Viewshed Analysis to Rank Home Privacy

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Geog 593
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Study Area

Scenic, private residential neighborhood along the Sandy River, east of Portland, OR, on the Historic Columbia River Highway

Data Source: Oregon LiDAR Consortium, Sandy River 2011 Lidar Project
ENVI: LiDAR for Feature Extraction

- Building footprints extracted from first-return lidar point cloud

Model Inputs: Building Footprints; Bare Earth and First Return DTM s
Model 1: First tool

Model 1: Add Fields
Model 1: Field Calculator

Model 1: Create Building Layer
Model 1: Polygon to Raster

Model 2
Model 2: Segment 1, Calculate Fields

![Diagram showing process flow for calculating fields]

Model 2: Segment 1, Calculate Fields

![Table showing field calculations]

- Shape_Length
- Shape_Area
- value
- OFFSETA
- RADIUS2
Model 2: Segment 2, Null House and Create Polyline

Model 2: Segment 2, Remove Selected House

Removed house
Retained house
Model 2: Segment 3, Multiple Ring Buffer
Model 2: Segment 3, Polygon to Raster & Reclassify

Model 2: Segment 4, Viewshed
Model 2: Segment 4, Viewshed

Model 2: Segment 4, Calculating Privacy Score
Model 2: Segment 4, Calculating Score

Model 2: Segment 4, Privacy Score: ‘922’.
Results of 5 Test Houses

<table>
<thead>
<tr>
<th>Building ID</th>
<th>Privacy Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1170</td>
<td>No Data (perfect privacy)</td>
</tr>
<tr>
<td>423</td>
<td>1</td>
</tr>
<tr>
<td>1168</td>
<td>25</td>
</tr>
<tr>
<td>1166</td>
<td>705</td>
</tr>
<tr>
<td>19</td>
<td>1234</td>
</tr>
</tbody>
</table>

Issues

Lidar feature extraction errors:

- Some buildings missed
- Some natural features (hedge) classified as buildings
Conclusion

- We have created a reusable tool
- Enhancements
  - Window locations could be used instead of the vertices of the building footprint (note this would require additional data input by the user);
  - Include 2nd and 3rd floors
  - Include outside recreation areas
  - Road visibility
  - Privacy enhancement by the addition of landscaping.

References