

Visualization and recommendation of large image collections toward effective sensemaking

Gu, Y., Wang, C., Ma, J., Nemiroff, R. J., Kao, D. L., & Parra, D. (2017). Visualization and recommendation of large image collections toward effective sensemaking. *Information Visualization*, 16(1), 21-47. <10.1177/1473871616630778> Accessed 26 Apr 2021.

Abstract

In our daily lives, images are among the most commonly found data which we need to handle. We present iGraph, a graph-based approach for visual analytics of large image collections and their associated text information. Given such a collection, we compute the similarity between images, the distance between texts, and the connection between image and text to construct iGraph, a compound graph representation which encodes the underlying relationships among these images and texts. To enable effective visual navigation and comprehension of iGraph with tens of thousands of nodes and hundreds of millions of edges, we present a progressive solution that offers collection overview, node comparison, and visual recommendation. Our solution not only allows users to explore the entire collection with representative images and keywords but also supports detailed comparison for understanding and intuitive guidance for navigation. The visual exploration of iGraph is further enhanced with the implementation of bubble sets to highlight group memberships of nodes, suggestion of abnormal keywords or time periods based on text outlier detection, and comparison of four different recommendation solutions. For performance speedup, multiple graphics processing units and central processing units are utilized for processing and visualization in parallel. We experiment with two image collections and leverage a cluster driving a display wall of nearly 50 million pixels. We show the effectiveness of our approach by demonstrating experimental results and conducting a user study..

Keywords

Large image collection, graph layout, progressive drawing, node comparison, visual recommendation.