Subject:
Geographic Routing: paper summary
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Geographic Routing Made Practical
Young-Jin Kim, Ramesh Govindan, Brad Karp, Scott Shenker

Cross Link Detection Protocol (CLDP) is a distributed planar subgraph generation algorithm for arbitrary connectivity graphs.

Geographic routing algorithms provide scalable point to point routing for a network of nodes in 2D space (usually wireless mesh networks). Previous work has used Relative Neighborhood Graphs or Gabriel Graphs as the planar subgraphs that geographic routing algorithms require for routing. However, RNG and GG are only planar under the unit graph assumption, which corresonds to a very idealistic model of a wireless radio. The authors show that this model is invalid for real wireless network nodes and thus RNG and GG will not produce the planar graphs needed for geographic routing in wireless networks. They propose CLDP as an alternative planar graph generation procedure, and give simulation and experimental evidence for its correctness and efficiency in practice.

They dismiss Kuhn's Quasi-Unit Disk Graphs approach as unscalable for degenerate graphs, without showing formally how theirs is scalable in these cases. I think that the second half of the paper (on CLDP) should have been less experimental and more formal. The experimental analysis of the two Mica testbeds was needed to show that the unit graph assumption is unrealistic for wireless devices. But then they waste space showing experimental evidence for CLDP's correctness and scalability while leaving the formal proof to a technical report.

The authors propose looking at the effects of localization errors and node mobility in the future. It might also be interesting to make location an uncertain parameter. Small devices will not have GPS receivers, so they may have to try to guess their location based on current and past neighbors' data and their own movement.

Steve Tarzia