Scientific Visualization
Today's Demo
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
Robotics
What are the future of Robots?
Meet the world's first android actress

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.
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
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?
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
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](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
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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