Interactive Visual Analytics of Image-Centric Cohort Study Data

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Abstract—Epidemiological population studies impose information about a set of subjects (a *cohort*) to characterize disease specific risk factors. Cohort studies comprise heterogenous data variables describing the medical condition as well as demographic and lifestyle factors of a subject. Using well established statistical methods the data is hypothesis driven analyzed to find statistically significant variable correlations ('*interactions*'). Modern cohort studies also incorporate medical image data. Analyzing these data requires image segmentation, extraction of key figures and shape based subject grouping.
We propose a Interactive Visual Analytics approach that enables epidemiologists to examine both image-based as well as sociodemographic and medical attribute data. It allows for both classical hypothesis validation approaches as well as hypothesis generation by incorporating data mining methods. Adaptive linked information visualization views and 3d-shape renderings are combined with epidemiological techniques. Similarity measures between data variables are used to compute interesting changes in variable interactions for the current variable selection. Shape based grouping of subjects is facilitated using hierarchical agglomerative clustering.

Index Terms—Interactive Visual Analytics, Epidemiology

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