

SCIENTIFIC VISUALIZATION
TODAY'S DEMO



<https://www.youtube.com/watch?v=ufirpyUGPLk>

3:55 m

The Gebelein man story

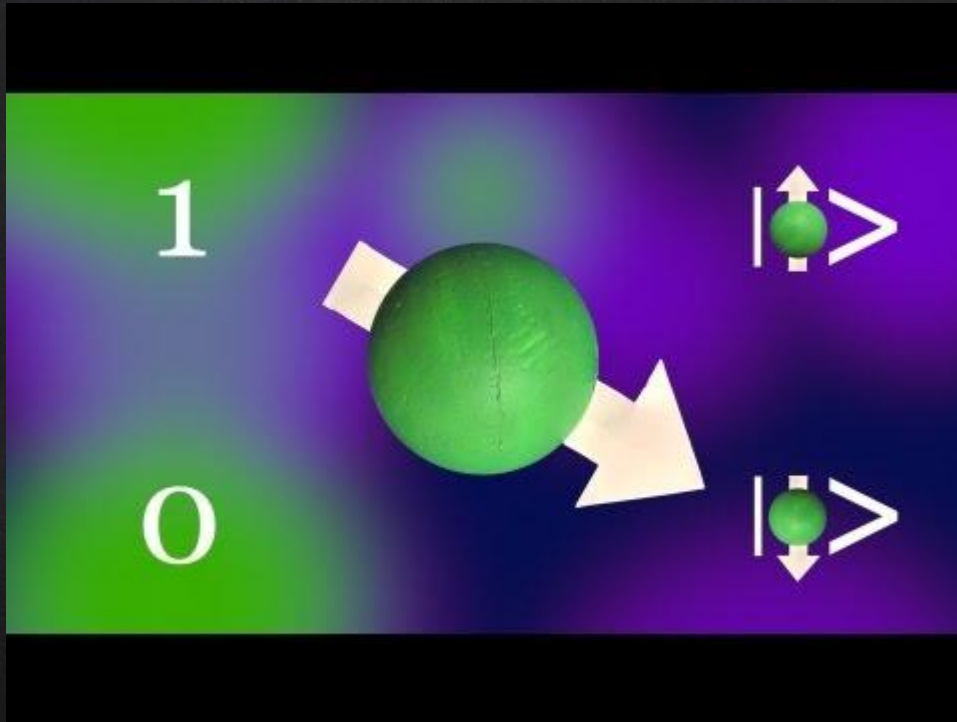


https://www.youtube.com/watch?v=Q4Z3W1RXh_g

ANNOUNCEMENT

- Bonus 6: sign up for today's demo session, starting at 1:20 p.m. until 2:00 p.m.
1 bonus point. 10–15 students in each session of 20 m.
- Aaron Knoll will give a guest lecture on scientific computing and volume rendering next week!
- Explain HW 6

FUTURE OF COMPUTING?
QUANTUM COMPUTING



https://www.youtube.com/watch?v=g_laVepNDT4

ROBOTICS

What are the future of
Robots?

Meet the world's first android actress



<http://www.telegraph.co.uk/film/sayonara/robot-actress-geminoid-f-uncanny-valley/>

ROBOTS

Are these robots?

- A light switch
- A security cam
- An electric mixer
- A computer
- A car



ROBOT CHARACTERISTICS

Robots generally have some capabilities in each of the following categories:

- Sense: can detect the environment around it
- Plan: can modify its behavior based on what it senses
- Act: can move itself or manipulate the environment

The School of Computing is one of a few departments with a Robotics degree track. The course structure follows a Perception-Cognition-Action plan.

ROBOT APPLICATIONS

Robots are used in applications that are:

- Dirty
- Dangerous
- Dull

Examples?

More recently, are seen as social machines:

- Toys and Home assistants



EXAMPLES OF ROBOTS

- Military: Big Dog
<https://www.youtube.com/watch?v=cHJJQ0zNNOM>
- Home: Roomba
<http://www.youtube.com/watch?v=LQ-jv8g1YVI>
- Industrial: Car assembly line
<https://www.youtube.com/watch?v=3CzuQ3DtsPc&feature=fvw>
- Medical: DaVinci
https://www.youtube.com/watch?v=VJ_3GJNz4fg



<https://www.youtube.com/watch?v=3lGtK1nefQM>

ROBOT ARCHITECTURES

Sense-Plan-Act: very much like AI problem

- Recognizing a dark spot as a shadow rather than a hole in the floor takes experiences and context
- Makes the assumption that action in a complex world requires human levels of intelligence
- We should make robots that are as human-like as possible, in AI and in physical capabilities
 - What are some advantages of a human-sized and human-like in capability robot?
 - <http://www.ai.sri.com/videos/> Watch SHAKEY

ROBOT ARCHITECTURES

Insect Behaviors:

- Cockroaches are very successful, yet are not “smart”
 - We don't need human capabilities, just insect-level performance
- Collection of competing behaviors
- Complexity emerges from simple rules
 - Roomba uses this paradigm
 - Called a subsumption architecture



<https://www.youtube.com/watch?v=C9p8B7-5MTI>

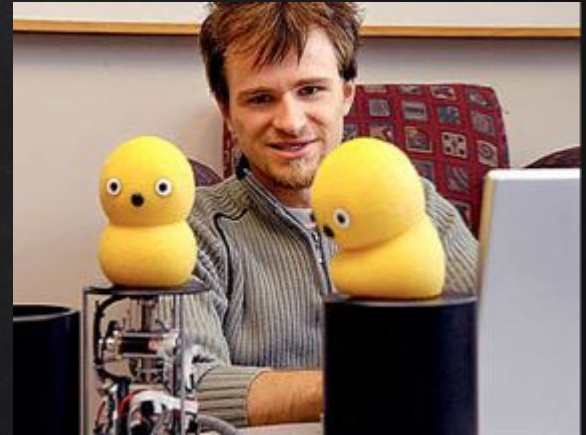
CURRENT DIRECTIONS: MILITARY

- Afghanistan may be the first robotic war
 - 1 robot for every 50 soldiers
- US military wants autonomous vehicles
 - Avoid convoy deaths
- Robots now have weapons
- <https://www.youtube.com/watch?v=WfxshX5kReA>
- <https://www.youtube.com/watch?v=Ci7EFmO260E>
- <http://www.youtube.com/watch?v=yliThCy3RxY&feature=related>



CURRENT DIRECTIONS – SOCIAL

- Health care robots
 - Interaction with patients
- Therapy Robots
 - Simplified relationships with autism patients
- In home assistance for elderly
- MIT's Nexi robot
 - Uncanny valley
 - <http://www.youtube.com/watch?v=XrmrU7P-ysA>



CURRENT DIRECTIONS: CONSUMER

- Chores
 - Vacuum
 - Gutter
 - Pool
- Toys



<http://www.youtube.com/watch?v=G5d3A-SV9Vo&feature=fvwrel>

CONCLUSIONS

- Robotics is a huge growth area
- Used any place that work is
 - Dangerous
 - Dirty
 - Automation
 - Repetitive tasks
 - Assisting people



THANKS!

Any questions?

You can find me at
beiwang@sci.utah.edu

<http://www.sci.utah.edu/~beiwang/teaching/cs1060.html>

CREDITS

Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by [SlidesCarnival](#)
- Photographs by [Unsplash](#)