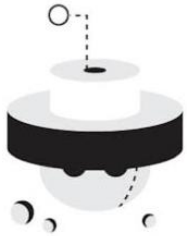# Search and rescue robots

Kristian Onsjö

Erik Roos

Amanda Nilsson

Layout of presentation

- Short introduction
- How search and rescue robots work today and current problems
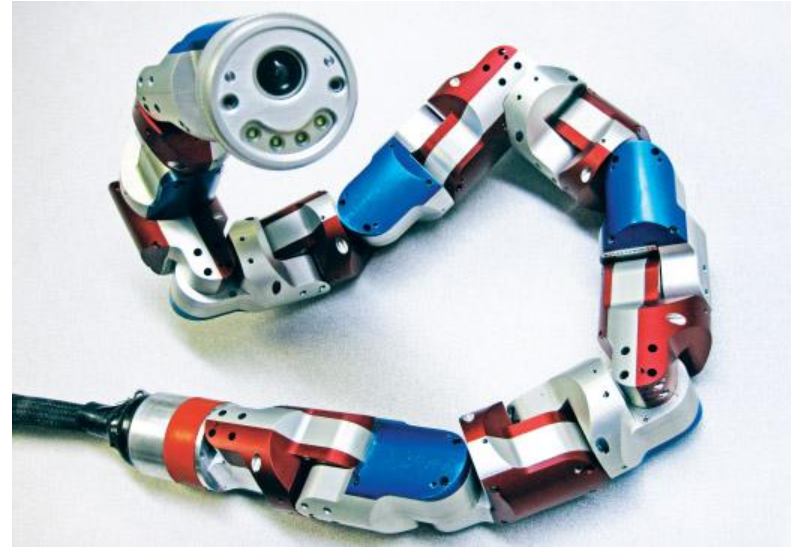- Future prospects and how things may turn out
- Summary

Challenges that have been addressed

- Tackling obstacles, complex environments

- Human-robot interaction

- Efficient exploration

Tackling obstacles - the snake robot

- Inspired by a real biological snake

- Traverses complex terrains
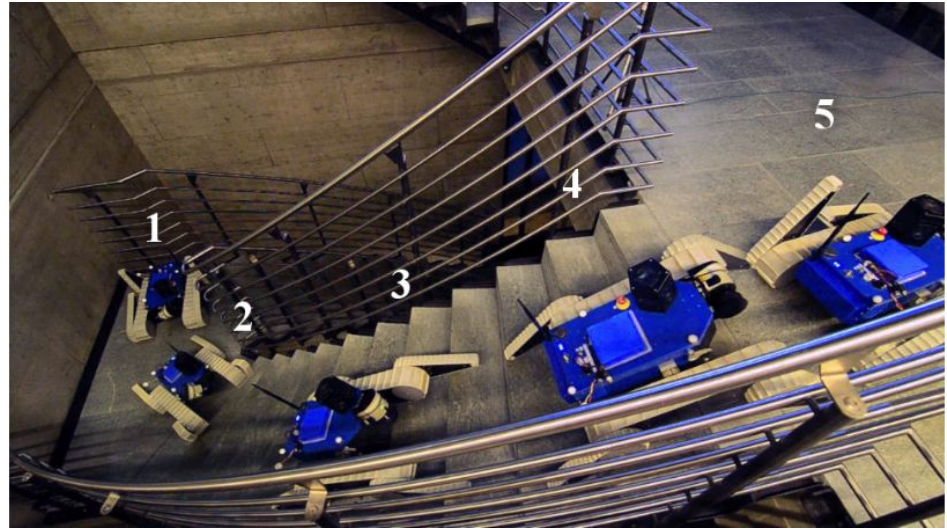
- Maps areas difficult for humans to approach

Human-robot interaction

- Teleoperation requires well designed interfaces
  - Reference frame (robot position relative to environment)
  - Health indicator
  - Sensor information
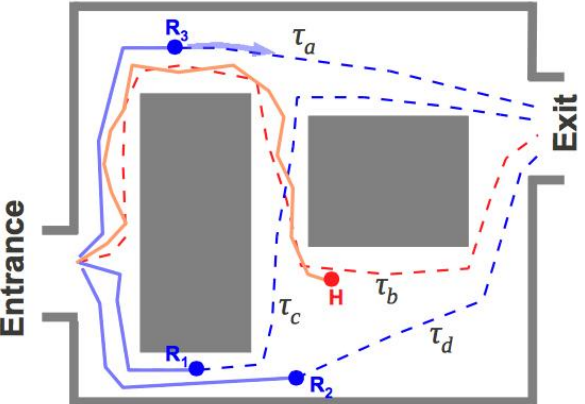
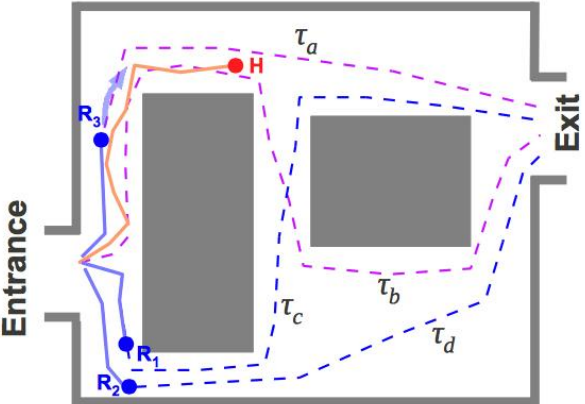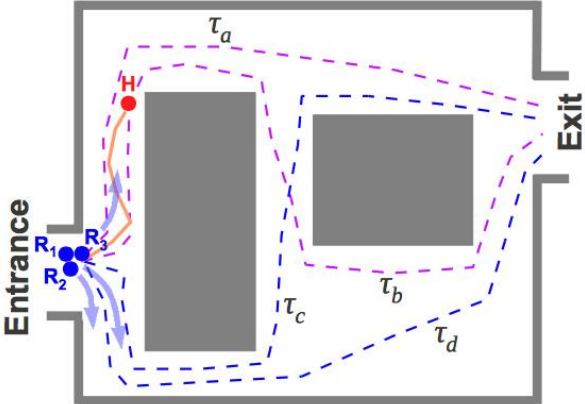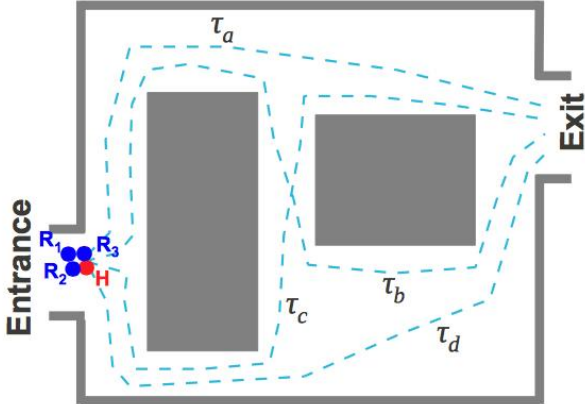- Autonomy helps relieve cognitive load

Efficient exploration

- Path planning
  - Reach target autonomously
  - Navigate home

- Cooperation

Example: Collaborative topological exploration

How well does it work?

- Navigation works well in static environments
  - Dynamic environments - challenging

- Full autonomy not realistic
  - Recognition of objects - hard

What might be the next step?

- Tackling obstacles, complex environments

- Human-robot interaction

- Efficient exploration

Tackling obstacles

- Improving rescue personnel safety

- How to improve navigation?

- How to improve mapping of disaster areas?

Human-robot interaction

- How to relieve robot operators?

- Autonomous movement

- Optimized interfacing

Efficient exploration

- Swarming

- Requires advanced autonomy and communication

- Reliable life-sign detection
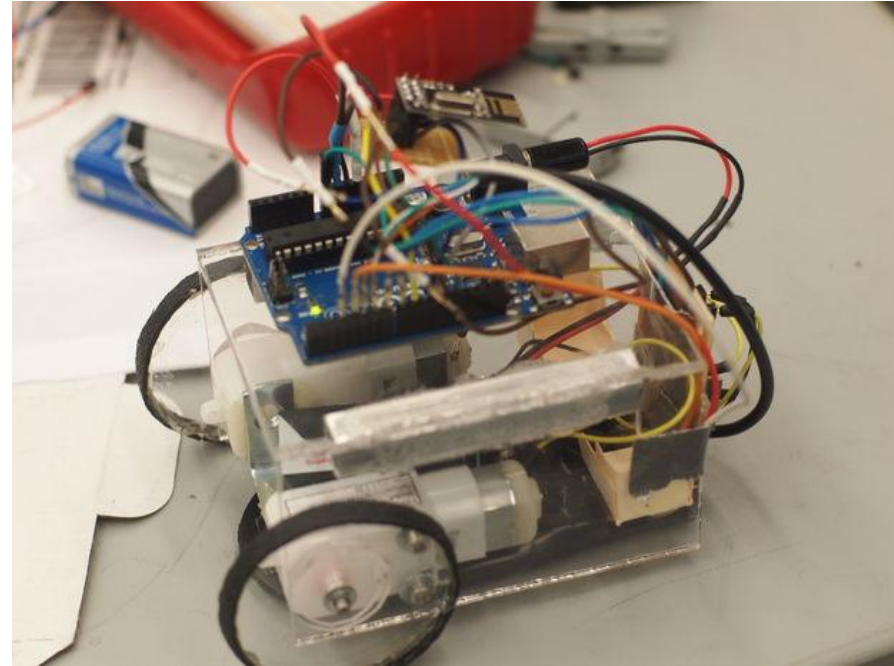
- Precise location announcement

Summary

Names to look up

- Robin Murphy: 'Disaster Robotics'
- Vijay Kumar: www.kumarrobotics.org

Do it yourself!

- Blueprints available on instructables.com
- Estimated cost 16:50$
- Documentation for kilobots available online
- Estimated at 20-50$

Thank you for listening!