Security Implementation using Biometric

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Abstract—**The project aims to develop a biometric security system, which can protect the user's device from unauthorized or unauthenticated access. The idea is inspired from Microsoft Windows Hello and Google Now, which allows us to speak our mind and the machine does it, through the profound advancement in machine learning and artificial intelligence. This project aims to implement an application which can recognize the face and the voice of the user, and accordingly allow or deny access to the system.**

Keywords—***CMUSphinx, OpenCV, Real time, biometric, Face Recognition, PCA, eigenfaces, Yale Face DataBase, Principle Component Analysis, MFCC, GMM***

I. Introduction

Biometric Security is gaining more and more attention recently. This project attempts to implement an application which can take the voice input from a microphone, face input from a camera, and verify the authenticity of the user accessing the system.

II. Motivation

Human beings have reached a stage where it is no longer convenient to type the password when they want to be authenticated. This was the basic motivation of this project, i.e., to replace the password input using a keyboard, and instead ask the user to smile in front of their personal computer, and talk interactively to it. Then that personal computer unlocks, if it recognizes the integrity of the user.
Currently, no fool-proof solution exists which attempts to do both these tasks. There exists individual solutions for each of these individual tasks. But, these solutions are proprietary and requires specific licenses to use the offered services.

III. Problem Statement

To design a security system for GNU/Linux operating system using biometric of the user, i.e., the face and the voice of the user, that would replace the traditional password input using a keyboard.

IV. Related Works

1) Google Now https://www.google.com/search/about/learn-more/now/
2) Microsoft Windows Hello https://support.microsoft.com/en-in/help/17215/windows-10-what-is-hello

V. High Level Design

1) Design a function which takes the user voice through the microphone, and the name of the user and returns True or False, accordingly.
2) Design a function which takes an image of the user, using the camera, and the name of the user and returns True or False, accordingly.
3) Finally, design a system which unifies the functions designed above. The system should be able:
   - to override the default login screen in a GNU/Linux system.
   - to ensure the integrity of the confidential details created using the above functions.

VI. Literature Survey

A. Background and Related Work

Speaker recognition is the identification of the person who is speaking by characteristics of their voices (voice biometrics), also called voice recognition.
Speech is a kind of complicated signal produced as a result of several transformations occuring at different levels: semantic, linguistic and acoustic.

VII. Conclusion

In this project, I have tried to implement a face recognition based biometric security system. It also demonstrates the various capabilities of image recognition from video sequences. However, several aspects remain to be researched and extended. For instance, since face to face meeting encompasses several modalities, such as speech and gesture, these capabilities need to researched and implemented.

References

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