Responsive Thinwire Visualization

By

Dr. Kenneth Been
Computer Science
New York University
New York

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In this talk I will motivate, describe, and demonstrate a responsive system for visualizing a large geographic data set over a thinwire—-or, informally, an internet map browser for the contiguous continental United States (48 states plus the District of Columbia), with full detail down to street level.

Traditionally, virtual reality, architectural walkthrough, and other related systems assume that there is some minimum bandwidth between user and data. When these systems are adapted to the internet, various techniques are employed to reduce the bandwidth required, but the basic assumption of some minimum does not go away. In this environment, the systems strive to maintain a given frame rate, usually at least ten frames per second.

In contrast, we are interested in the "thinwire" environment, where bandwidth is volatile and unpredictable, and might even drop to zero temporarily. (We include the wireless connection as an example of "thinwire"). While the frame rate model might make sense in this environment, its usefulness is not as great. Instead, we focus on responsiveness. Well known results from psychological studies on cognition and perception provide a model for how a responsive system should behave to give a smooth interactive "feel", despite unpredictable bandwidth. The system I will describe has responsiveness as the primary design goal.

For more information, please contact Dr. Niki Pissinou at 305-348-3987