TourGuide: Interactive Visual Analysis of Clinical Oncology Data

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Introduction and Problem

Finding patterns in clinical oncology data is challenging. Medical analysts need to deal with multiple entities (patients, tumors, diseases, etc.), a variety of attribute types (textual, numerical, and categorical), and a large number of attributes, including metadata about the patients, their tumor disease, comorbidities, treatments, and outcomes.

Our goal is to support analysts in finding new insights, for example, by comparing patients that have different tumor subtypes, in the context of their comorbidities and their responses to applied treatments.

Material and Methods

After anonymizing the data with state-of-the-art methods, the data is loaded into a predefined ontology that is part of the Calumma clinical research infrastructure (calumma.at). The data is then visualized in the web-based Ordino visual analysis tool (ordino.caleydo.org).

Results

Calumma allows analysts to query the clinical data by non-trivial criteria, and to combine and aggregate data across the whole data structure, including patient metadata, diagnoses, treatments, and outcomes. In Ordino, analysts can interactively select, filter, sort, group, and rank the patient data. When identifying potentially interesting patterns, the analyst can instantaneously verify its statistical significance.

Conclusion

We present a web-based software platform that flexibly supports efficient data preparation, querying, and interactive visual analysis of clinical data.

Note that exemplary medical findings made with our software are described in the abstract "Reasons for failure to give adjuvant chemotherapy in early breast cancer - interactive visual analysis of clinical data with the TourGuide software".

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