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COSBAS User Manual

Git: `https://github.com/undecidables/Documentation`
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August 2015

Contents

1 Introduction

The COSBAS system is a highly secure and modern access control system that uses Biometric data to authorize the individuals request to enter the department and offices. This document will specify how to place the COSBAS system in a working state. The document instructs on the necessary steps to install the hardware needed by our system as well as installing the COSBAS system software on the relevant computers.

2 System Overview

2.1 Overview Description:

The COSBAS (Computer Science Biometric Access System) is a secure system that uses Biometric inputs (such as facial recognition and fingerprint scanning) to unlock and gain access to the department and offices.

2.2 Pinpoint Descriptions:

2.2.1 COSBAS-Client

The COSBAS client is the hardware aspect of the COSBAS system. It will allow users to capture biometric data to be used as authentication for access to the department. The images are taken (be it facial, fingerprint etc.) and then sent off to the server for authentication while waiting for a response from the server to permit the access or not.

2.2.2 Web-Client

The interface for the COSBAS system will be a responsive webpage the user (authorized and temporary visitors) may use to request permission for access to the department. They can also book appointments with members of faculty on the system.

2.2.3 Bookings and Appointments

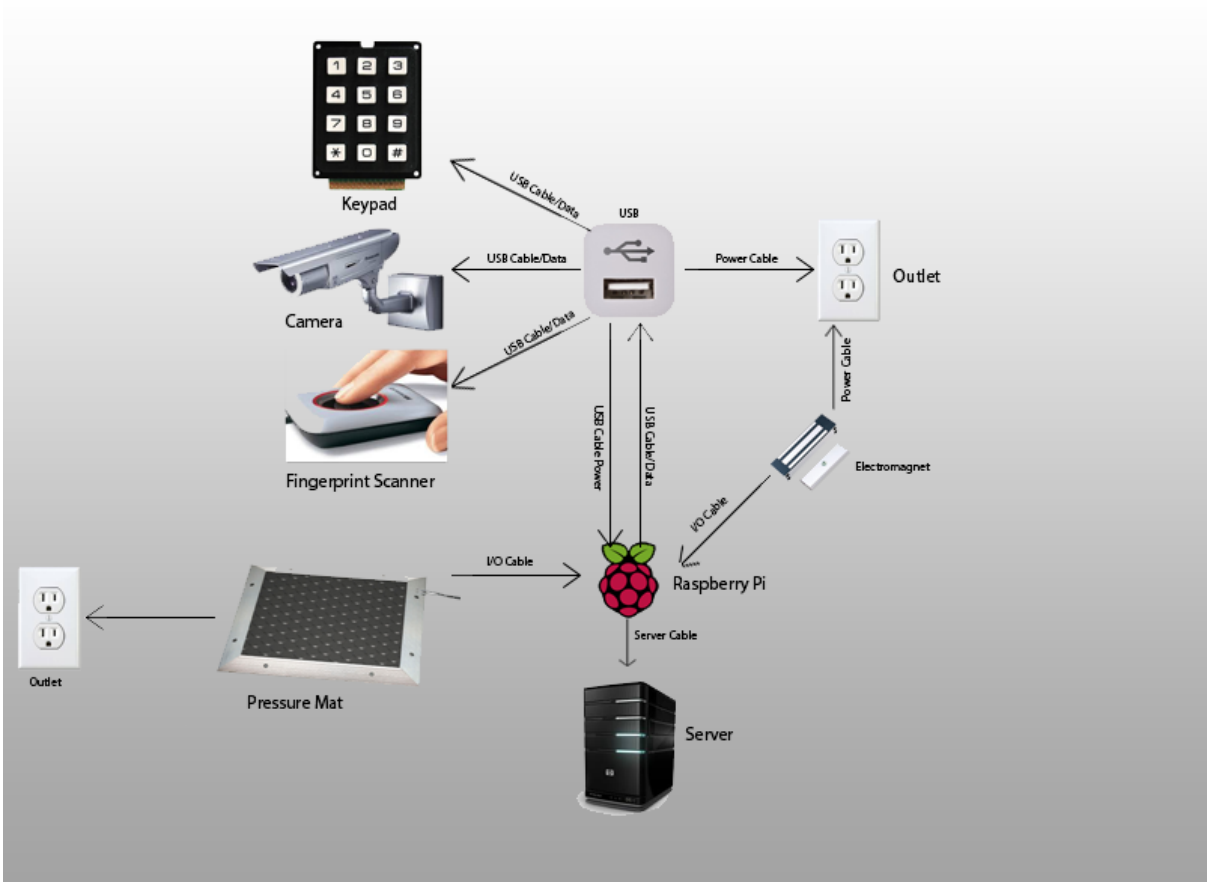
An unauthorized user can book an appointment with an employee enrolled in the system by making use of a Calendar integration feature on the web based interface. Authorized users can then either accept or decline the booking for an appointment of which the person whom made the booking is notified of the status of their booking via an email.

2.2.4 Temporary Access

Once a booking has been accepted by the authorized user of COSBAS, they will be notified via email containing a link that will expose their temporary access code generated by the COSBAS system. There will also be another link in the email the user may click on to cancel the appointment with the associated COSBAS user. In such a case, the temporary access code will be revoked.

3 System Configuration

3.1 Graphical System Configuration diagram



3.2 Description of the equipment used as illustrated on the diagram

- Client - Raspberry PI: Is a very small computer with a very low power consumption. The PI can handle quite a few input/ouput devices via the USB/HDMI/LAN/GPIO ports
- Camera: A device which will capture an image of the user that will want to authenicate via biometrics.
- Fingerprint scanner: A device that will caputer the finger print of the user which will be used for authentication.
- Keypad: Will be used by users that will gain access to the building via the keycode.
- USB Hub: This device will allow us to connect more than one device via USB to the client as well as give power to the client.
- Pressure mat: This device will allow us to pick up that the user is ready to be authenticated to gain access to the building.
- Electromagnet door lock: Will keep the door locked until the client has succesfully authenticated the user.
- Server: Will be used for all the heavy computations such as facial/finger print recognition, etc.

3.3 System Configuration Explained

The system is made up of pluggable authentication devices such as a keypad, camera and fingerprint scanner, as well a client (Raspberry Pi) and a server. The entire authentication process is started a soon as the user steps onto the pressure mat sending the authentication data to the Raspberry Pi for processing before it is sent to the server for authentication. Once authentication is complete on the server, a reply will be sent to the client and the client will act accordingly.

3.4 Communication and networking

The pressure mat, USB Hub and electromagnet door lock all get their power from the main outlet while the keypad, camera and fingerprint scanner will be getting their power via the USB connection. The Raspberry Pi also connects to the USB Hub both for power and data transfer between the authentication devices and the client. The client communicates with the server via a LAN cable and the pressure mat and electromagnet door lock connects to the client GPIO pins via I/O cables.

Once the user steps onto the pressure mat a signal is sent to the client which gets its data from the authentication devices and processes that data before sending it off to the server if it was valid data. The server the authenticates the person and sends the data back to the client that will then, if the authentication was successful, open the door for the user.

4 Installation of the COSBAS System

5 Getting Started

5.1 Getting Access to the System

To gain access to the COSBAS System through the web client you need the following:

- **Username** - This username is the same as the username needed to login to the CS Website. Usually it is the employee number of the staff member
- **Password** - This is the password that you use to login to the CS Website.

5.2 Register on the System

If you need to register on the system you need to go to the department where they will add you to their LDAP servers such that you can login to the system.

Note: Only staff members or frequent recognised members will be able to get access to the system by means of the CS username and password. If you are not such a member then you can view the web client as an guest and still make appointments as you wish.

5.3 Change of Login Details

The COSBAS System will not be able to change your username or password. To change your CS login details, which is your COSBAS login details, you need to go to the department since the COSBAS System authenticates the user through LDAP.

5.4 General Walkthrough of the System

5.4.1 COSBAS-Client

As mentioned previously the client consists of the hardware, which is the camera, fingerprint scanner, raspberry pi, keypad and pressure pad. The client will do the biometric detection on the Raspberry Pi and will send the neccesary data to the server for the biometric autentication.

Walkthrough per Biometric/Authentication Method,

- **Facial Recognition** - Stand on the pressure pad to initialize the camera to take a photo. After an photo has been taken facial detection will occur in the Raspberry Pi to detect if there is in fact a face in the image. The image is sended to the server for authentication where the user can gain access to the department if successful authentication has been the case.
- **Fingerprint Scanning** - Place a finger on the fingerprint scanner.
  Either one of the following fingers may be used,
  - Left Thumb
  - Left Index Finger
  - Right Thumb
  - Right Index Finger

  The fingerprint scan will be authenticated against current stored copies of the user's fingerprints. The user will gain access if the authentication has been successfull.
- **Authentication Key** - Enter the authentication key on the keypad.

  - For **registered users** such as the staff members this will be the dedicated authentication key you will be provided with once registration for the COSBAS System has been done.

  - For **temporary/guest users** this will be the key that was provided after the appointment has been approved by the particular staff member through the email that the guest user should've received.

5.4.2 Web-Client

- **Registered User**
  - Login with your COSBAS Login Details (see section 5.1)
  - If you have a gmail account and would like to link your Google Calendar to the appointment system, grant permission to Google to get access to your Calendar (You will be redirected to the grant access page of Google).
  - Go to the appointment page to approve or decline appointments.
  - Go to the booking page to make a booking by using the online form.
- **Guest User**
  - No login will be needed.
  - Go to the view calendar page to view the calendar of a specific staff member.
  - Go to the booking page to make a booking by using the online form.

- **Admin User**
  - Login with your COSBAS Login Details (see section 5.1)
  - Go to the appointment page to approve or decline appointments.
  - Go to the booking page to make a booking by using the online form.
  - Go to the registration page to upload the biomteric data of a specific staff member, that is to register the user on the COSBAS System.
    Note: When registering a user that user will need to provide his/her login details (CS Login Details) before registration can be done.

5.5 Exit the System

To exit the system depends on the type of user you are,

- if you are a **registered/admin user** you can simply click on the logout button to exit the system.
- if you are a **guest user** you can exit the system by simply closing the browser.

6 Using the System

This will be described at a later stage.

7 Troubleshooting