

Basic Biometric Fingerprint Concepts

Enrollment

Refers to the entire process of capturing a fingerprint image, extracting relevant data, creating a record with user information, and storing the record to memory. Overall system performance will be increased by also evaluating the quality of enrollment before deciding to store the record.

Verification (Authentication)

This is the operation of comparing a live fingerprint against the corresponding record stored during enrollment. A result of pass or fail is returned based on whether the score was above a pre-defined threshold value.

Scanning an Image

When the reader properly reads a fingerprint, it looks for image quality and fingerprint content. When a raw image is collected from the sensor, the reader searches for the fingerprint core.

Proper Finger Placement

The basics for successful operation of the fingerprint readers are simple but important. System performance improves dramatically with consistent finger placement. It is important to make sure that the position of the finger allows the reader to record the unique features of the print. Here are the steps to follow for trouble-free fingerprint recognition.

Bioscrypt has designed the Ridge-Lock to create “simple user instruction” and “consistent” finger position. With the fingertip raised, slide the finger across the RidgeLock, until it “locks” into place within the first indentation of the finger. Next, lower the finger onto the sensor and apply moderate pressure.

Common mistakes

Correct finger placement is a significant component for reliable fingerprint imaging. The following list some common mistakes to avoid.

- Sliding the fingertip into place instead of lowering it onto the sensor will cause distortion of the fingerprint and will degrade image quality. Keep the fingertip raised while locating the Ridge-Lock, and then lower the fingertip.
- Rotating the finger into position also will cause distortion of the fingerprint, subsequently making verification less reliable.
- Positioning the finger to one side and leaving a portion of the sensor exposed will degrade image quality.
- Placing the finger at an angle to the finger guide is another common mistake. Rotation of the fingertip will not provide a reliable image of the fingerprint.

Image Quality

The quality score is based on how well the ridge pattern is defined within the fingerprint image that was enrolled. In other words, quality measures how clearly the reader imaged the fingerprint. Poor quality enrollments can result in an elevated rate of false rejection making it difficult for the user to verify reliably. For best image quality, be sure that the sensor window is clear of dirt, residue, or other material that can block the reader’s view of the fingerprint

Dry skin is another factor that can contribute to an unreliable image of a fingerprint. A normal amount of moisture on the skin makes the ridges and valleys of the fingerprint stand out to the sensor. Too little moisture makes the image “noisy” and will cause the reader to reject the image during processing. Lightly moisturizing the finger will enhance the contrast of the print and provide more reliable verification. The increased sensitivity of the silicon sensor is dramatically reducing problems in this area.

Content

The Content score is based upon the amount of usable information the reader sees in the fingerprint. Templates that are characterized by low content scores may result in elevated rates of false acceptance. The higher the content, the greater the degree of useful information.

Image Consistency

Once a user's fingerprint template has been enrolled, the best performance in the candidate matching process depends on consistency. Obviously, the user must use the same finger for ID verification as was used to form the original template. It also is important to position the finger correctly for each verification, as was done when the template was originally enrolled. The goal is to present consistent placement to the reader so the reader sees approximately the same information each time.

Content and Quality Summary

Quality and Content Minimum Thresholds

Score	Poor Range	Normal Range
Quality	< 40	>= 40
Content	< 20	>= 20