UWE Bristol | University of the West of England

brl Bristol Robotics Laboratory

Connected Assistive Robotics @ Bristol Robotics Laboratory

ANCHOR ROBOTICS PERSONALISED ASSISTED LIVING STUDIO

Enabling Independent Living

Praminda Caleb-Solly

Theme Leader for Assisted Living in the BRL
Head of Electronics and Computer Systems at Designability

Intelligent robots, integrated with smart home sensors and healthcare databases, can provide the ability to realise autonomous assistive care solutions to support independent living for an ageing population.

Connected and Secure Assistive Robotics Ecosystems

Assistive technologies, such as smart home environments, integrated sensors and assistive robotics, are recognised as important tools in helping older people improve their quality of life and live independently for longer. Current research is looking into a range of different ways in which robots might be used, such as assisting older adults with age-related disabilities and long-term conditions, and their carers, in daily tasks, to enable independent living and active ageing.

Assistive robots, working in conjunction with smart home sensors, can enable pro-active initiative to prompt and support a person wherever they are in their home, thus offering increased availability, awareness and access, as compared to a static tele-care system. The assistance provided by a robot could include lifting and carrying, support with dressing and rehabilitation, or to monitor health with early detection of problems, using an interactive robot to provide guidance for taking remedial action.

Assistive Robotics Projects in the BRL

Researchers at the Bristol Robotics Laboratory (BRL) at the University of the West of England are also leading the way in this field, working on key areas of research that are crucial to ensuring that service robots are useful and usable.

CONTACT DETAILS

For Further Information Please Contact:

Dr. Praminda Caleb-Solly
Associate Professor
Bristol Robotics Laboratory, UWE
Praminda.Caleb-Solly@uwe.ac.uk
Twitter: @praminda
Telephone: 0117 3283178

Flagship projects in the Bristol Robotics Laboratory include CHRIS[1], investigating cooperative human-robot interactive systems, MOBISERV[2], an integrated intelligent home environment for the provision of health, nutrition and well-being services to older adults, INTRO[3], an interactive robotics research network for training a new generation of robotic researchers to build intelligent robots that can function in real-world environments,

[1] http://www.brl.ac.uk/researchprojects/chrisproject.aspx
[2] http://www.mobiserv.info/
[3] http://introbotics.eu/

MOBOT[4], providing intelligent active mobility assistance by integrating sensory processing, proactive autonomy and adaptive interaction and ReMeDi[5], a robot system designed to enable medical tele-examination of patients.
New projects include I-DRESS[6] and CHIRON[7], both developing robotic devices to offer physical assistance. The work in the BRL involves understanding how people and robots can interact intuitively, safely and effectively; designing and testing robots that will be acceptable and enjoyable to use, and ensuring that the technology is developed being mindful of ethical and cultural issues. A robot as the interface also has the potential to offer a more social and entertaining interaction experience. The use of voice recognition and speech synthesis, gesture recognition and sensor information from ambient intelligent environments and smart garments, enable a robotic assistive system to offer more natural interactions.

Taking a Person-Centred Approach to Design

We take a person-centred approach:

- Understanding people's context of use and perspectives on robotic assistive technology
- Investigating potential barriers and constraints and criteria for acceptability
- Considering ethical issues and social and cultural impact of the technology

We strive to seek user input using a range of participatory design methods.
It is important to us to consider all stakeholders' perspectives and address the challenges of effective communication between end-users and technical researchers.
We aim to work in multi-disciplinary teams including clinicians, carers, physiotherapists, user experience designers, occupational therapists, and psychologists.

Iterative prototyping and evaluation is central to our person-centred approach, ensuring that systems are useful, usable and accepted.

User acceptance and ensuring effectiveness and efficiency of these technologies requires employing participatory design approaches that are inclusive, involving older people, their formal and informal carers, healthcare and social care and service providers, and clinicians. This can only be achieved by adopting a multidisciplinary approach in the conceptualisation, design and deployment of these technologies.

In addition to achieving technological feasibility and user acceptance, it is vital to ensure that these technologies are economical to manufacture and maintain. Legal and ethical aspects of the use of autonomous systems are also areas that need more deliberation.

Assistive Robots and the Internet of Things

A key aspect of the research into Assistive Robotics is developing contextual and social intelligence for the robot to interact appropriately, safely, and reliably in real-time. The aim is to develop robust and intelligent assistive robots by incorporating both environmental and user characteristics, and behaviour as part of the overall control system architecture.

Connected assistive robots need access to information that is current and gives a dynamic world view of the user and their environment in order to provide information and support that is 'intelligent' and incorporates learning, otherwise the robot is functioning as a pre-programmed state machine.

Drawing on contextual information from environmental and activity sensors instrumented into a smart home, and information about the user's current physical and emotional state, assistive robots can create value through provision of interventions that are more socially intelligent in regards to how, and what advice and support is provided.

To create a more holistic service that can prioritise events based on aspects of health and social circumstance, requires an adaptable intelligent learning system. Building on existing research on intelligent control system architectures, research is being conducted to develop modular infrastructures that can be extended over time, as new functionalities are defined, and people's conditions, and hence needs, change.

Our current research focus in developing assistive robots that can be integrated into a range of contexts centres on establishing how robotic devices can be appropriated as vital elements of a broader connected assisted living ecology.

Assistive Robotics @ BRL

Innovation for Healthy Independent Living

[4] http://www.mobot-project.eu/
[5] http://www.remedi-project.eu/
[6] http://www.chistera.eu/projects/i-dress
[7] http://www.designability.org.uk/researchproject/chiron-care-at-home-using-intelligent-robotic-omni-functional-nodes/