Challenges in implementing provenance tracking in visualizations

Kiran Gadhave

University of Utah, UT, USA
`kiran@sci.utah.edu`

Abstract. Provenance tracking is considered an important part of visualization systems, but it is difficult to find in-the-wild visualization systems which have provenance tracking integrated. Provenance tracking enables designers to implement features like undo/redo, reproducibility, collaboration, action recovery, adaptive systems, etc.

In visualization research a lot of tools are web-based prototypes. These tools either lack provenance tracking completely or have an ad-hoc solution developed for the project. Developing custom solutions adds complexity to the development process and if provenance data is not relevant to the immediate research goal, designers might completely forgo addition of provenance tracking. Retrofitting provenance tracking in research prototypes is hard if the initial development did not plan for it. The above challenges are not limited to web-based prototypes and similar challenges can be found for desktop or mobile solutions too.

Libraries which add provenance tracking support require a significant amount of work by the designer and usually do not support tracking of multiple provenance types. Different libraries store the tracked data in different formats, because there is no common standard for provenance in visualization systems.

To further understand and address the above problems we should have a discussion on what are the common practical challenges designers face when they want to track provenance in either a new project or add the capability to an existing project. We should also continue these discussion on how to solve these challenges.

We have developed a web-based provenance tracking library — Trrack, which was developed iteratively over two years with feedback from students and software developers in our lab who adopted it in their projects. We published our work as a short paper in VIS 2020 and we continue to work on improving the library. This discussion will help us and other library developers in making sure that the provenance tracking tools fit diverse needs.