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Meaningful activity replacement recommendations in dementia

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Abstract. Exercise of meaningful activities is important for people living with dementia, both for quality of life and to maintain the necessary basic activities of daily living. A method is proposed for recommendation of replacements for lost meaningful activities that accounts for the need to maintain activities of daily living.

Keywords. Dementia; goal modelling; self-care; independent living

1. Introduction

Dementia is a set of symptoms that include deterioration in memory and the decline in the ability to perform everyday activities. Persons Living With Dementia (PLWDs) require increasing care as their underlying disease progresses. There are benefits of independent living, to PLWDs in improved quality of life, and societal benefits of reduced costs compared to institutional care [1]. To continue to live independently, PLWDS need to continue to perform Activities of Daily Living (ADL) [2] and Instrumental Activities of Daily Living (IADL) [3]. Quality of life (QoL) is enhanced by Meaningful Activities (MA), which have the additional benefits of exercising (I)ADLs.

If the ability to perform MAs is lost, QoL is reduced; (I)ADLs and skills intrinsic to an MA may no longer be performed. For example, an MA of 'attending church' may exercise the 'dressing' and 'transportation' IADLs, and cognitive, language and social skills. Should loss of an MA occur, we seek to recommend alternative MAs that will maintain a PLWD's QoL and ensure that (I)ADLs and skills continue to be exercised

2. Methods

For each MA, we determine which other activities are exercised. Table 1 gives an example of some MAs and the activities and skills that each exercises. Should an MA no longer be performed, the set of MAs is used to generate a ranked recommendation list by using a simple k nearest neighbour (knn) method [4]. Detection and recommendation need not be 'real time' but a swift recommendation would be beneficial to help minimize loss of ability to perform the component activities of an MA.

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Table 1. Example MAs and the ADLS and IADLs that they exercise.

Activity_name	ADL Bathing	ADL Dressing	ADL Toileting	ADL Transferring	ADL Continence	ADL Feeding	IADL Telephone	IADL Shopping	IADL Food	IADL Laundry	IADL Transportation	IADL Finances	skill Motor	skill Cognitive	skill Vision	skill Sensory	skill Language	skill Social
Meals with family	N	Y	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	Y	N	Y	Y
Coffee with friends	N	Y	N	Y	Y	Y	N	N	N	N	Y	N	Y	Y	N	Y	Y	Y
Current affairs	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y	N
Sport (playing)	N	Y	N	Y	N	N	N	N	N	Y	N	Y	Y	Y	Y	Y	N	N

3. Results

A simple example based on the information shown in Table 1 and using the simple knn method is given. If we assume that a PLWD can no longer play sport, we see how close the other MAs in our set are by simple matching of activities and skills. This gives us a ranked list of suggested replacement MAs: coffee with friends (6 matches), meals with family (5), current affairs (1). So, we would recommend consideration be given to 'coffee with friends' as an activity that could replace the benefits lost by no longer playing sport.

4. Discussion

We plan to further refine the replacement activity selection algorithm and the selection criteria, to include themes that describe the rewards of MAs such as physical activity, being part of a community, or spiritual rewards; and to include flags to filter out MAs that may be inappropriate to recommend, e.g. 'visiting graveyards'.

5. Conclusions

There is potential to help PLWDs maintain essential (I)ADLs and skills if performance of an MA that exercises (I)ADLs and skills declines, by generating a ranked list of suggested replacement MAs. By encouraging PLWDs to replace lost MAs by alternative MAs, it is suggested that the period of independent living for PLWDs may be extended.

Acknowledgements

References

[1] C. Olsen et al, "Differences in quality of life in home-dwelling persons and nursing home residents with dementia - a cross-sectional study," BMC Geriatr. 2016 Jul 11;16:137.

[2] S. Katz, A. B. Ford, R. W. Moskowitz, B. A. Jackson, and M. W. Jaffe, "Studies of illness in the aged. The Index of ADL: a standardized measure of biological and psychosocial function," JAMA 185, pp:914-919, 1963.

[3] M. P. Lawton and E. M. Brody, "Assessment of older people: Self-maintaining and instrumental activities of daily living," The Gerontologist, 1969 9(3), pp:179-186

[4] Fix, Evelyn; Hodges, Joseph L. (1951). Discriminatory Analysis. Nonparametric Discrimination: Consistency Properties (PDF) (Report). USAF School of Aviation Medicine, Randolph Field, Texas