

Example scenario

Jannalea Larsen: an older adult (primary end-user) who has incorporated engAGE system in her daily life for cognitive function support and self-management



Jannalea Larsen is 70 years old, and she has a busy Saturday. The COVID-19 pandemic has put serious restrictions on her daily living and social life. This has now lasted over a year. Nevertheless, she is going strong despite of the cognitive decline that she is suffering from. Her total relief is the engAGE robot. The day began with preparing breakfast and taking care of her weekly laundry. Both tasks require more procedural capability than Jannalea can mobilise without help. The engAGE robot follows her along with these tasks and recognizes her physical doings as well as her confusions whilst talking to herself. Then, the engAGE robot kindly launches the step-by-step instructions that Jannalea's daughter has "quality-checked" to copy *exactly* the way Jannalea used to perform these tasks when she was cognitively healthy. The robot is also building a new procedure for Jannalea with the help of its sensor network and AI capability: doing the evening check of her home as there is no smart-home technology installed in the building (closing the windows, secure locking the door, and turning certain home electronics off). Jannalea is also very keen on "checking" her home *herself* before going to bed and the robot has observed deviations from the normal procedure. The weekly Saturday treat is the virtual meeting with her family. Before the COVID-19, these meetings counteracted the geographical distance there is to Jannalea's nephews and daughter who are her closest family. Now, during the pandemic year, these meetings have been the only way to "be a family" – something that is extremely important for Jannalea. The family is using the Saturday meetings to inspire Jannalea to recall important life events, friends and acquaintances, work, travel, hobbies, and the like. This information is used to feed her memories into the engAGE system, to be used for storytelling. Jannalea was very fond of theatre and art. Her fond memories are mainly about the pieces and last, but not least the actors. This background makes the drama and role-playing feature of engAGE a tailor-made option for cognitive function stimulation for Jannalea. The role-plays are extracted from her memories and applied in a role-play template. All this also requires an effort from the family, but seemingly, it is worth it. Jannalea is enjoying her life together with the engAGE robot, and her cognitive ability appears quite stable.

Dr. Karlsen: Jannalea's neurologist (SECONDARY END-USER) who keeps track of her progress

Dr. Karlsen is specialized in the follow-up of seniors with mild cognitive impairments (MCI). Dr. Karlsen is convinced that ICT and robotics innovations have the potential of decreasing cognitive decline and memory loss in the elderly by actively supporting the seniors in their activities of daily living (ADL) with reminders of processes, tasks, and appointments. Dr. Karlsen has heard of hospitals employing the services of actors to engage in role-playing activities with MCI seniors' residents, which had shown great abilities in maintaining them mentally active and had tremendous effects on their mood during their stay at the hospital. However, the nature of this activity is mostly restricted to large hospitals in the city centre and most of Dr. Karlsen's MCI patients are still living in their

homes, some of them even living quite remotely from the agglomerations. Furthermore, this same remoteness of some patients makes the daily monitoring by the healthcare professionals difficult as they must visit many distant patients in little time. Having a robotic system being able to first support and monitor seniors with MCI with their ADL by providing them reminders and guidance, while also maintaining them cognitively engaged through drama/storytelling-based memory engagement would be ideal to him. He also sees much potential in having an easy-to-use communication channel between the MCI seniors, his medical team (doctors, nurses, etc.), and the informal caregivers and family. Indeed, he noticed most of his patients are not able to use conventional ICT means (smartphone, computer, etc.) anymore to engage in communications due to aging and progressing illness and are therefore more and more isolated. As a fervent technologist, he would also see the use of monitoring and analytical techniques as precious tools to evaluate the evolution of his patients' symptoms, therefore being able to carefully fine-tune their treatments and to anticipate any potential hospitalisation/placement in a medicalized home if needed.

Laura: Jannalea's daughter (SECONDARY END-USER) is monitoring her progress to ensure any signs of decline are addressed early on and participate in joyful and fun robot-driven social activities together

Laura Smith is a 45 years-old woman. Laura has always been very close to her mother, has been deeply affected by her cognitive decline, and wants to support Jannalea the best she can in her activities of daily living (ADL). Unfortunately, Laura lives in another distant city and can only visit her mother occasionally during weekends or holidays. But thanks to the engAGE robot, she is now able to help by programming her mother's basic ADL (cleaning, preparing meals, etc.) and set up reminders directly from her computer. During her phone call or visit, Laura always pays attention to her mother's behaviour and reports any issue that could potentially signal a further cognitive decline in the engage system using dedicated questionnaires. By doing so, she feels confident she participates in monitoring the health state of Jannalea and collaborates with the healthcare professionals. Laura values also very much the possibility to establish direct call through the engAGE system, as her mother frequently loses her cell phone or forgets to charge it. Lately, Jannalea has also experienced issues with the handling of her new smartphone which is not adapted to her condition. Having shared her mother's passion for theatre, Laura knows which are Jannalea's preferred plays and citations and therefore participates in the setup of the drama/role-playing activities, which she also complements with funny family anecdotes to make sure it maximizes Jannalea's involvement and motivation.