Default Title

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1 Nearest Neighbor Charge of path not much larger than density-based path distance

Ideas: 1. Assume uniform density. 2. Break into small squares around segments (perhaps overkill), and lay down enough points so that you expect three points per square. (One or two probably suffices). 3. Color a square white if there's no point in it. (If all squares black, then done. Remaining work = bounding contiguous white runs).

Assumptions: Some kind of smoothness on path.

Method: 4. Break path into n log n squares. 5. with high probability no (log n) run of squares will be all white. (Need it so that NN dist within each 'run' can be computed effectively). 6. Now charge each 'run' (of size log n) to the NN dist only from points within the run, within the union of squares of that run. 7. Can constantly approximate it with: sum of squares of contiguous white runs, where you need a multiplier of 2 for white squares that are on the boundaries. 8. Sum of result forms an upper bound on the actual NN distance. Since it is the sum of n independent random variables, it is concentrated around the mean with high probability. 9. Profit? (Something here might have slipped. How would I actually write this out with Chernoff bound or Central Limit Theorem?). 10. Something here fucked up... I would recommend writing out the probability argument formally. The main fuckup is that you showed that if you laid down enough enough points so that exactly n log n squares around the path had three points,, the expected value of the entire thing is concentrated around the mean of hte log-n run. Except that there are way, way too many dependencies here (the run-size, the number of squares, etc. are coupled and you can't set them independently.)

2 Nearest

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