Università Tor Vergata, Roma

Ingegneria Civile e Ingegneria Informatica

GeoInformation PhD Curriculum

4^{th} 2013 GeoInformation Seminar

DISP meeting room, Ingegneria dell'Informazione, 1 Via del Politecnico
14 March 2013, starting at 16:00

Matteo Picchiani

Neural Networks optimization for high-dimensionality retrieval problems in remote sensing

Neural Networks have proven their effectiveness in retrieving geophysical parameters from remote sensing data. However, the application of the neural network algorithm to the inversion of high-dimensionality input vectors is not straightforward, but demands more sophisticated implementation schemes.

An advanced framework to systematically address these issues has been developed and is under test in different domains. Preliminary results will be reported regarding SAR data and MODIS multispectral images for respectively monitoring tectonic and volcanic activities.

Matteo Picchiani received the Laurea (B.S., in 2005) and the Laurea Specialistica (M.S., in 2007) degrees in Telecommunications Engineering from the Tor Vergata University, Rome, Italy, where he is currently pursuing the GeoInformation Curriculum Ph.D. degree.

Since 2007 he has been with the Tor Vergata University Earth Observation Laboratory and has collaborated with the Istituto Nazionale di Geofisica e Vulcanologia in Rome. His research activity addresses the application of remote sensing to geophysics problems, like tectonics and volcanic activity. In particular, his study is focused on the development of a new framework for solving the inverse problem by neural networks optimal modeling.

Christopher Stewart

Remote sensing techniques for subsurface archaeological feature detection

Remote sensing is a recognised asset to archaeological surveys. While techniques exist for ground based identification of buried structures that are neither invasive nor destructive, their application over large areas is both costly and time consuming. Remote sensing techniques offer the advantage of providing a synoptic view and demonstrate the capability to detect features indicating the presence of subsurface structures using instruments that operate in various regions of the electromagnetic spectrum. Techniques currently used in remote sensing archaeological surveys include aerial photography, multi and hyperspectral imaging, thermal imaging, LIDAR, photogrammetry and SAR based techniques.

The aim of this PhD research project is to develop new, and improve existing, remote sensing methods for archaeological prospection. In particular, remote sensing techniques have been developed with multi-frequency polarimetric SAR data and tested over sites in Egypt and Italy. A number of features of archaeological interest have been identified in Egypt. The application of SAR based methods over Italy appears to be more challenging. Anomalies of potential archaeological interest have been identified, but still need to be validated. Optical techniques, including analysis of the spectral signature and photogrammetric terrain analysis have also been applied. Development and validation of existing and new SAR based techniques, taking advantage of new data and external project participation, is foreseen to continue.

Christopher Stewart graduated in 2001 with a Bachelor of Science degree at Stirling University, where he majored in mathematics. In 2002 he graduated at Edinburgh University with a Master of Science degree in Remote Sensing and Image Processing. He is currently undertaking a PhD research project at Tor Vergata University of Rome whilst working at ESA/ESRIN in the Earth Observation Science, Applications and Future Technologies department.

You are cordially invited to attend.

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http://www.disp.uniroma2.it/geoinformation/