Researchers detect fake art from originals

As museums continue to digitize their art collections, it becomes increasingly easier for paintings to be forged. Two Penn State researchers are part of an international team working on a digital system to help detect original works from counterfeit ones.

James Z. Wang, associate professor of information sciences and technology, Jia Li, associate professor of statistics, and their colleagues published their work in the July issue of *IEEE Signal Processing.*

The team's findings are based on 101 high-resolution grayscale scans of van Gogh paintings provided by the Van Gogh and Kröller-Müller Museums in the Netherlands. Wang and Li broke each scan down into sections measuring 512 by 512 pixels, or about 2.5 by 2.5 inches in canvas size, and analyzed them based on patterns and geometric characteristics of the brush strokes.

From the 101 scans received from the museums, art historians identified 23 as unquestionably authentic van Gogh works. These were used by the computer system as a training database for van Gogh's brushstroke styles.

Statistical models were created to capture the unique style, or "handwriting," that became the artist's signature in 23 of the scans. The other 78 -- either works of van Gogh, works of van Gogh's peers or paintings that had at one time been attributed to him but later found to be unauthentic -- were compared against the generated models to test the algorithms.

Wang and Li, along with computer science and engineering doctoral student Weina Ge, compiled those findings into an online system that allows any painting to be compared against existing data to help determine its authenticity.

The painting analysis project results were first presented at a workshop at the Van Gogh Museum in May 2007. Other authors of the paper, "Image Processing for Artist Identification: Computerized Analysis for Vincent van Gogh's Painting Brushstrokes" include: C. Richard Johnson Jr., Cornell University; Ella Hendriks, Van Gogh Museum; Igor J. Berezhnoy, Phillips Research Europe; Eugene Brevdo, Shannon M. Hughes and Ingrid Daubechies, Princeton University; and Eric Postma, Maastricht University.

Although the research in this field is just starting, Wang said he is confident about its future.

"I believe it is very important to study arts and cultural heritages. Through tackling these tough problems, we can advance the core technologies at the same time," he said. "I anticipate computer scientists, art historians and mathematicians to collaborate more in the future."

The project was recently featured on the PBS TV show NOVA:ScienceNow, where they identified a forged van Gogh among a group of six paintings. The National Science Foundation supported this work.

For more information on the digital painting analysis project, visit: http://www.digitalpaintinganalysis.org

Source: Penn State