

Physicists Help Police with New 3D Hologram Technique

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Forging wills and bank cheques could now be near impossible thanks to a team of physicists in Rome (Italy). Writing in the latest issue of the Institute of Physics journal, *Journal of Optics A*, the scientists announce a new technique that can detect forged handwriting better than ever before.

Professor Giuseppe Schirripa Spagnolo, Carla Simonetti and Lorenzo Cozzella from the Università degli Studi "Roma Tre" in Rome, Italy, have devised a forgery detection method that **creates a 3D hologram of a piece of handwriting and analyses tiny variations and bumps along its path using two common scientific techniques: virtual reality and image processing.**

Until now, detecting forged signatures or handwriting has generally been done by experts who analyse the sequence of individual “strokes” in a piece of handwriting using normal, 2D samples. However, a good

forgery can go undetected at the 2D level because it isn't always easy to determine the exact sequence of strokes.

Schirripa Spagnolo's team create 3D holograms of the path of a piece of writing, generating an image on a computer that looks like a ditch or furrow. This makes it easy to analyse variations or "bumps" generated by the writer's pressure on the paper at cross over points, for example the mid-point of the figure eight.

The most common technique used by forgers is tracing, although in real life no two signatures are ever identical. A more sophisticated method is known as the "Freehand Technique" and here the forger copies the general style and characteristics of the handwriting they are trying to copy. However, in both cases it is almost impossible for the forger to reproduce the exact variation of pressure used by the original writer.

Professor Schirripa Spagnolo said: "Using image processing and virtual reality makes it easy to detect the presence of bumps at cross-over points. Finding these bumps allows experts to easily determine the sequence of strokes in a piece of handwriting and the tell tale signs of a forgery or original. Another benefit of this technique is that it doesn't damage the sample."

The Rome team used their technique, known as "3D Micro-Profilmometry" to analyse hundreds of different handwriting samples made using a variety of different paper types and pens. They have also applied their technique to wills and cheques and successfully detected forgeries in both.

Professor Schirripa Spagnolo said: "We believe this type of 3D micro-profilometry is one of the most promising ways of detecting forged handwriting, and it will be a powerful tool for forensic experts around the world."

Paper: [Institute of Physics' Journal of Optics A](#)

Source: Institute of Physics

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