Douglas-Peucker revisited

Stephane Winnepenninckx

DP algorithm

- draw a ‘baseline’ between start & end points.
- Search for the point @ max distance of the baseline. Keep that point.
- do the same with left & right part.

DP used for ...

- reducing the # points needed to represent a Polyline.
- but without changing the shape of the Polyline.

example
DP ends when ...

- ... # points = max allowed points
- ... distance <= max allowed error, in each segments
DP problem

- algorithm is applied when last point is known.

DP results

- pretty good (the best?)
- quality equals handmade solution

? update DP

- I can't wait until the end point
- I can't store all of them
- I can't compute fast enough
- I have to transmit the data over slow or costly network.

example

- geo data must be transmitted over mobile (gsm) network.
- I can't afford the cost of transmitting every geo data.
- I can wait only a little bit.
DPW

- essential point: must be conserved
- observation point: can be promoted to essential point, if not:
- obs points are doomed to be dumped.

DPW

- first obs point is promoted
- same as DP

DPW

- wait ...
- ... until you have two obs points

DPW

- draw a baseline between last essential point and the last obs point.
- is there an obs point further than the max allowed error? promote it to essential
- all obs points behind the new essential one are doomed to be dumped.
DPW

- need to transmit: new essential point
- transmit at regular interval (even when there is nothing to report)

DPW

- repeat ...
- ... for each new obs point

DPW

- need to have a max buffer size
- you never know you are between LA and Las Vegas
- the last obs point is promoted, empty buffer.

DPW results

- not much more points as DP
- nearly the same quality
- not a surprise, cannot see into the future (yet)
- can be extended to non-geo data
DPW problems

- beware of straight lines
- only max error criteria
  max # points is not available.

DPW demo
- real gps track of a swiss paraglider

all points (899)

DP 2D (347/899)
### Results

<table>
<thead>
<tr>
<th>Name</th>
<th>#pts</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP 2D</td>
<td>347</td>
<td></td>
</tr>
<tr>
<td>DPW 2D</td>
<td>375</td>
<td>+8 %</td>
</tr>
<tr>
<td>DP 3D</td>
<td>488</td>
<td></td>
</tr>
<tr>
<td>DPW 3D</td>
<td>492</td>
<td>&lt; +1 %</td>
</tr>
</tbody>
</table>

899 points max err 10 m
Questions

- Thank you to be here
- Hope to see you FOSDEM16
- DPW on non-GEO data

stephane@winnepenningckx.com