

# Smart home technology supporting people with dementia

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# Overview

- Rationale
- Classifications
- Service applications
- Evidence for implementation
- Ethics

# Rationale

- 2025 one million people in the UK will have dementia
- 63% of people with late onset dementia live in private households (in the community) and 36.5% live in care homes (1)

# International influence



World Health organisation  
United Nations  
European commission  
National agenda

Challenges of delivering  
Health and Social Care  
to future populations  
with a changing  
demographic profile

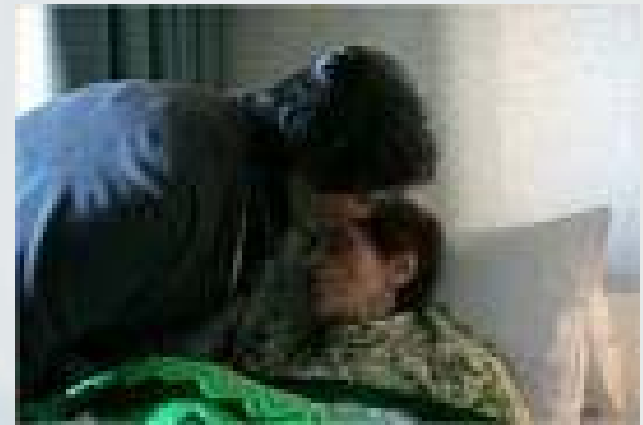
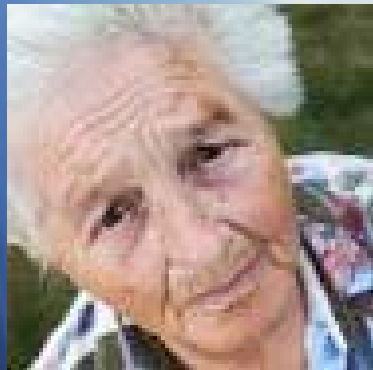


# Other factors influencing change

- ICT Development
  - Decreased Cost
    - Communications, Peripherals and Hardware
  - Increased Capability
    - Data Gathering and Analysis to Inform Health Care
  - Increased Device Stability
  - Enhanced Standardisation and Compatibility across Devices

# Dementia has...

*“ the potential to overwhelm health and social care services which are already ill equipped to respond to the challenge of dementia” David Hunt Chief Executive Alzheimer’s Society*



# Smart Home Classification

1. Homes with intelligent objects
2. Homes with intelligent objects that communicate
3. Connected homes
4. Learning homes
5. Attentive homes

(Aldrich 2003)

# Homes with intelligent objects



Cobolt talking alarm



Sony universal remote control



Mybelle big button picture

# Homes with intelligent objects that communicate



**SENIOR Pilot**



**SICARE Light**



**SRS 100**



**SRS Lite**

# Connected homes

- Hillmount Close in Belfast



- Internal and external networks allowing interactive and remote control of systems as well as access to services and information from within and beyond the home

# Learning homes



- Adaptive home Colorado
- Patterns of activity in the homes are recorded and the accumulated data are used to anticipate users needs and to control the environment

# The Attentive Home



The aware home in  
Colorado

The activity and location  
of people and  
Objects within the home  
is constantly  
Registered and this  
information is used  
to control technology in  
anticipation of  
The occupants needs.

**the Aware Home**  
@ Georgia Institute of Technology

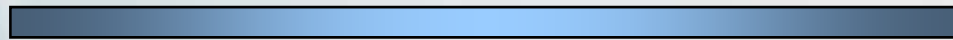
Is it possible to create a home environment that is aware of its occupants whereabouts and activities?

If we build such a home, how can it provide services to its residents that enhance their quality of life or help them to maintain independence as they age?

The **Aware Home Research Initiative (AHRI)** is an interdisciplinary research endeavor at [Georgia Tech](#) aimed at addressing the fundamental technical, design, and social challenges presented by such questions.

# Technology Continuum

Social Alarms      Environmental Control Systems      Automated Home Environment



Assistive  
Technologies



# So what does it all mean?

- Smart home
- Context aware home
- Predictive home
- Ubiquitous home
- Ambient home environment
- Telehealth
- Telemedicine
- Telecare
- Preventative technology
- Social alarms

# Different things to different people

- Technologists
- Commercial providers
- Service providers
- Service users

# Technology

- Can contribute to support people with dementia in the community
  - Individual level
  - Service level
- Impacts on
  - Person (and families) receiving support
  - Staff delivering care
  - Organisations
  - Society

So what about the evidence?



Is it ethical?



# Technology from my perspective is considered...

- An intervention
- With a purpose
- With a consequence
- Developing devices and services
- Support people at home and their carers
- Greater independence, changed service model.....

# Technology with community care

- Rationale
  - Political
  - Sociocultural
  - Commercial
  - Technological
- Service Complexity and heterogeneity
  - Service users
  - Device type

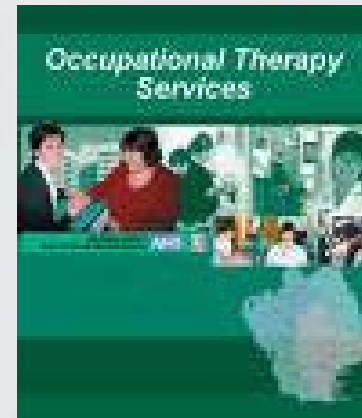
Technology therefore can no longer be viewed as neutral  
When used within services.

# Ethics defined...

- Constructed norms of internal consistency regarding what is right and what is wrong. It is more than what is considered to be 'good' (4)
- Standards of right and wrong, good and bad. What we ought to do to fulfill our moral duty (5)

Tavani 2007 “ ... defines ethics as the study of morality” which he states is a system of rules for **guiding** human conduct and principles for **evaluating** those rules” (6)

# World views, paradigms and perspectives



What influences your perspective on the smoking ban?

Duboy and Miley suggest we should make a distinction between **microethics** (linked to individuals) and **macroethics** (linked to social policy and organisational arrangements).



# Ethical theories

- Deontological theories
  - Interventions should be considered in relation to pre-existing duty based requirements within the given scenario.
- Consequentialist theories
  - Suggest that reflecting on the consequences of the scenario should assist with decision making
    - Ethical egoism; an action is morally right if the overall consequences are favourable for the person carrying out the action
    - Ethical altruism considers the consequence for all except those carrying out the action

# Principles established by the Astrid Project

- *Autonomy: people should be able to decide what they want to happen or be done to them.*
- *Benificence: we should try to do good to the people we care for.*
- *Non-maleficence: we should try to avoid doing people harm*
- *Justice: people should be treated fairly and equally.*

Welcome to...

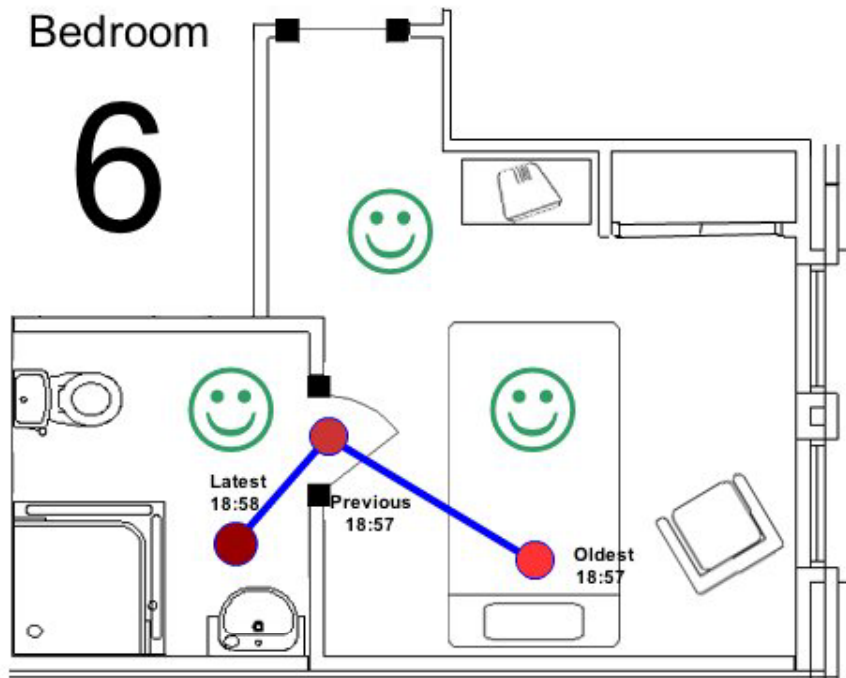
Your future and mine



Date 09/06/2005

Time 18:58

# Tenant: John Martin



Time Water Currently Running

00:00:00.00

Total Duration Water Last Turned On For

00:00:28.31

Fall Estimator Timer

00:00:00.00

Less

Normal

More



Sleep Pattern



Water Usage



General Activity



Wandering Within Room



Wandering Between WC & Room

# So ethical issues could arise

- Control
- Independence
- Autonomy
- Self governance
- privacy

# Developing an ethical framework

- Heterogeneity of provision requires framework to acknowledge multi-agency partnerships (commercial providers etc)
- Ethics generally linked to research and research governance



# Astrid project suggest 3 P ethical framework

- Perspective - consider the views of all people involved in the proposed action and the consequences of not taking the action.
- Principles;
  - Autonomy
  - Beneficence
  - Non-maleficence
  - Justice
- Paradigms - as reference points against which ethical issues can be clearer and the solution evaluated in terms of its appropriateness  
(originally formulated by Tony Hope 1997)

# Some concluding thoughts

- “growing body of evidence that telecare services provide people with greater safety and security whilst maintaining independence for longer” (3)
- Service innovations tend to report on consent to participate
- Opportunity to stimulate debate and innovate in this area.

# Or what about Moors law 2005

“As technological revolutions increase their social impact, ethical problems increase.”

- Realistically take into account that ethics is an ongoing and dynamic enterprise.
- Multidisciplinary collaboration  
(Technologists/ethicists/social scientists)
- Better ethical theories
- More proactive and less reactive

BBC NEWS | UK | Tag dementia sufferers - minister

http://news.bbc.co.uk/1/hi/uk/6570511.stm

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**Tag dementia sufferers - minister**

**Elderly people with dementia could be tagged to make it easier to track their movements, a minister has proposed.**



Science Minister Malcolm Wicks told the BBC the satellite technology could enable them to lead fuller lives and would reassure their families.

A rise in the number of sufferers is forecast

He said it would give sufferers, who often experience memory loss, "freedom to roam around their communities".

The charity Help the Aged said the technology could have "potential" in helping care for people with dementia.

**'Dignity and independence'**

Mr Wicks said the idea could lead to claims of interference in people's lives, and permission would be needed.

"This is about dignity and independence in old age," said Mr Wicks.

Tagging would have to be with the permission of the elderly person, or at least with that of "their family and loved ones", he said.

"By knowing where they are they could have the safety and

**VIDEO AND AUDIO NEWS**

**Minister says technology can help the elderly**

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- ▶ 1.7m 'will have dementia by 2051' 27 Feb 07 | Health
- ▶ Alzheimer's disease 08 Jan 04 | Medical notes
- ▶ Bracelets to protect vulnerable 12 Jan 07 | Devon
- ▶ 'You are just left alone' 27 Feb 07 | Health
- ▶ Singer Melly has early dementia 27 Feb 07 | Health

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- ▶ Alzheimer's Society
- ▶ For Dementia

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# Tend to get!

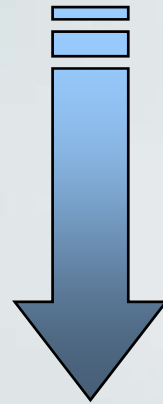
- Different terminology
- Ethics
- Privacy
- Consent
- Security
- Legal issues



It all makes sense to me....



# Electronic Assistive Technology in Health and Social Care



Supported Independent Living  
Via Tailored Integrated  
Services & Technologies



# Big white elephants



# Millennium Dome



# References

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8. BjØrneby S. Topo P. Holthe T. *Technology, Ethics and Dementia: A guidebook on how to apply technology in dementia care*, The Norwegian Centre for Dementia Research, INFO-Bank, Norway, (1999)