

New, content-based geographic map search tool unveiled

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Tomasz Stepinski demonstrates LandEx, a new, content-based geographic map search tool. Credit: University of Cincinnati

A new digital map-search tool will be described by University of Cincinnati Professor Tomasz Stepinski at an international conference Sept. 20. Stepinski said the new tool, known as LandEx, is only the first of several applications to emerge from his research on application of query-by-image-content systems to thematic maps.

Stepinski, the [Thomas Jefferson](#) Chair Professor of Space Exploration at the University of Cincinnati, will present "LandEx - A GeoWeb-based Tool for Exploration of [Patterns](#) in Raster Maps" on Thursday, Sept. 20 at GIScience 2012, an international conference in Columbus, Ohio. The paper is co-authored by Stepinski and colleagues from the University of Wroclaw and Adam Mickiewicz University in Poland.

LandEx (for "Landscape Explorer") uses the National [Land Cover Dataset 2006 \(NLCD2006\)](#), a very large map derived from Landsat multispectral images, to enable example-based queries for localities across the [United States](#) having patterns of land cover similar to user-selected reference. In other words, if a user selects a specific area within the United States, LandEx will identify all areas in the United States with similar patterns of land-cover.

The LandEx [tool](#) is currently available online to allow researchers and educators to explore its capabilities.

"Much research went into development," Stepinski said. "How to measure similarity between patterns, how to do the search, how to display the results, how to speed up the search; all must be decided."

In NLCD2006, 16 different categories of land-cover are shown using different colors resulting in a complex patterns of colors and shapes that requires sophisticated methods for their description and comparison.

"The ability to search large volumes of data for similar patterns is taken for granted in many fields," Stepinski said, "but to the best of our knowledge, our work is the first to develop a [search tool](#) for land-cover maps or similar spatial data sets."

LandEx is among the projects underway at the Space Informatics Lab, established by Stepinski at UC in March 2011. The Space Informatics Lab is located within UC's Department of Geography, and its work is supported by UC's [Space Exploration](#) Research Fund, as well as research grants from the NSF and NASA. The Space Informatics Lab specializes in developing intelligent algorithms for fast and intuitive exploration of large spatial datasets and aims at the development of tools which would make intelligent exploration of vast spatial data accessible and intuitive.

Having demonstrated the concept with land cover data, Stepinski said his lab is looking for other applications.

"The general principle can be used to search and explore all spatial data including topographic data, climate data, soil data, ecosystems, and socio-economic data collected by the U.S. Census Bureau. The ultimate goal is to offer the user a total search for a sense of place," Stepinski said. "It would allow someone to ask very complicated geographic queries very quickly and get answers in real time."

Provided by University of Cincinnati

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