



ICT - Information and Communication Technologies



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**H**ELLA  
Automation



HAUS DER BARMHERZIGKEIT  
AKADEMIE FÜR ALTERSFORSCHUNG

# HOBBIT – Towards a Robot for Aging Well

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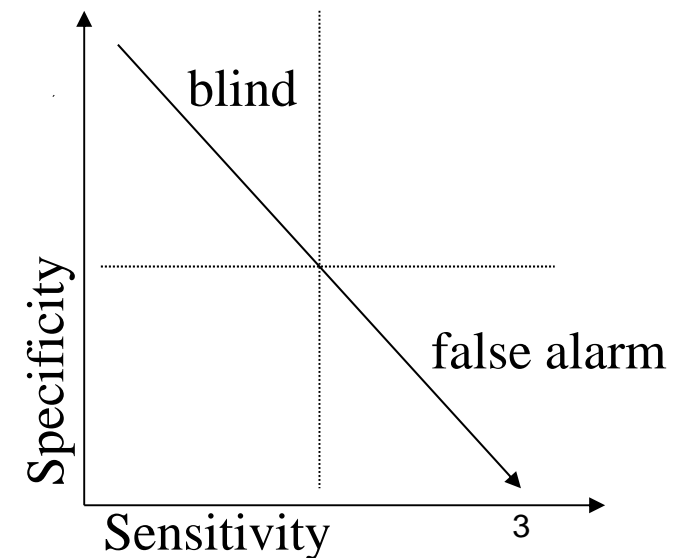
[www.hobbit-project.eu](http://www.hobbit-project.eu)

# Demographic Challenge

- Strong growth of population of old people
- Wish to be independent
- **Fall** is main reason for moving to a care facility
- At least one fall per year (in Austria, 8M people)
  - Senior citizens > 65 years ..... 30% (N=440.000)
  - Senior citizens > 80 Jahre ..... 50% (N=207.000)
- Direct consequences of a fall
  - Citizens > 65 years: > 50% of hospital visits due to falls
  - 14.000 fractures of thigh bones per year
  - 3 hours limit: otherwise more severe complications

# Automatic Fall Detection

- Different sensors
  - Installation in home  
.... high installation costs
  - On the person  
.... limited acceptance
- Conflict of goals
  - Sensitivity  
(no false alarms FA; =  $TP / (TP+FA)$ )
  - Specificity  
(no false positives FP; =  $TA / (TA+FP)$ )



# HOBBIT – A Pragmatic Approach

- HOBBIT puts user in centre of all design issues
- Approach: Mutual Care
  - User needs help from robot
  - Robot imperfect: user helps
    - E.g., learn favourite objects of user
    - E.g., open doors for robot
- And develops the needed technology



Stehen Sie morgens auf,  
damit jemand morgens aufstehen kann.  
Alles in einem Haus.



Und wer wird Sie pflegen,  
wenn Sie einmal alt sind?  
Hoffentlich jemand wie Sie.  
Alles in einem Haus.



**Robot: closing the gap but no replacement of personal care**

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# HOBBIT: User-driven Approach

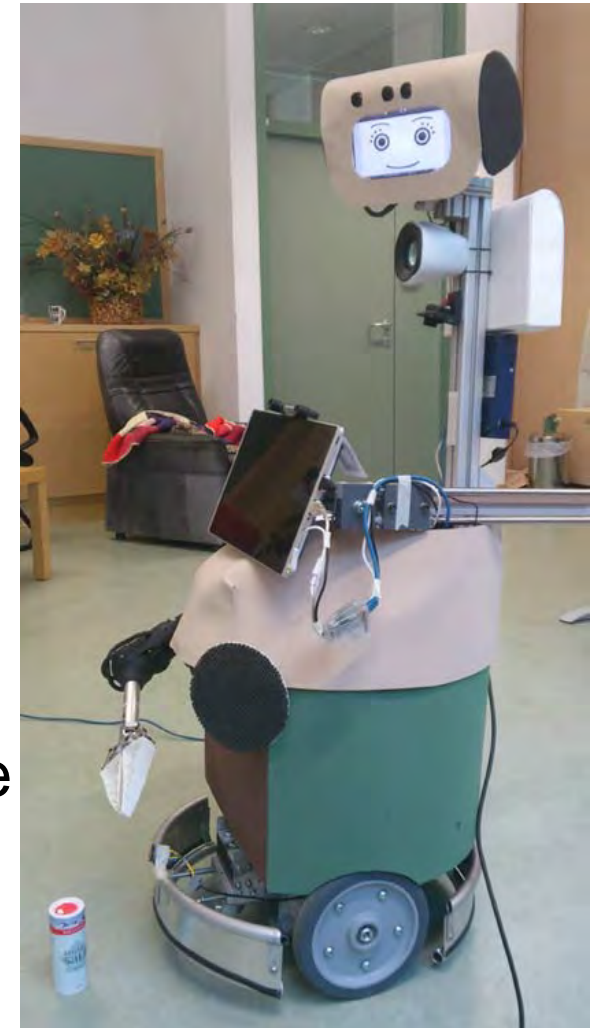
- User workshops
  - A, S, Gr
- Emphasis on Mutual Care paradigm
  - User helps robot
  - Robot helps user

COMMANDS & SERVICES	PRIORITISATION of the users (D1.2)	PRIORITISATION Considering Mutual Care implementation	PRIORITISATION
Call friend	1	-	1-
Surprise me	1	+	1+
Play Games	1	+	1+
Go recharging	2	+	2
Follow Me	2	+	2
Bring Object	1	+	1+
Pick up Object	1	+	1+
Learn Object	1	+	1+
Call robot	1	+	1+
Initialization Dialogue	1	+	1+
Reminder	1	-	1-
Emergency Detection and Handling	1	-	1
Energy Management	*	-	2
AAL alarms	2	-	2
Incoming Call	1	-	1-

# Fall Prevention and Acceptance

- User-centred MMUI
  - Reachable screen
  - Touch, voice, gestures
- Pick-up, learn, bring object
  - Turntable
  - Tray to store objects
- Emergency detection
  - MMUI: Touch, button, voice, posture
- Integration on small platform

Hobbit



# HOBBIT Summary

- Introduce robot to user by trusted person
- Mutual Care: robot and user help each other
  - Attachment theory (pets, tamagochi)
- Learn object
  - Engage user & make her feel self-confident
- Pick-up object more important than bring object
  - Emotions to express needs: asking for reward
- Detect emergency situation
  - Hand shake before alarm, Calming dialogue