

## Health Trajectory Clustering Using Deep Belief Networks

**Authors :** Farshid Hajati, Federico Giroi, Shima Ghassempour

**Abstract :** We present a Deep Belief Network (DBN) method for clustering health trajectories. Deep Belief Network (DBN) is a deep architecture that consists of a stack of Restricted Boltzmann Machines (RBM). In a deep architecture, each layer learns more complex features than the past layers. The proposed method depends on DBN in clustering without using back propagation learning algorithm. The proposed DBN has a better a performance compared to the deep neural network due the initialization of the connecting weights. We use Contrastive Divergence (CD) method for training the RBMs which increases the performance of the network. The performance of the proposed method is evaluated extensively on the Health and Retirement Study (HRS) database. The University of Michigan Health and Retirement Study (HRS) is a nationally representative longitudinal study that has surveyed more than 27,000 elderly and near-elderly Americans since its inception in 1992. Participants are interviewed every two years and they collect data on physical and mental health, insurance coverage, financial status, family support systems, labor market status, and retirement planning. The dataset is publicly available and we use the RAND HRS version L, which is easy to use and cleaned up version of the data. The size of sample data set is 268 and the length of the trajectories is equal to 10. The trajectories do not stop when the patient dies and represent 10 different interviews of live patients. Compared to the state-of-the-art benchmarks, the experimental results show the effectiveness and superiority of the proposed method in clustering health trajectories.

**Keywords :** health trajectory, clustering, deep learning, DBN

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