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Automatic tree growth observation using laser scanners

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Development and increasing availability of laser scanning technology has been providing new opportunities to researchers to develop new computer vision and 3D modeling applications in order to reconstruct objects of interest in computer environment. In the outdoor environment, trees are one of the most important objects of interest to monitor, model and measure. Trees do vital job for well-being of all living species. They provide beauty, food, protected space for animals, but more importantly, they absorb carbon dioxide and provide oxygen which contributes to environmental circulations. Therefore, for scientists, for municipalities and other government agencies, it is important to track number of trees and to measure their physical attributes for scientific analysis such as carbon dioxide absorbing volume. Thanks to laser scanning technology which provides opportunity to do all these physical measurements in the computer environment without disturbing the nature and also by using less man effort. In the last decade, scientists have offered algorithms to detect trees from laser scanning point clouds and to generate 3D models of them in the computer environment. In this talk, a method to detect individual trees from laser scanning point clouds is introduced briefly. The method also provides trunk measurements of trees which provide important information about the tree growth. The test results are shown for TUDelft campus point clouds which are acquired by different sensors which are; mobile, airborne and terrestrial laser scanners.

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Volunteered big raster data collected through unmanned aerial systems for disaster preparedness and response

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As citizens are quickly embracing emerging mobile technologies, they are shifting spatial data collection practices, performances and knowledge associated with geographic information systems (GIS). Volunteered geographic information (VGI) is presenting the ability to collect geographic information from a heterogeneous spatially distributed population and has been revolutionary for the field of geographic information science. To date, VGI has largely been contributed in the form of vector data (points, lines and polygons), often attached with relevant attributes and multimedia. Unmanned aerial vehicles (UAV) are becoming increasingly accessible to the public due to their diminishing price and improved ease of use, these devices are presenting an opportunity for UAV enthusiast to contribute VGI in the form of raster data. Unmanned aerial systems (UAS) include the use of UAVs, hardware (i.e. GPS, camera) and software (i.e. autopilot) required to run and process the data captured from sensors mounted to the vehicles themselves. Disaster response efforts have long recognized the utility of UAS and GIS for environmental monitoring. Providing a platform for UAV enthusiast to contribute and process imagery could increase the spatial and temporal resolution of imagery already available. Aerial imagery can be used for measuring acute or gradual changes, which inform both disaster planning and response. Here, I present a system aimed to support processing of volunteered raster data before a disaster, that can be used to inform public and governmental decision making by presenting visualizations of complex environmental processes over time at multiple spatial and temporal scales.

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