



## Introduction and Background

Worldwide, the number of people with dementia is expected to reach 81.1 million by 2040. The current paradigm of health care is one of 'therapeutic nihilism', services in the community are fragmented and carers and PWD are struggling to cope. Exclusionary attitudes towards PWD have led them to be seen as incapable, without personhood resulting in isolation, stigma and poor care outcomes.

To combat loneliness and the effects suffered by PWD, effective techniques include those that increase a person's resilience. Resilience is an adaptive capacity that refers to one's ability to 'bounce back' and cope in the face of adversity. Interventions focusing on strengthening the personal attributes and external assets (i.e. resilience) of PWD show much promise as they may help retain cognitive capacity and reduce social exclusion. ICT solutions can be used to increase psychological skills like resilience (Norris et al 2008). There is also important new research in the use of robots to deliver ICT solutions and to act as companions (combatting perception of loneliness) via a novel user-centred concept called "Mutual Care" which provides the possibility for the human to "take care" of the robot like a partner (FP7). In this way, real feelings and affections are created making it easier to accept assistance from a robot - in certain situations - in return the human can also support the machine.



## MARIO

The MARIO project aims to manage active and healthy ageing through the use of caring service robots. It is a €4 million European Union's Horizon 2020 funded research and innovation programme, within the thematic section 'Societal Challenge on Health, Demographic Change and Wellbeing'. It brings together a team of international experts from academia, industry and dementia groups to work collaboratively in tackling the burdens imposed by dementia and developing innovative solutions using caring robots. The technology at the heart of MARIO is the robot Kompai, designed and developed by a consortium partner, French company Robosoft. Other partners in the consortium will provide technological expertise in the areas of robotic applications and semantic computing.

The project will last for three years during which three pilot studies of robots interacting with people with dementia will be undertaken. The first pilot will run in the West of Ireland, organised by NUI Galway's School of Nursing and Midwifery, the second will run in Stockport, UK, organised by the city's health care managers, while the third will run in Italy, organised by a leading research hospital, Casa Sollievo della Sofferenza, which is pushing research boundaries in comprehensive geriatric assessment. The outcomes of the research are expected to be of great benefit to people with dementia as well as lead to commercial opportunities for cutting-edge technology companies.

## Illustrative Example of the MARIO Concept

Mr. Hope, has type two diabetes, he is a widower and lives alone in the suburbs. His only daughter was worried and asked him to move near her. Mr. Hope agreed and he moved into a small city apartment in the same building as his daughter. Both his daughter and her husband were out working all day, so Mr. Hope spent most of his time in his small apartment on his own. He didn't have anyone to talk to and his friends now lived too far away to visit. One night his daughter came to his apartment to find him disoriented and stressed. She took Mr. Hope to the doctor and he was diagnosed with MCI (mild cognitive impairment). His daughter didn't want to admit Mr. Hope to a care of the elderly home but she also could not stay with him all day. The doctor suggested an alternative: the MARIO robot.

Mario moved into to Mr. Hope's apartment and soon this strange couple looked like "best friends". MARIO monitored Mr. Hope's daily routine, vital signs and emotional wellbeing and sent reports, directly to his doctor. MARIO also recorded if Mr. Hope was eating properly. Mr. Hope felt better having "someone" around to talk to. He called MARIO to follow him around the apartment describing things to him or how the food tasted ("poor MARIO, you can't have an ice cream but I will tell you how it feels"). MARIO's had memory training games that kept Mr. Hope busy while at the same time enhancing his attention and memory; they were also fun. MARIO also stored his favorite music, and films and reminded him of birthdays and social events. Based on MARIO's reports, his doctor suggested several therapeutic interventions to enhance Mr. Hope's health status and maintain his independence. Everyone felt happier.

