



J9 Distinguishing Characteristics of Robotic Writing

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After attending this presentation, attendees will be familiar with the characteristics observed in machine-simulated writing.

This presentation will impact the forensic science community by alerting the forensic document examiner of the advances of robotic writing technology and the features that distinguish robotic writing from genuine handwriting.

Robotic handwriting has been long in the making, dating back to the 18th century. Since the 1940s when the Robot Pen became commercially available, autopen devices with advanced features have been used to reproduce an exact copy of a person's signature. In the field of forensic document examination, the term "autopen" has become a standard for all signature-duplication machines. These autopen devices are used to replicate signatures of government officials and also major corporate companies, so these influential leaders and business people can apply their time elsewhere without removing the touch of personalized correspondence and the authenticity of official documents.

Today, in an era of rapid proliferation of digital devices, handwriting has become an unconventional, vintage skill. But, with the advent of new technology, it is possible to mimic an individual's handwriting to generate customizable written documents with the use of digitization, mechanics, and software programming. Programming and mechanics work together to encompass pen positions, speed, and letter form, then integrate that into writing onto paper via a robot. The robot can simulate pen movements, including pen lifts and touches, by operating along three linear axes that move simultaneously. To an untrained eye, the product of this machine is a document that can be mistaken for a genuine, handwritten correspondence by the individual whose handwriting is being simulated.

To reveal the distinguishing characteristics of such technical reproductions of one's handwriting, a study was conducted. Robotic writing samples of six individuals were compared to known, genuine writing samples of the same individuals, including directed and collected samples. Distinct features observed in the robotic samples included even pen-pressure, variable sequence of up strokes and down strokes, and the superimposition of letter forms. Examination, comparison, and evaluation of these features in both the questioned and known samples revealed substantial and significant dissimilarities and resulted in an opinion of non-genuineness.

Technology can certainly assist humans, but it cannot entirely replace humans in the area of writing. Handwriting is an acquired, perceptual motor skill requiring the melding of the mind and body. A person's handwriting is made up of a complexity of habitual patterns and can be identified based on the presence of individualizing features. Careful examination of the structural features as well as dynamic features of a particular writing can aid an examiner in recognizing when a robot is being used. This presentation will confirm the inconsistencies between the human hand and the robotic arm.

Reference(s):

1. McCarthy F., Winchester J. The Autopen. *Journal of Forensic Sciences*. 1973, 18(4), 441-447.
2. *History of Computers, Computing and Internet History*. Accessed July 31, 2017, <http://history-computer.com/Dreamers/Knauss.html>.
3. *Send Handwritten Notes*. Accessed July 31, 2017, <https://bond.co/>.

Questioned Documents, Robotic Writing, Autopen