cute naming concepts that were foreign to the oil and gas industry.
- The 'Bore Rat,' introduced in 1997 came with such terms as 'missions' instead of runs in the hole.
- These terms had a negative connotation in the market, Donovan said."

A.I. In News

“The next revolution in household chores.”

- *Boston Herald*. September 29, 2002
- "Great minds from MIT's Artificial Intelligence Lab designed Roomba because they were aware of those 'Jetsons' and 'Star Wars' stereotypes and wanted a more user-friendly robot.
- The robotics engineers believe if affordable robots are going to go mainstream, the creatures will have to do housework. ...
- When iRobot did focus-group testing in Chicago and the Boston area, groups of soccer moms and young parents were asked: 'Do you want a robot in your home to help with cleaning?'
- Initially, participants were appalled by the idea.
- 'They were envisioning a little android who would work the vacuum behind their backs,' [Helen] Greiner said.
- 'When we showed them (Roomba), they had an epiphany: 'Oh my gosh, that will save me time.' ' ...
- The biggest stumbling block to robotic success might be public perception, not the reality.
- Potential buyers must be convinced the bots are user-friendly.
- My dog must be convinced they don't bite."

A.I. In News

“A 21st-century golem.”

- *The Prague Post*. October 2, 2002
- Golem: In Jewish folklore, an artificially created human supernaturally endowed with life.
- "In his essay 'The Idea of the Golem,' Gershom Scholem writes, 'Golem-making is dangerous; like all major creation it endangers the life of the creator -- the source of danger, however, is not the golem ... but the man himself.'
- Argentine Ambassador Juan Eduardo Fleming had these words in mind when conceiving Project Golem 2002/5763, named after the respective years in the Gregorian and Jewish calendars.
- 'The project's goal,' he says, 'is to rescue, revive and project the values enshrined in golem symbolism and tradition' -- a tradition that began in biblical times and has made its way through to the present day.
- 'Today's Golem,' says Fleming, 'means artificial intelligence, robots, cloning, the Internet, computers.'
- And as Scholem indicates, these are not evil or destructive on their own but have the potential to become so based on what man, the creator, instills in them."

A.I. In News

“Man vs. Machine.”

- *ABC News*. October 1, 2002
- "There is no question that technology has made the workplace safer and more efficient.
- Today a robot can do the jobs of 10 workers.
- Steel mills are less dangerous.
- Sorting machines have made the movement of goods more efficient.
- New cars are turned out in much quicker fashion -- all because of technological advances.
- Organized labor understands that, but, like [Dexter] Cato, feels left out of the discussion.
- 'We ought to have a say in [the use of technologies],' said Ron Blackwell of the AFL-CIO. 'We ought be able to shape whether they are going to be technologies that create jobs and help everyone.' ...
- Jeremy Rifkin, of the Foundation on Economic Trends, suggests the problems are deeper. ...
- 'The bottom line is that by the mid decades of the 21st century, we're going to replace most workers with intelligent technology.'
- All of this could end years of labor drudgery, of dead end jobs, and dissatisfied workers, Rifkin said, 'but we have to rethink what a human being does and how we can get income to him once we replace him with robotics and technology.'"

A.I. In News

“I am Japan, Hear Me Roar.”

- *The New York Times*. October 6, 2002
- "The city-crunching monster has been a lightning rod for social commentary ever since 1954, when the first Godzilla reflected the country's fears of the nuclear age.
- Nearly 50 years later, the 26th film in the series is set for release in December, and although the producers are not talking, it is already clear that the rise of robotics will be among the issues Godzilla will face. ...
- In the decade since the last Mechagodzilla, Japanese companies like Sony and Honda have released ever-more sophisticated robots, with more fluid motion, realistic voices and sensory detectors.
- No longer consigned to the factory floor, robots have begun to penetrate the lives of ordinary Japanese, whether as playthings or task-oriented assistants.
- In response, the director of the newest movie has ditched Mechagodzilla's lumbering stride and rigid body movements, creating something that is less a machine than a sinister and nimble artificial intelligence.
- 'It is now realistic to believe that humans could build a robot to fight Godzilla,' said Shogo Tomiyama, the producer.
- Whether or not that would be a good thing is a question the movie will address.
- The Japanese are fascinated with robotics and are far more comfortable incorporating machinery into their daily lives than Westerners are."

ARTIFICIAL INTELLIGENCE
APPLICATIONS
IN MEDIA

Michael Rosiles

A.I. Media Applications

Arachne: Weaving the Telephone Network at NYNEX

- Arachne: expert system that automates interoffice facilities (IOF) network planning in New England Telephone and New York Telephone, NYNEX subsidiaries.
- 5yr forecast of expected IOF network demands with specific info about each central office (node with switching equipment), data about existing network, and expert planning rules.
- Resultant plan met forecasted demand, was economically added/disconnected transmission facilities, created a schedule to implement changes, designed routing services and necessary equipment.
- IOF network viewed as digital services hierarchy; planning required sufficient capacity at each level.
- Global optimization.

A.I. Media Applications

Times: An Expert System for Media Planning

- Based on all client's data (accounts, commercials, formats, marketing, targets, and periods) and television databases (audiences, programs, price lists, and so on)
- Rule-based skeleton.
- Successfully used since October 1988 by Mediatop.
- Why: activity of media planning
 - Television planning
 - Information processed
 - Software tools
 - Expertise
 - AI methodology
- Architecture
 - Input data
 - Screens analysis
 - Strategy & tactics

A.I. Media Applications

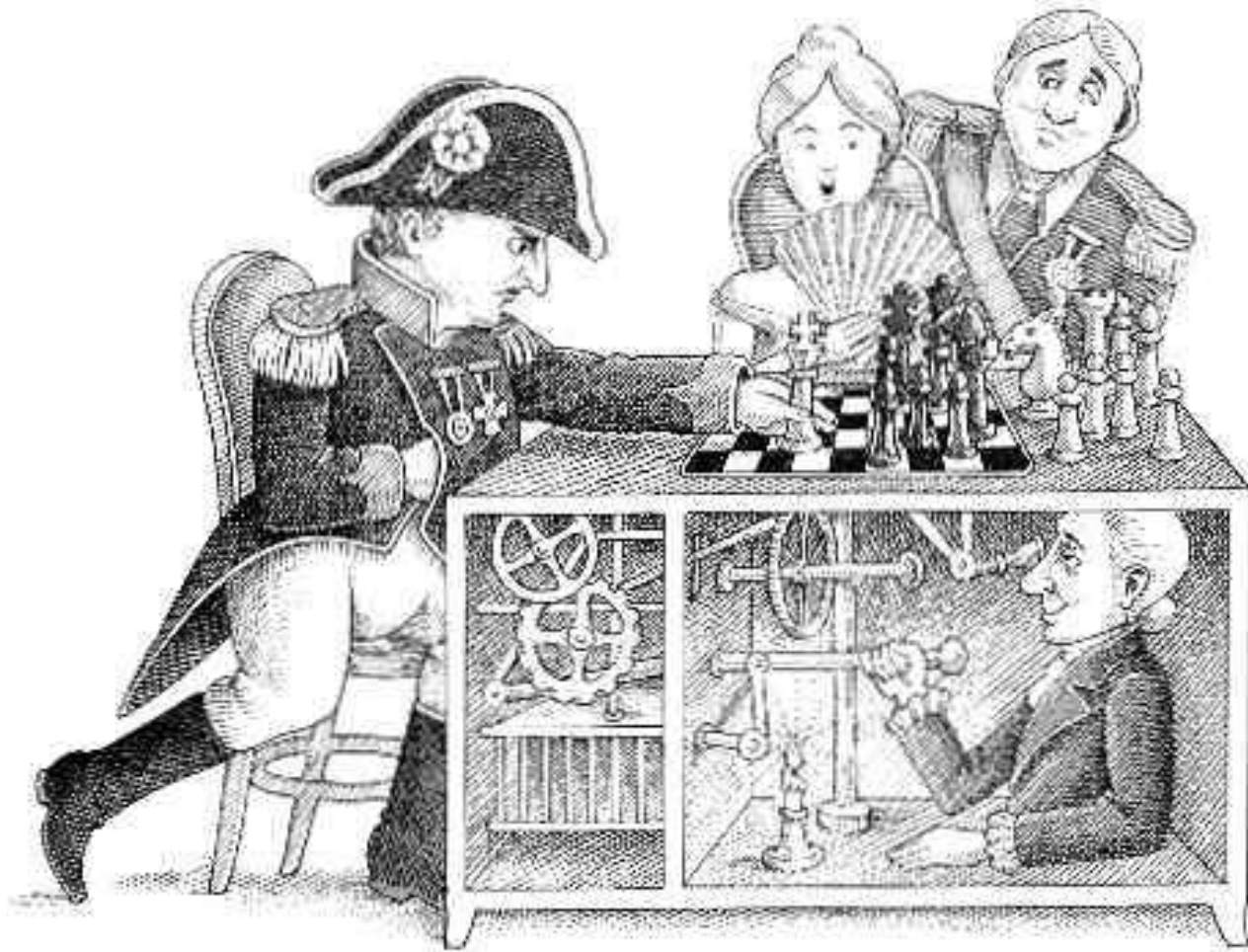
Wolfgang: Musical Composition by Emotional Computation (1/2)

- Two foci of interest:
 - Theory of goal formulation directed by emotional constraints
 - New method to artificially compose music
- Question: do such systems truly compose music or are they really music generators?
- Wolfgang uses emotional computation, K-lines, and musical grammars.
- Marvin Minsky's K-line theory
 - Describes behavior and cognition of a system by dynamic relationships of linked semi-intelligent agents called K-lines.
 - Sets of K-lines form societies which can form multiple connections with other societies and provide different types of intelligence.
 - Activation of sets of K-lines compose partial mental states.
- E-nodes (emotional nodes)
 - In musical composition, defines emotional qualities of auditory stimuli
 - Examples: modality, single harmonic structures, harmonic progression, amplitude, tempo, rhythm, musical structure, etc.
 - Emotions--happy, sad, anger, soul searching, etc.--get real number weights.

A.I. Media Applications

Wolfgang: Musical Composition by Emotional Computation (2/2)

- Wolfgang allows user to request composition that communicates one of a specified set of emotions.
- Currently, musical components are melody, harmonic progression, rhythm, tempo, and motivic development.
- Skeletal structure
 - 64 measures, 4/4 time, quasi Sonata Allegro form
 - 3 sections
 - Exposition, 32 measures with modulation
 - Development, 16 measures with modulation back to original key
 - Recapitulation, 16 measures in original key



Thanks!