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## European Commission researchers' pattern-recognition programme adopted by U.S. services

**As a result of transatlantic cooperation in the field of environmental mapping technologies, a powerful pattern recognition programme developed by researchers at the European Commission's Joint Research Centre (JRC) is being adopted by specialists in a number of U.S. federal agencies including the U.S. Department for Agriculture's Forest Service and the Environmental Protection Agency (EPA).**

The computer programme is based on a system known as **Morphological Spatial Pattern Analysis (MSPA)** and works by following a customised sequence of image processing steps. Its purpose is to detect and highlight the different geometric features of objects within a given image, e.g., recognising various types of geographical land-cover features.

The system has been deployed in US national protocols such as the Resources Planning Act<sup>1</sup>, for improved assessment reports on trends in forests and their status. The US Environmental Protection Agency (EPA) also uses the programme for research studies on wetland habitats. The fruitful co-operation of these American institutions with the JRC has resulted in a number of peer-reviewed scientific papers<sup>2</sup>.

Peter Vogt and Pierre Soille of the Joint Research Centre's Institute for Environment and Sustainability (IES) in Ispra, Italy, developed the programme. The U.S. Department for Agriculture's Forest Service is using the software in the context of a Collaboration Agreement with the JRC. First results from the use of the application are already in demonstration on the *Eastern Forest Environmental Threat Assessment Center's* web-site<sup>3</sup>, detailing the state of American national forest patterns.

<sup>1</sup> <http://www.fs.fed.us/research/rpa/>

<sup>2</sup> For example: <http://dx.doi.org/10.1016/j.patrec.2008.10.015>

<sup>3</sup> <http://forestthreats.org/tools/landcover-maps/mspa>

The ingenuity of the programme is its underlying purely geometric process and the resulting possibility of identifying generic classes of object, which makes it suitable for a vast range of applications. With no need for manual input, the system can, for example, reliably detect physical structures and holes in a digital satellite image.

The technology could also be used to spot manufacturing defects on a circuit board, distinguish between healthy and clogged arteries in medical diagnostics or identify polluted downstream water systems in cases of accident-related environmental crises. It can even provide an immediate solution to any two-dimensional maze within milliseconds, on a standard Personal Computer.

A user-friendly version of the MSPA software application called *GUIDOS* (**G**raphical **U**ser **I**nterface for the **D**escription of image **O**bjects and their **S**hapes) is freely available from the JRC website:

<http://forest.jrc.ec.europa.eu/biodiversity/GUIDOS>.

Image overlays for easy display in **GoogleEarth**<sup>®</sup>, depicting the latest JRC research results on forest patterns in Europe and globally can also be downloaded for free: [http://forest.jrc.ec.europa.eu/biodiversity/Pattern\\_maps/](http://forest.jrc.ec.europa.eu/biodiversity/Pattern_maps/).

The JRC collaborates with a number of American scientific and R&D-related organisations and is currently participating in the annual meeting of the **American Association for the Advancement of Science (AAAS)** in Chicago, where it is presenting its work in a number of symposia on topics including nuclear energy, soil biodiversity, *pre-implantation genetic diagnosis* and nano-engineered food. <http://www.aaas.org/meetings/>

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