TECH BRIEF

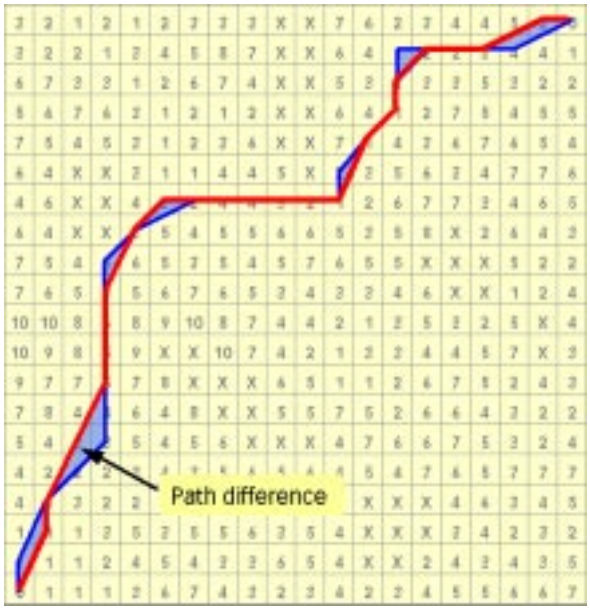
NCRST
NATIONAL CONSORTIUM ON REMOTE SENSING IN TRANSPORTATION
INFRASTRUCTURE

Corridor Location

THE GATEWAY SHORTEST PATH

THE PROBLEM

One of the most difficult aspects of corridor location is to achieve consensus around a good decision. There are constituencies with different interests and emphases (e.g. economic, environmental), and invariably some who are directly impacted by deleterious effects of the proposed facility.



Existing solution approaches employing optimization models usually find alternative paths (blue line) which are only small perturbations of the shortest path (red line). The result is a small area difference between paths as shown by the arrow.

Corridor location software traditionally has two components:

- Calculating the "cost" of a given path through a cost matrix, and optionally,
- Finding an optimal path that minimizes this cost.

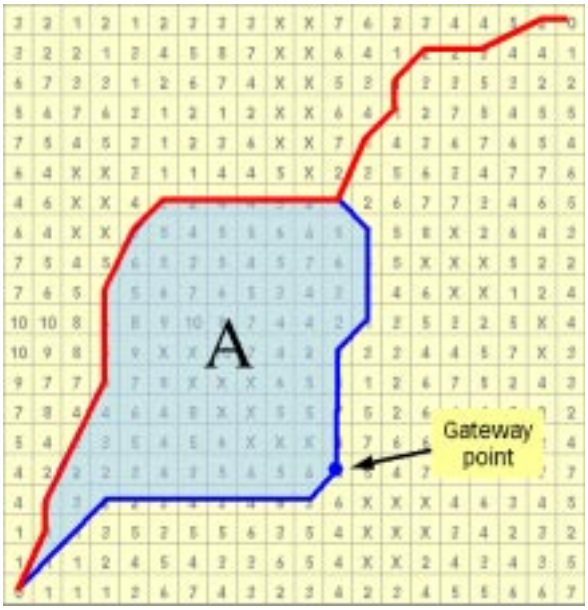
Decision support systems should generate alternatives for consideration that are not only very *similar* to other paths under consideration, but also some that are very *different* spatially, while achieving comparable goals in terms of cost minimization. Proposed paths that have generated conflict and strong emotions can then be reconfigured completely, without significantly sacrificing their logistical benefits.

THE SOLUTION

Researchers at the University of California, Santa Barbara have developed the Gateway Shortest Path Problem (GSPP) approach, which finds spatially different alternatives by selecting "gateway" cells and computing shortest paths that pass through those gateways. The further the gateway cells are from the optimal path, the more likely it is that the gateway path will be significantly spatially different from the optimal path. The result is usually a good alternative in terms of cost since it is after all a shortest path, albeit constrained. The placement of gateway points is a matter currently under study.

ADDITIONAL INFORMATION

www.ncgia.ucsb.edu/ncrst



The figure above shows a gateway path (blue line) found using GSPP that is constrained to pass through the gateway cell indicated by the arrow. The area between the two paths (A) is significantly greater than in traditional optimization methods.

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Research and Special Programs Administration