

A Visualization System to subdivide Dementia Diagnosis Stages

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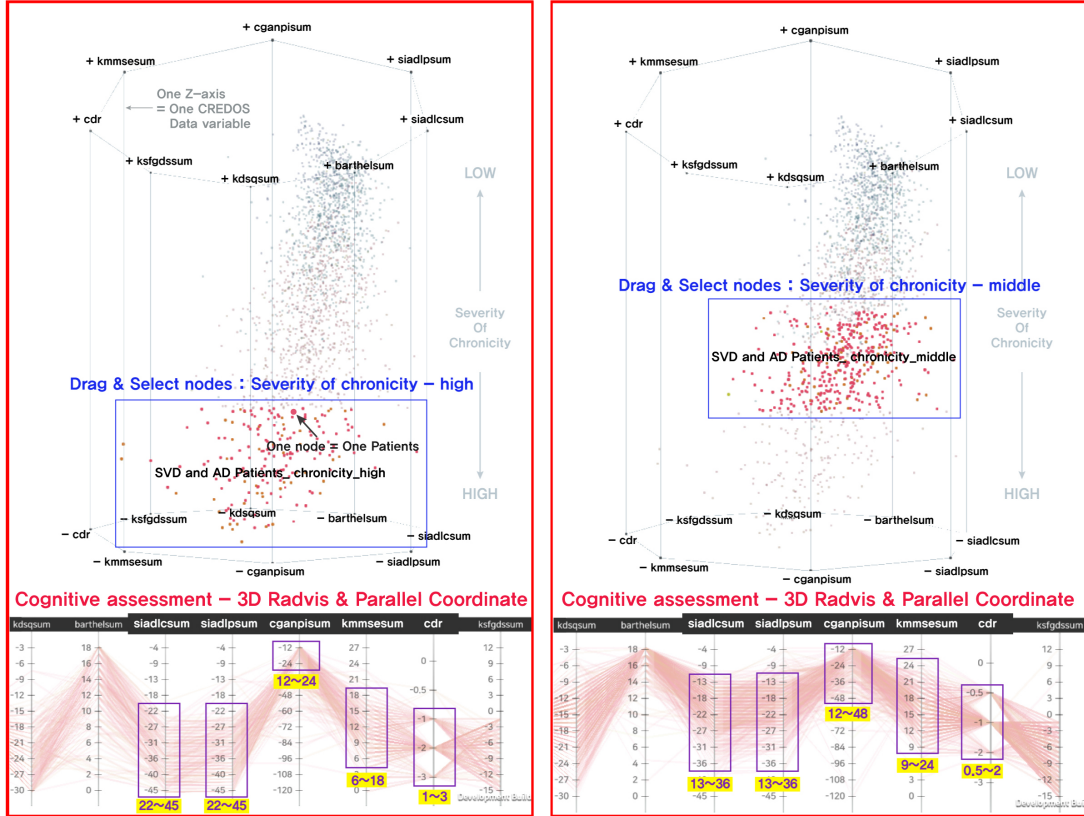


Figure 1. A Visualization analysis system to subdivide dementia diagnosis stages: 3D Radvis and Parallel Coordinates. As our research aims to propose an analysis tool to subdivide patients' diagnose stages eventually to develop a customized diagnosis system, it is essential to identify how the patient group assessment result values are drawn, and to break down such characteristics. Visualization through 3D Radvis enables this subdivision by considering the difference of heights, since the location information of each node ultimately illustrates the medical status of a patient. By interpreting the assessment results presented in 3D Radvis as line graphs in parallel coordinates, we aimed to analyze diagnosis patterns in a more detailed way along with 3D Radvis. (Left) Filtered nodes of high chronic grade among nodes of AD and SVD (Alzheimer's Disease and Subcortical Vascular Dementia), (Right) Filtered nodes of moderate chronic grade among nodes of AD and SVD.

Keywords— Visual Analytics, Information visualization, Health Informatics, Big Data Visualization

ABSTRACT

Dementia is a disease of which early detection and treatment is considered highly important, and the progression of dementia may vary substantially among individual patients. We suggest a visualization facilitating a more detailed analysis through subdividing characteristics within patient groups. The aim of this study is to help build a diagnosis system according to the characteristics of individual patients by proposing an analysis tool that subdivides the diagnosis stages. This paper thus identified data in various perspectives with a multi-dimensional visualization tool, and studied the differences between scores on each diagnosis stage by comparing the diagnosis results. Based upon the refined CREDOS (Clinical Research Center for Dementia of South Korea) data, we visualized the distribution of dementia diagnosis assessment results through two techniques: 3D Radvis with Scatter plots on a three dimensional and parallel coordinate which showed each result

as a line graph. Next, through a case study, key variables were extracted to subdivide the patients. We also designed an analysis method to subdivide a group with a specific disease stage when the chronic grade within the group varies. As a result, variables in cognitive assessments were identified to be more important indicators than physical examinations. If the chronic grades vary within a group of AD and SVD, it appeared to be effective to consider the total score of current functioning and latent ability in S-IADL, CGA-NPI, K-MMSE and CDR (Figure 1). Such findings are expected to be beneficial for medical professionals aiming to diagnose patients according to individual characteristics.

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