Connecting the Dots
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Problem and Motivation
Our project creates an interface for manually creating and sharing metro maps of news stories in a clean and clear way. The primary work on which it is based is Dafna Shahaf’s “Connecting the Dots” project. In her formulation, the selection of stories, the “metro lines” that connect them, and label display are all determined by computer algorithm, while layout is an entirely manual process.

We propose a system that makes layout an efficient and easy task. This is important because a primary advantage of metro maps of news over simple ordered lists, is their ability to inform users about key events more effectively.

That is, on information summarization tasks, a metro map with Shahaf’s algorithmically-chosen lines allows users to more quickly grasp important points (as determined by experts) of complex events like the Greek Debt Crisis. If we give non-designer users a simple and powerful tool for metro map visualization of news, we allow people to connect different news stories, and visually summarize complex series of events, and also frame existing content with appropriate context that’s likely missing from hyperlinks within the text.

Approach
The most important feature we implemented on the editing side of the project was a force-based layout carefully tuned to balance between enforcing a clear, well-spaced, octolinear metro map layout and allowing interactive user editing of the layout. The force-based layout uses the default D3.js force-directed layout, augmented with octolinearity enforcement. Upon each user interaction with the editable map (dragging a node to a new location), the octolinearity constraint is relaxed and then gradually re-introduced. Time ordering follows the same pattern.

With careful experimentation we found a set of parameters that allowed effective user changes to the layout without the fiddliness of manually enforced octolinearity.

After editing, including label placement, in addition to some other work (see “Future Work”) is completed, the project is ready to present. Our presentation mode allows the user to click through the metro map and bring up full text of the stories on a sidebar, as well as “dynamic focus” on any particular metro line, centering the view on that line and fading out others. We also include a tutorial slideshow.

Future Work
Additional features implemented in future work should be focused on making editing more natural and flexible for those without technical backgrounds. Currently, a great deal of the content must be hard-coded; included directly in xml files by the user. While this is still short of the difficulties that making (even static versions of) these timelines in a presentation or image editing program, it’s still not as friendly as letting the user drag-and-drop from query results on a fully pre-processed repository of new stories, with the option to add their own. This would fit with a user-friendly node insertion and path drawing mechanism.

Good-looking dynamic focus still requires a fair amount of manual user intervention. We would like for line-centering to be automatic given an initial layout. More complex metro maps, with cycles or with multiple lines crossing a single edge, still present visualization problems. Force-layout can have a difficult time coping with the former, especially when enforcing left-to-right date ordering, while the latter was aesthetically unappealing under schemes we considered.

More speculative features include a friendlier interface for sharing metro maps, maybe something like manyeyes. Also, a strong alternative to force-based layouts, though it would require significant re-implementation, are mixed-integer programming methods.

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