UNIVERSITY OF TEXAS AT ARLINGTON
RESEARCH INSTITUTE

Assistive Robotics

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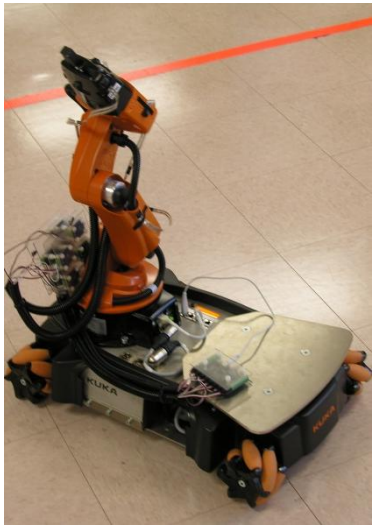
Vision

By 2017, UTARI becomes a global leader in the research and development of advanced technology specifically in the areas of Advanced Manufacturing, Biomedical Technologies and Robotics. Our focus remains enabling product development to help humanity, providing unique, affordable solutions to complex problems.



Mission

UTARI bridges the gap between academic research and product development in the areas of Advanced Manufacturing, Biomedical Technologies and Robotics and is a major source of research revenue for UT Arlington ($100 M per year by 2017).

We collaborate with UT Arlington faculty to promote undergraduate and graduate education by providing opportunities for exciting and stimulating research and development. We also collaborate with government, industry and university partners to facilitate early stage product development in our four disciplines.

We host symposiums, consortia, and events to bring together our partners to focus on specific issues. We concentrate on developing and maintaining a talented work force for not just UTARI but for the Dallas/Fort Worth metroplex.

We provide opportunities for our partners by having an interdisciplinary team of engineers working together in a state of the art facility.

Assistive Robotics

Using robotic technology to:

1) Assist human beings in the performance of dirty, dull, and dangerous tasks.
   - Military Operations
   - Manufacturing
   - Agriculture
   - Homeland Security
2) Assist people with disabilities (to include our Wounded Warriors)

Military Operations

4 JUONS submitted as III Corps Commander

1) Persistent Stare
2) Route Clearance
3) Convoy Following
4) Robotic Wingman

Ongoing Efforts at UTARI

- Established Autonomous Systems Lab
- Sponsoring Autonomous Systems Symposium
- Focused on UGV's, UAV's, boats, microrobotics
- Current Efforts
  - Control
  - Human machine interface
  - Swarm technology
  - Machine vision

Assistive Robotics Partners

Encouraging Presentations at GVSETS

- RSJPO
  - Open robotics architecture
  - "Optionally manned"
  - Adaptive autonomy
  - Multi-platform operation
- TARDEC
  - "Autonomy enabled systems"
  - Autonomous Mobility Applique Systems (AMAS)
  - Dismounted Soldier Autonomy Tools (DSAT)
  - Applied Robotics for Infrastructure and Base Operations (ARIBO)

So…if funding is delayed, denied…

- Focus on assistive robotics to help people with disabilities
  - Large market (and increasing)
  - Corporate interest
- Allow commercial need to advance technologies for military systems.

Profile of Older Americans

- 65^{+} population
  - 40.4 million: 2010
  - Increase of 5.4 million (15.3%) since 2000
  - 1 in every 8 Americans
- Average life expectancy for those over 65
  - 17.3 years: male
  - 20 years: female
- 85^{+} population
  - 5.5 million: 2010
  - 6.6 million: 2020
- 20% of Americans have disabilities

US Wounded Warriors
(Global War on Terrorism)

- Current casualty figures
  - Operation Enduring Freedom: 18,000+ (and growing)
  - Operation Iraqi Freedom: 32,000+
- 90% survival rate regardless of injury type
- Sustained very severe injuries

UTARI Ongoing Activities

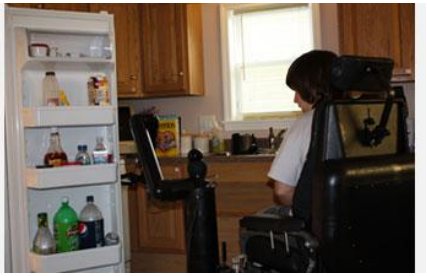
- Established an assistive robotics lab and living laboratory
- Focused on
  - Robotic Skin (NSF)
  - Dynamic prosthetic interfaces
  - Biomask/Bioglove/Biodome
  - Eye tracking/3D point-of-gaze
- And…
  - Building 2 “smart homes” with HEB
    - June ’14 Victoria, TX
    - Sept. ‘14 McAllen, TX

Technology Roadmap

Home Automation

Simple Telepresence

Improved Interfaces & Integration



Capable General Purpose Robots

Image Credit: Home Automation Montreal

Next Generation Single Purpose Robots

Intelligent Mobile Manipulators

Immersive Telepresence

State of the Art Assistive Technologies

Home automation systems with interfaces for disabled people

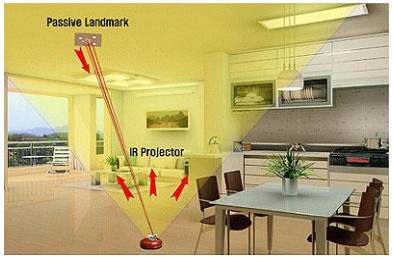
Single purpose robots that perform domestic tasks such as cleaning and mowing

Self-lowering cabinetry

Household fixtures that require less dexterity

Telepresence robots

Value Added Integration



Embedding sensors to allow enhanced robot navigation in the home

Integrating manipulators onto telepresence robots to allow remote assistance or Increased dexterity to user

Installing RFID tags to enhance the operation of morphable prosthetics

Installing context-aware computers requiring less user interaction

Enhancing telepresence robots to support remote medical checkups

Custom Solutions from UTARI

Next generation robots including trash cans that can take themselves to and from the curb and hampers that can transport laundry to the washing machine

Wheel chairs that use eye gaze detection to navigation between rooms and manipulate objects

Creation of ‘mission control’ infrastructure to allow call centers to provide remote assistance and control of assistive robots

General Purpose Robots in Homes