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The Smart Dementia Care Project

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The Smart Dementia Care Project

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Introduction

The Smart Dementia Care project¹ seeks to lengthen the period of independent living for people newly diagnosed with a dementing illness, and to help those people maintain quality of life while living independently. The project is developing a toolkit including a computational model of qualities of daily living for persons living with dementia (PLWDs), that will aid PLWDs in maintaining beneficial activities, and which can suggest alternatives if the original activities are no longer being performed. The toolkit is being co-designed with PLWDs, formal and informal carers.

Selection of activities

Activities benefit individuals in several ways. Basic Activities of Daily Living² (ADL) allow individuals to survive: more advanced Instrumental Activities of Daily Living³ (IADL) are key to living independently. Table 1 lists these ADLs and IADLs. More sophisticated are 'Meaningful Activities' (MAs), performance of which gives individuals pleasure or other satisfaction. These activities may include visiting friends, doing puzzles, or gardening, enhance quality of life for individuals, but also exercise some IADLs and some cognitive functions.

Monitoring performance of activities

Each PLWD will have a set of activity goals. Achievement of these activities can be self-reported by the PLWD (or their carer) via the toolkit, or detected using sensors including wearable on body sensors or passive infrared sensors in the home for motion detection, switch sensors on doors, drawers and household appliances like fridges or ovens. Should under-achievement of an activity be detected, the PLWD can be encouraged to improve their performance, or suggested to choose a less demanding activity that still exercises the IADLs and cognitive functions. Figure 1 shows a simplified workflow for validation of achievement of exercise goals and recommendations for replacement activities.

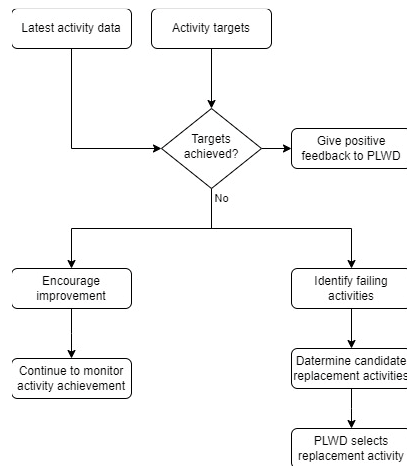


Figure 1. Workflow for monitoring of activities

Table 1. ADLs, IADLs and monitoring methods

Activity group	Activity	Monitoring method
ADL	Bathing	Sensors
	Dressing	Sensors
	Toileting	Sensors
	Transferring	Self-reporting
	Continence	Self-reporting
	Feeding	Sensors
IADL	Telephone	Sensors
	Shopping	Self-reporting
	Food	Sensors
	Laundry	Sensors
	Transportation	Self-reporting
	Finances	Self-reporting

Conclusion

Maintaining activities for PLWDs is important, not only to extend their period of independent living but also to improve their quality of life during that period. Activity performance can be encouraged; should a PLWD be no longer able to perform an activity they can be encouraged to perform simpler activities that have similar benefits.

References

1. The Smart Dementia Care Project: <https://www.smartdementiacare.ie/>
2. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged. The Index of ADL: a standardized measure of biological and psychosocial function. JAMA 1963;185:914-919
3. Lawton MP, Brody EM. Assessment of older people: Self-maintaining and instrumental activities of daily living. The Gerontologist 1969;9(3):179-18