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Bridge reconstruction in LiDAR point clouds

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Abstract

TODO

1. Introduction

TODO

2. Terrain reconstruction

The majority of our effort was aimed towards reconstructing the surface underneath the bridge. At the start we tried some basic approaches towards terrain reconstruction and got some insight into problems that we will have to solve. These were:

- how to obtain the area of the terrain under the bridge,
- how to generate points on this area to best reconstruct the terrain and
- how to deal with outliers and other vegetation, power lines and object that are adjecent to bridges.

Our first attempt at solving this issue can be seen in figure **??**.

After some experimentation we have come to an algorhitm which proved very effective in reconstruction terrain under a bridge. We have also chosen a very complex bridge example in order to make our approach as robust as possible. Our example were two adjecent bridges that extended over a moving body of water at an angle. Both also extended over a large portion of the terrain. This example and its reconstruction attempt can be seen in figure **??**.

Our approach:

- 1. define the bridge polygon from the SHP file and remove every point that is determined to belong to a bridge.
- 2. generate values x and y along the bridge in such a way that they run parallel to the valley bellow the bridge.
- 3. sample points from both sides of this line (terrain adjecent to the bridge). If there are no such points to be found sample the surrounging area of the terrain that has already been completed.
- 4. Process the sampled points to remove any objects that aren't terrain.
- 5. Interpolate the z coordinate with distance as a weight on sampled points from 4.

3. Bridge reconstruction

4. Conclusion

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