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Dissertation press release 06.11.2020

Sensing a colourful 3D world with a special LiDAR sensor

Title of the dissertation	Environment Awareness with Hyperspectral LiDAR Technologies
Contents of the dissertation	Lidar is a method for measuring distances using laser light with a sensor. Differences in laser return times can be used to make three-dimensional representations of the target. Lidar is widely used in autonomous cars nowadays due to its capability to sense 3D world. As we know as common sense, LiDAR is always monochromatic, so the world that LiDAR sense is a 3D grey world. Is it possible to sense a colourful 3D world with LiDAR, since the texture of the target contains a lot of information for human being understand the world? Moreover, whether we can also collect more exciting information from the sensed objects, for example, with the capability to see the infrared content which is invisible to a normal camera? In this study, I try to extend the concept of monochromic LiDAR to multispectral even hyperspectral version with the latest developed techniques. And I also examine how such new sensing technology can help for plant science, forestry and mining application. However, the list of the applied research field of such technology is endless. I do believe that the only limitation for the applicability of such a novel sensor is our imagination. Just like the colour photography brings a colossal impact to black-and-white photography. The hyperspectral LiDAR technologies will bring revolutionary opportunity to various research fielding, and environmental awareness is just one of them.
Field of the dissertation	Computer engineering, remote sensing, computer vision, plant science, mining, forestry
Doctoral candidate	Dr Yuwei Chen Born in Hangzhou, China, 1976
Time of the defence	24.10.2020 time 13:00
Place of the defence	Via remote technology
Opponent	Professor Jouni Pullliainen, Finnish Meteorological Institute, Finland
Custos	Professor Antti Ylä-Jääski, Aalto University School of Science, Department of Computer Science
Electronic dissertation	http://urn.fi/URN:ISBN:978-952-64-0077-8
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A doctoral dissertation is a public document and shall be available at Aalto University, School of Science, Department of Computer Science, Konemiehentie 2, main hall at the latest 10 days prior to public defence.