

It's Palm, Not Palmer

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Character recognition technology for handheld computers often incorporates the use of novel systems of writing. This paper describes the Graffiti® writing system used with the PalmPilot series of handheld computers and its implications for forensic handwriting examinations. As the writer becomes accustomed to using Graffiti®, certain characteristics may carry over into non-Palm writing. Handheld computers are becoming part of daily life, and the writing systems used with them, like Graffiti®, may become part of a Forensic Document Examiner's workload.

Introduction

Handheld computers have moved from novelty to fad to trend, becoming a significant element in the information technology picture (Railsback and O'Niell, 1999). As with any computer technology, each new and improved model reaches the market more quickly than the last. Though the popularity of the handheld computer might prove to be transient, its implications for handwriting identification may linger.

Materials

The Palm series came to dominate the handheld computer field, and by mid-1999 the company (a subsidiary of 3Com Corporation) claimed a 72% share of the worldwide market with distribution in more than 35 countries (<http://www.palm.com>). The original models, introduced in 1996, were called the Pilot 1000 and the Pilot 5000. In 1997 the first models with the designation "Palm" were introduced—the PalmPilot Personal and the PalmPilot Professional. The third generation, the PalmIII, released in 1998, was the first to omit "Pilot" from the name, although many people continue to refer to any 3Com model as a "PalmPilot." The fourth generation debuted in February 1999 with the Palm IIIx (a more powerful version of the Palm III), and the Palm V. The latest models released are the Palm VII and the Palm IIIe (there were no Palm IV or Palm VI models).

A paper (Kruger, 1994) was presented at the ASQDE meeting in 1994, on the topic of hand-

writing recognition by handheld devices and the forensic implications of this technology. The paper discussed the Newton MessagePad, a product that was designed to recognize the user's handwriting and convert it into type. This machine had to be pre-programmed to recognize many different basic forms of each handwritten character in order to cope with the wide range of individual variation in letter formation, stroke order, etc. Even with an extensive library of letterforms in memory, the Newton Message Pad still required "training" to overcome inter-writer variation (or what could be termed individual writing habits). Instead of using this approach, the PalmPilot's designers reverted to a concept used in the early days of Optical Character Recognition (OCR), when special fonts were designed for the convenience of mechanical readers rather than human readers. Palm's designers decided not to program their handheld to understand the user's writing; instead, they would teach the consumer to write so the computer would understand.

Discussion

Graffiti®, the writing system used by Palm devices for data input, may appear a bit strange to the eye but, like the OCR fonts, it is easily recognizable by the computer. The writing system can be learned quickly and becomes second nature to many users. Palm owners have been known to use Graffiti® characters even when they are not writing on the Palm. At a business meeting one may well see a presenter using Graffiti® characters on the whiteboard with everybody else in the

basic character forms illustrated in the PalmPilot Graffiti® Reference Card (Fig. 3), the device will understand alternative formations for many characters. Variations from the letter formations are described in *PalmPilot: The Ultimate Guide* (Pogue, 1999). It is possible to choose within a set of class characteristics, which may create an ensemble of class or subclass characteristics that could "contribute meaningfully toward individualization" of a person's writing (Thornton, 1986).

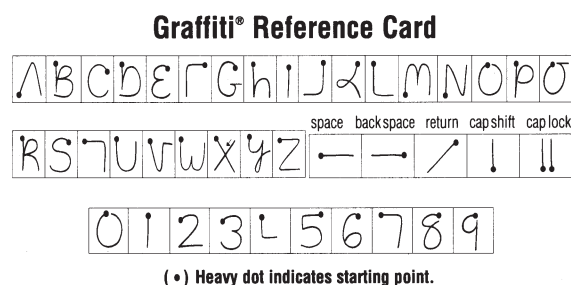


Figure 3.

It is recommended to write Graffiti® vertically, not on a slant. In addition, letters should be made large, as the longer the strokes, the more material there is for the PalmPilot to recognize. A document written entirely in large, vertical upper case printing except for the "H" in lower case, where the "E" is in cursive style, the letter "T" is written like a "7," and the letter "F" like a Greek capital "G" (gamma), may well be by a Graffiti® user. Other habits that may carry over into daily non-Palm writing include the use of two dots for a period, and a dash instead of a space.

Graffiti® as a writing system

Writing habits influenced by use of Graffiti® might be evaluated as class characteristics of Palm users. Of course, incorporation of one or more of the special characters (or alternate forms), or other writing habits from Graffiti® into a more traditional style of writing is an individual matter. In a hybrid writing style with some Graffiti® elements, or even with a full Graffiti® style writing, the combination of elements may result in a distinctive ensemble of class or subclass charac-

teristics. Finally, as with any writing system, a certain amount of divergence is allowed before legibility is compromised, even for a computer. This level of individuality in the execution of a Graffiti® character can appear in the angularity or roundness of turns, the angles of strokes to each other, or internal proportions.

Today handheld computers are becoming part of daily life, and the writing systems used with them, like Graffiti®, may become part of a forensic document examiner's workload.

References

- Railsback, K., and O'Niell, L. (1999). Invasion of the Handheld Computer: New Applications Are Helping Handhelds to Get a Foothold in the Enterprise. *Infoworld*, August 2: 35-36, 38.
- Palm. Online. Internet <http://www.palm.com/news promo/corporate/overview.html>. PalmPilot Reference Card®, (1997) 3Com Corporation.
- PK Palm Pilot Page. Internet. <http://www.imperial-consulting.com/pilot.html>
- Kruger, D. (1994). "The Newton MessagePad 110-The Next Generation," presented at the Annual Meeting of the American Society of Questioned Document Examiners, Long Beach, CA, August.
- Pogue, D., (1999). *PalmPilot: The Ultimate Guide*. 2nd Edition. O'Reilly & Associates. Sebastopol, CA.
- Thornton, J. (1986). Ensembles of Subclass Characteristics in Physical Evidence Examination, *Journal of Forensic Sciences*, 31:2 501-503.