Acquisition of Topographic Data by Laser Scanning and Digital Photogrammetry

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Extended Abstract

Data from air-borne laser scanners provide the chance of accurate digital terrain modelling (DTM) in forested areas. With the use of airborne laser scanners dense point sets can be provided with a vertical accuracy of about ±0.25cm in flat terrain. Depending on the system used, the horizontal linear point distances vary from 0.3m to 2.5m. In wooded areas a large portion of the points is not on the ground surface. These points lie much higher, as the laser beam can be reflected in the tree tops. These are the so-called vegetation points. To find the real ground surface an interpolation technique for this asymmetrical error distribution is required.

For this task we proposed to use the well-known linear prediction combined with robust estimation. With this special filtering and interpolation method an automatic classification of the laser points into terrain and vegetation points is possible. The experiences made up to now show, that this method can be used even for a penetration rate of about 25%, if the vegetation and terrain points are mixed thoroughly.

In the future we will concentrate on the modelling of the surface through the tree tops. This surface can be brought into relation with the terrain surface. The volume between these two surfaces is of importance in forestry. For this aim laser scanner data recorded with first and last impulse are of special interest.

The derived contours of a laser scanner DTM are poor in geomorphological detail. Further research and developments are necessary to find the right combination of laser scanner data and other data sources, especially digital photogrammetry. The result will be a high quality DTM for large scale applications.

References

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