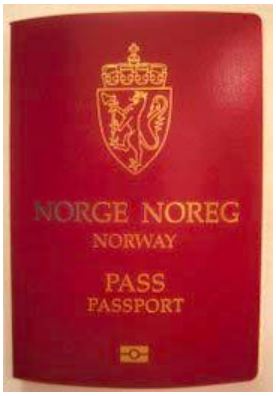
Hand Biometrics Technology

Student Worksheet:

Biometrics (ancient Greek: bios ="life", metron ="measure") is the study of methods for uniquely recognizing humans based upon one or more intrinsic physical or behavioral traits. In information technology, "biometric authentication" refers to technologies that measure and analyze human physical and behavioral characteristics for authentication purposes. Examples of physical (or physiological or biometric) characteristics include fingerprints, eye retinas and irises, facial patterns and hand measurements, while examples of mostly behavioral characteristics include signature, gait and typing patterns.

Sample Applications



1. Since the beginning of the 20th century, Brazilian citizens have used ID cards that incorporate fingerprint-based biometrics.
2. Microsoft has introduced a fingerprint reader that prevents computers from being used by unauthorized people.
3. Some countries have implemented biometric passports that combine paper and electronic identity -- using biometrics to authenticate the citizenship of travelers. The passport's critical information is stored on a tiny RFID computer chip. The icon is incorporated onto most biometric passports to indicate the technology.

Hand Geometry Biometrics

Hand geometry is a biometric that identifies users by the shape of their hands. Hand geometry readers measure a user's hand along many dimensions and compare those measurements to measurements stored in a file.

Viable hand geometry devices have been manufactured since the early 1980s, making hand geometry the first biometric to find widespread computerized use. It remains popular; common applications include access control and time-and attendance operations.

Since hand geometry is not thought to be as unique as fingerprints or retinas, fingerprinting and retina scanning remain the preferred technology for high-security applications. Hand geometry is very reliable when combined with other forms of identification, such as identification cards or personal identification numbers. In large populations, hand geometry is not suitable for so-called one-to-many applications, in which a user is identified from his biometric without any other identification.

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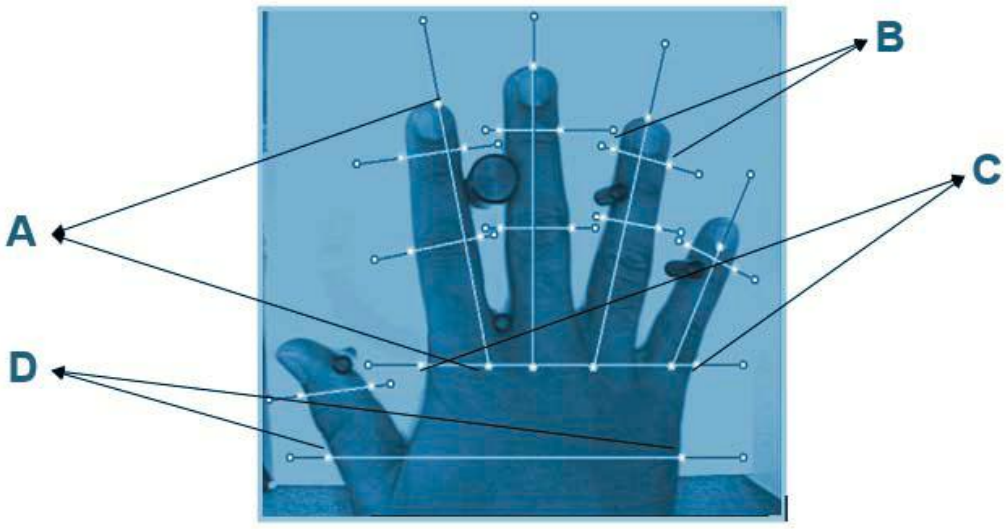
Biometric templates contain information extracted from biometric traits. The resulting codes can be used for identification in a variety of situations. In this activity, you'll determine your own personal hand geometry code.

Step One:

1. Trace your right hand on a piece of paper, keeping the pencil as close to your skin as possible.
2. Using a ruler, measure the following in centimeters (see diagram below):
    a. Distance from index fingertip to bottom knuckle _____cm
    b. Width of ring finger, measured across the top knuckle _____cm
    c. Width of palm across 4 bottom knuckles _____cm
    d. Width of palm from middle knuckle of thumb across hand _____cm



3. Record the 4 numbers in A, B, C, D order, which is your personal hand geometry code:
    ____ _____ _____ _____

Step Two:

Have someone else in your class trace your right hand, and repeat the measurements above. Record the 4 numbers in A, B, C, D order…are there any differences?

____ _____ _____ _____

(Note: Biometric information on this page is provided by and used with the permission of The National Biometric Security Project (NBSP). Duplication is permitted for educational purposes only.)

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You are a team of computer engineers meeting to determine whether personal hand geometry templates or numbers would be unique enough to serve as an element in a new security system for a museum.

Evaluation Phase

As a team (if working with a partner), examine the geometry templates you have received. These will represent the codes of staff that need to access the museum during evening hours to check on the security of a group of priceless paintings. Discuss and answer the following questions to help form your plan for incorporating biometrics into the museum's new security system.

1. How similar were the geometry template codes you examined? What did you observe that was most similar? What did your team determine to be different in the group?

2. What problems do you envision an employee might encounter as they placed their hand in the biometric scanning device?

3. Are there any guidelines your engineering team would recommend regarding either capturing the codes from each employee, or in scanning the employee's hand at the entrance to the museum?

4. Do you think that fingerprint scans would be more effective? Why? Why Not?

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Biometrics can be applied to many situations, such as computer login security, employee recognition, time or attendance record systems, and voter identification. As a team of "engineers" describe three other situations where you think engineers should consider incorporating biometrics technology to solve problems.

Please indicate whether any of these situations might warrant at two-level system, where hand biometrics is one of the two levels of verification:

1.

2.

3.

At Walt Disney World, biometric measurements are taken from the fingers of guests to ensure that the person's ticket is used by the same person from day to day. Do you have privacy concerns about this? Why? Why not? If you were part of the engineering team on this project, what would you do to ensure privacy?