



RET Site: Cyber Security Initiative for Nevada Teachers (CSINT)

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Facial Recognition, Retina, Fingerprints, Hand Geometry, Voice, and DNA **Biometrics**

Introduction

The purpose of the study is to examine and demonstrate the awareness of Cyber Security in the field of Biometrics that make a connection to the techniques and methods used in Graphic Design

Graphic Design

Graphic Design is in a sequential CTE program. The integration of biometrics will be applied in Design 2 and 3 to inspire and prepare students for careers in high-wage, high-skill, and/or high-demand fields such as Cyber Security.

Outline of Unit Lessons

- Concept of Identity
- Biometrics Systems
- Image Processing
- Integration of Mechanical Drawing Skills
- Assessment

Theory of Identity

Research and essential questions on Identity.

- What does identity mean to you?
- Why is identity important in relationships, in a multicultural society, and for security?



The work of Angela Dass creates a see, think, wonder discussion about Identity.

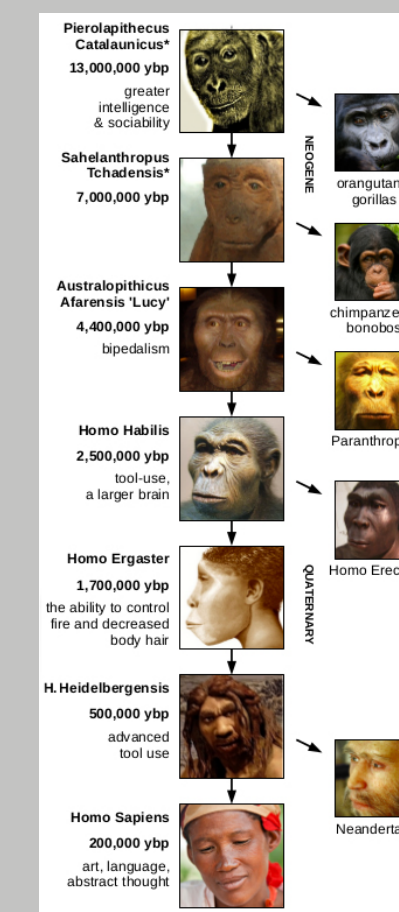
- Models such as ID, keys, passport are used to distinguish traditional methods of identification.

The History of Identity

Students make observations based on dates and images.

The activity is to make assumptions how the features became more human as each period advanced.

They share ideas and add new insight to the discussion.



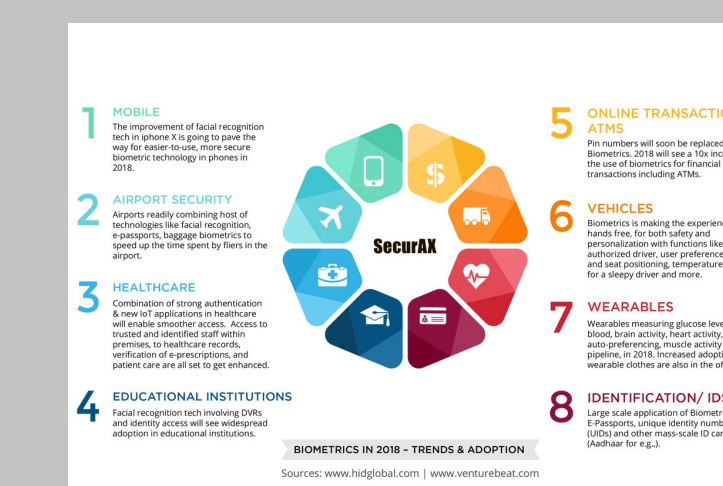
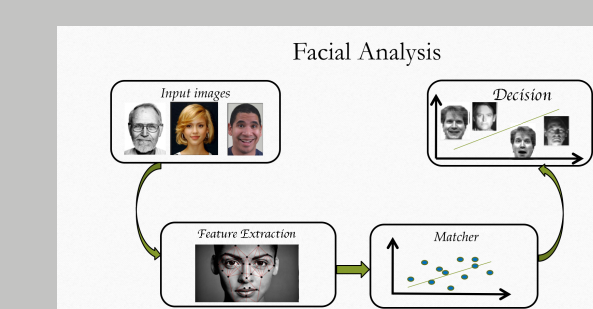
Theory of Biometrics

Biometrics and it's Applications

The lecture is of the Biometric's

- SENSORS such as camera and scanner
- Feature extraction
- Matcher
- Decision

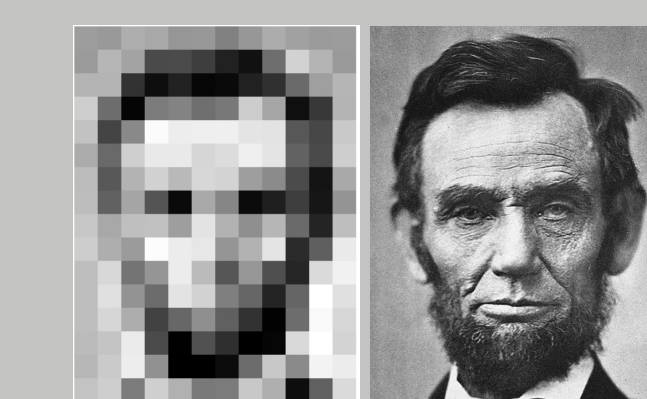
Defining each block of the system as well as how the process works in relation to the face, fingerprints, retina, voice, and DNA.



- What personal devices do you own that require an identification?
- How is the use of Biometrics a violation of identity?
- How does the use of Biometrics insure our security?

From Biometrics to Image Processing

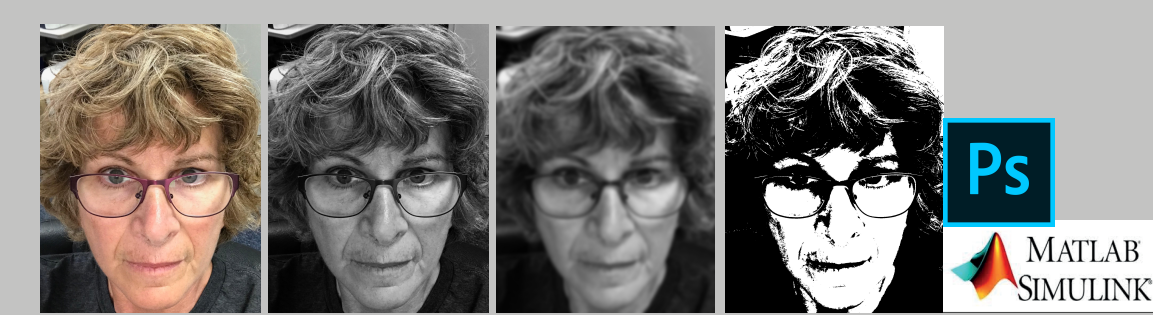
All Biometric processes utilize images, What is an image?



- Display a pixelated image
- QTF (Question Formulation Technique) Students ask deeper more meaningful questions
- Demonstration to capture images from the internet
- Apply the rules of copyright. Use examples of images such as Snapchat and Instagram.
- Discuss the sharing of digital information and solutions to keep information more private.

Digital Image Enhancement

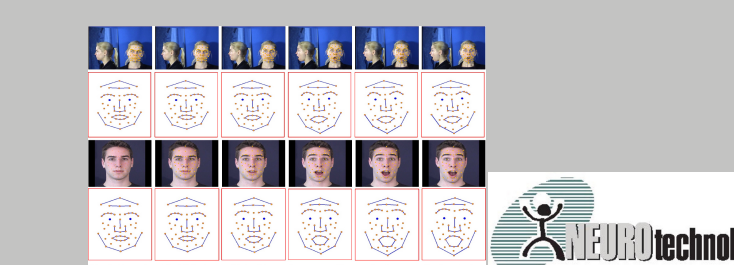
Filtering



- **Activity 1** Students perform filtering techniques in Photoshop. They will read a color image into grayscale, perform abinarization, and edge detection.
- **Activity 2** Students will perform the same activity in Matlab. and assess the results of the two filter procedures.

Face Detection

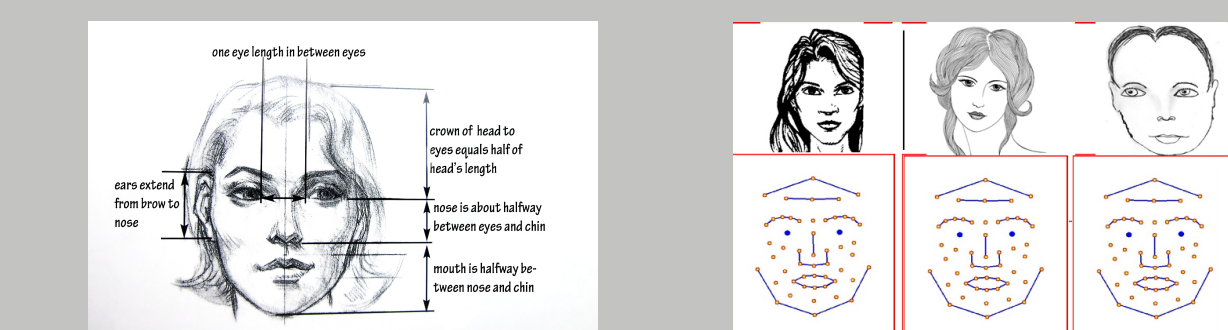
Build and Test a Biometric System Based on Face Analysis



- **Activity 3** Students build a data base and test the system Performance based assessment by analyzing theory versus practice.
- **Activity 4** Students will try to spoof the system taking a variety of images in lighting situations and image rotation to train the system for analysis.

Drawn Image Quality Assessment

Lesson on the Facial Features is Assessed by a Match of Measurement.



- **Activity 5** Students draw facial proportions Students will measure with accuracy the facial features and employ values to create form.
- **Activity 6** Scan the drawn image and verify a match. The system will provide a score to assess if the drawing has similar (features) to the photo.