Project 1.3.3: Who Are You?

Introduction

Are you who you say you are? Prove it! To prove your identity, you most likely reach for some sort of photo identification card. But what if you were asked to prove your identity with biology? Biometrics is a field of science that uses physical characteristics, such as facial features or patterns in the eyes, and behavioral characteristics, such as voice or handwriting, to determine or confirm identity. A biometric system can authenticate that you are who you say you are or identify you by comparing your information to that in a file. You actually hold the key to your own “living password.”

You have probably seen examples of biometric scans in movies or on TV. A scientist approaches a secure door and places his or her hand on a keypad to gain access. The voice, face and eyes of a secret agent are scanned before he or she is allowed to diffuse a deadly bomb and save the world. While some of the information presented is surely exaggerated, there is science behind this science fiction. Biometric scans are not just for secure areas in government buildings. These scanners have been tested at airports and even used at theme parks to link visitors with their admissions ticket.

In this activity, you will explore biometric systems and analyze the science behind the technology. You will form your own biometrics firm and work to create a biologically-based security plan for a real-world client. You will assess the accuracy of each scan you include in your proposal as well as describe how easy it would be for a person to fake this data. In our world of heightened security, we need to be aware of those around us as well as protect our own identity. Proving who we really are may come down to the clues locked inside our organs, tissues and cells.

Equipment

- Computer with Internet access and presentation software
- Laboratory journal
- Outlining and Summarizing Guidelines handout

Procedure

1. Obtain an Outlining and Summarizing Guidelines handout from your teacher and review the protocol for summarizing scientific articles.


3. Write a summary of the article in your laboratory journal following the protocol described on the Outlining and Summarizing handout.

4. Answer conclusion question 1.

5. In your laboratory journal, list the common forms of biometrics presented in the article. With a partner, rank the forms from most to least secure. Which do you
think would be the most difficult to fake (most secure)? Which do you think would be the easiest to fake (least secure)?

6. Pair up with another group to form a team of four.

7. Compare your rankings and debate any differences.

8. With your team, design a security plan using biometrics technology for one of the following clients:
   - An airport interested in increasing overall security measures.
   - A hospital interested in a better way to link new mothers and fathers with their newborn babies.
   - A popular theme park interested in a way to ensure that visitors do not share admissions passes.
   - A bank interested in securing access to accounts, inside the building, over the phone, and at ATMs.
   - A government agency interested in protecting the nation’s secrets.

9. Be aware that another team in the class will be working on a plan for the same client. You will be competing with the other team for this contract.

10. With your team, decide on a company name.

11. As a team, decide on the biometrics application(s) you think would be best for your client. Think about the scans you have learned about in the article, but make sure to research and consider other methods such as vein geometry, hand geometry or ear shape. Do not be afraid to push the limits of technology -- be cutting edge! Use the websites listed in Step 15 for ideas.

12. Take notes and outline your plan in your laboratory journal.

13. The plan that you design should directly meet the needs of your client. You probably would not need DNA identification to get into a theme park. Make sure to think about how the addition of these new measures is going to affect those who work in or visit this site. You do not want to slow business or production by the addition of unnecessary measures. The system should be user-friendly and should be built with cost in mind.

14. Using presentation software, create a 10-15 minute presentation of your plan. Organization of the information is up to you, but your presentation should:
   - Present your company name as well as a mission statement that outlines your company’s main goals and objectives.
   - Clearly outline your proposed security plan using language appropriate for your audience.
   - Explain the science behind the biometrics method(s) you choose.
Include relevant pictures or diagrams.

Discuss the accuracy of the technique(s) as well as potential limitations.

Provide a “success story” – either real or fictional – that showcases the power of the technology.

Describe how easy it would/would not be for someone to “beat the system.”

Address issues of privacy.

15. Use additional online resources to further research the field of biometrics. Once you decide on the scans you would like to focus on, search for each form by name (such as retinal scan or voice recognition). The websites listed below may be of help for general information. Make sure to research all forms of biometrics. You do not need to stick to the examples you listed in your laboratory journal.

- How Stuff Works- How Biometrics Works
  http://science.howstuffworks.com/biometrics.htm

- National Institute of Standards and Technology- Biometric Authentication Technology: From Movies to Your Desktop

- Michigan State University – Biometric Recognition
  http://biometrics.cse.msu.edu/info.html

16. Share your presentation with the class. Be prepared to answer questions and defend your choices.

Conclusion

1. What in the article surprised you or was new to you? Which techniques had you heard of before?

2. Explain how biometrics could help prevent identity theft.
3. Describe some of the ethical concerns related to biometrics.

4. What role could your DNA play in biometrics of the future?

5. Describe the human body systems that are involved in the biometrics applications you chose for your project.

6. Explain the role human body systems, tissues and cells play in identity?