Designing Biometric Devices

By Robin Springer

"Universal design of biometric technologies will do for the biometric industry what the Universal Serial Bus (USB) has done for the computer industry" says William J. Lawson, PhD, biometric technologies advisor for the International Center for Disability Resources on the Internet, introducing the oft-overlooked aspect of accessibility into the implementation of biometrics.

Many people think of biometric deployments in the context of a single biometric challenge that is used for identification or verification of an individual's identity, focusing on the product without giving much thought to the user. While biometrics are intrinsically accessible for people who are disabled, (the technology allows access without requiring a quadriplegic to type a password or someone who is cognitively impaired to remember a PIN) a single biometric cannot accommodate all users. A quadriplegic may not be able to swipe a card. A blind individual cannot utilize visual cues necessary to perform an iris scan. An amputee may be precluded from fingerprint identification.

Dr. Judith Markowitz, president of J. Markowitz, Consultants explains that even when all biometric indicators predict usability, enrollment is not always successful, "Some people may speak perfectly well but can't use speech recognition or voice verification for apparently unknown reasons." This anomaly is consistent across biometric identifiers.

If an alternative authentication method is not available, the probability of discrimination is increased so integrating additional means of authentication, whether by traditional screening or additional biometric challenges, does not just facilitate universal design principles, it makes good design sense.

Some biometrics experts argue that multiple biometric challenges dilute the quality of the results while others believe that each biometric challenge adds an additional layer of security. Addressing multiple identification challenges in the context of accessibility, the discussion morphs into one of usability and even of legislative requirements.

This issue is clearly addressed on a Federal level in Section 508 of the Rehabilitation Act of 1973, which mandates that any product utilizing biometrics must also include an additional method of identification or activation that is not based on biometrics.

How then, do we design biometrics to be user-centric? What if we start by looking at disability as a culture instead of a quadriplegic being unable to walk? His life experience is different from someone who is not in a wheelchair. Asking how people are going to be impacted by the product can expand our sensitivity to users' needs. Could someone who is deaf use this? Would an individual with arthritis be able to use this? What about my child? Or my grandmother?

Ensure that alternative access modes provide the same functionality and convenience as the original device. If the alternative is too complicated, it's probably not the right solution. And don't be afraid to ask for help. Consultants are available to assist in identifying potential problem areas and in building accessible solutions.

Neil G. Scott, director of the Archimedes Hawaii Project, believes products will be most useful when they are intent driven, "Providing verbs is easy. Providing nouns is difficult." Scott's Intelligent Tasking System (iTASK) enables users to completely control computers and electronic devices with the use of speech recognition, head tracking and eye tracking. "People know what they want to do but they may not know the steps to get there." He believes users need to be able to state their intent to the computer and the computer needs to identify the necessary steps and implement the action.

Lawson envisions a fusion of a contactless smartcard with a contactless biometric that incorporates a two-stage interface process. The first stage of the interface identifies the user's preferred mode of authentication (voice, fingerprint, etc.). In the second stage the proper biometric authentication challenge or response is presented to the individual requesting access. If in Stage One the user was identified as blind or as preferring an audible prompt, Stage Two would initiate the appropriate challenge.

X-Pass, by Secure Biometric Corporation, while still a prototype, is a modular card that was architected as a platform, compatible with many algorithms and programs, and intended for embedded systems. Michael F. Shapiro, president & CEO of Secure Biometric Corporation explains, "We wanted to create an enabling technology as opposed to a total solution. The platform will accept any number of biometrics and interact with any other systems."

X-Pass can emulate a magnetic stripe card, among other devices, so institutions implementing the solution can keep their existing infrastructure. The card holds multiple templates (voice, fingerprint, PIN, etc.) and will soon include GPS and GSRP. Because authentication is completed via certificate exchange, the biometric templates never leave the device, precluding privacy issues.

In the real world a quadriplegic can complete virtually all of his banking tasks on the computer. He can check his balance and pay bills, perhaps using speech recognition to dictate his password, enter payment amounts, and for command and control. But, if he is scooting about town and needs some extra cash, he is going to be hard-pressed to type his password at the ATM. He is required to expose his secure information (his password) to gain access to his money.

Imagine the power of a universal biometric device in this scenario. The user keeps the card in his pocket. The sensor at the ATM identifies the individual as a bank customer and provides the preferred biometric challenge, which is not subject to hacking or eavesdropping.

Emerging technologies are proprietary in nature and, as such, initially there are no standards to address usability concerns. If we can design biometric devices that will provide security, access, and control, while incorporating universal design, perhaps it will be more compelling to discuss disability as a culture instead of as a limiter.
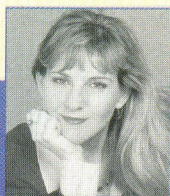
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