# **Empowering People Living with Dementia**



## in Smart Home

Jose G. Gimenez Juan C. Augusto J.Gimenezmanuel@mdx.ac.uk J.Augusto@mdx.ac.uk

Jill Stewart J.Stewart@mdx.ac.uk



1. Professor Computer Science, 2. Senior Lecturer in Housing & Environmental Health

## **MOTIVATIONS**

- > Dementia forecasts: 1M by 2025 in UK.
- > People with dementia (PWD) lose autonomy and independence. 45% living at home.
- Continued care is expensive and emotional taxing for carers.
- Social Health high expenses.

## STATE OF THE ART

- > Ambient Assisted Living (AAL) focus on the elderly.
- > Real-time Activity Recognition(AR) using nonintrusive sensors.
- > The large variety of low-cost sensors.
- Huge range of devices to interact with users.

## **GOALS**

- ❖ Delaying placement in a care home avoiding stress of PWD.
- Supporting PWD living at home allowing their self-sufficiency.
- Reducing the caregivers' stress due to a continuous care.
- Maintaining user's safety derived from continuous monitoring.
- Reducing the cost in the early stages of dementia.

#### **Activity Recognition** Non-Intrusive sensors Saving data Motion<sup>3</sup>, pressure<sup>4</sup>, energy<sup>2</sup>, The gathered data can be saved in a Detecting Activities of Daily living (ADLs) Hospital server for doctors access, allowing door/window5 such as sleeping, eating, grooming, bathing, clinical analysis. dressing, etc. and behaviours such as wandering or elopement ڪ ڪ **Proccesing Unit Primary Use** Suggesting the user **Evaluating the activity** The system assesses whether the activity is unusual or unhealthy by using the user's configurations User's feedback related to the activity detected. The user can reply to the system with moods, needs, etc. providing more useful information for the system to analyse. **User's Customization** Providing an easy interface to Notifying Personalized configure user's schedules and giving as much/ Multi-user intervention info as possible alerts. Home The system can differentiate the primary user through his/her mobile or a smart watch Configuring Interface

## **ACHIEVEMENTS**

- Detecting user's activities at home
- Assessing activities and behaviours according to the user's settings.
- Providing an interface to configure schedules and alerts.
- Coaching the user through mobile in case an unusual behaviour or activity is detected.
- Keeping the caregiver informed through mobile in case the user does not amend the behaviour.
- Storing ADL's info in a server for doctors' analysis and evolution.
- Differentiate the user's activity from others dwellers.

## **FUTURE WORK**

- Testing the system with people living with dementia
- Incorporating more type of sensors to get more precise information and adding other ADLs and behaviours
- Designing APP and user's interface guided by Co-design.
- Evaluate the different ways of interacting with the user
- Guiding the user to carry out Activities Daily Living (ADL).

## **TESTING & VALIDATION**

- Deployed and tested at Middlesex University's "Smart Spaces Lab".
- The initial tests have provided good outcomes detecting activities as sleeping, eating or wandering, and interacting with user and caregiver.
- Currently, the research is focused on long-term testing.

Watch some research video demos in <a href="https://grs.ly/x79zbaq">https://grs.ly/x79zbaq</a>

### References

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