

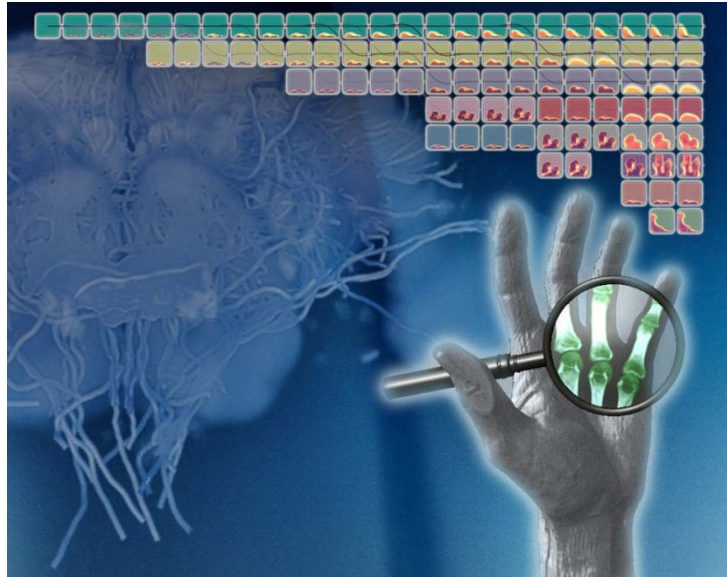
Visual Analysis and Exploration of Volumetric Data – Challenges and Perspectives



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Abstract:

Information technology has led to a rapid increase in the amount of data that arise in areas such as biology, medicine, climate science, and engineering. In many cases, these data – like the underlying phenomena – are volumetric in nature, i.e., they describe the distribution of one or several quantities over a region in space. Volume visualization is the field of research which investigates the transformation of such data sets into images for purposes such as understanding structure or identifying features. However, it is no longer sufficient to only provide means for analyzing individual data sets in isolation. Instead, many thousands of data points, each consisting of a volumetric representation, need to be investigated. Such volumetric data spaces not only require new approaches to data management and transfer, but also necessitate intuitive navigation, interaction, and visualization techniques. In particular, it is crucial to provide efficient facilities to visually explore, query, and retrieve data items, as well as methods to categorize and abstract the space. In this talk, I will outline the challenges involved in building such tools, present approaches on how to overcome some of the obstacles, and provide a perspective on how future research in this field may profoundly impact scientific knowledge discovery.