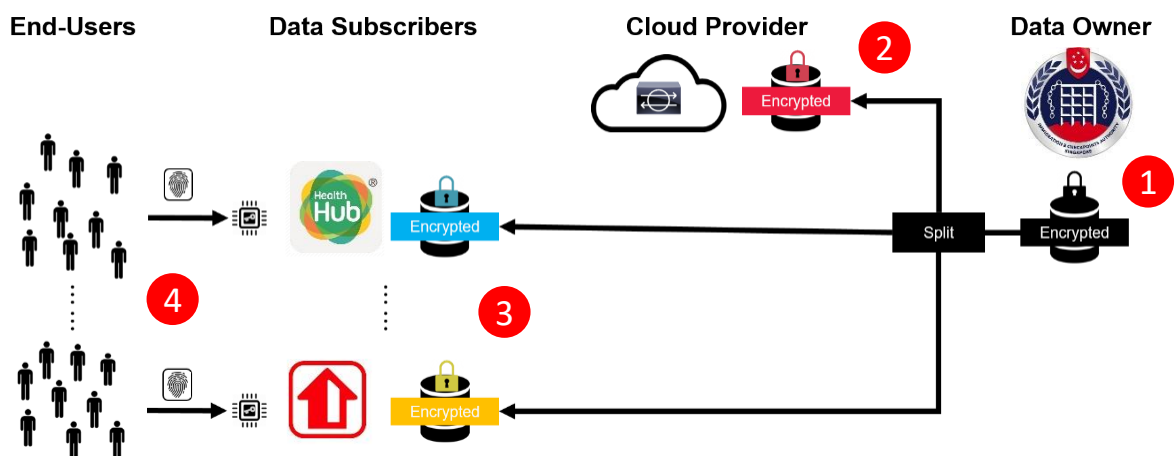


PBio: Introduction

PBio is a cross-organizational cloud-based biometric authentication system. PBio enables a data owner (government authority such as ICA), who holds users' raw biometrics, to share an encrypted set of biometrics to data subscribers (agencies such as CPF, IRAS, MyHDB). The subscribers then authenticate an individual remotely based on the encrypted biometrics. Hence, the data subscribers do not need to collect user biometrics, which reduces operation cost and the efforts to collect, and protect the biometrics.

The main use case, as of this experiment, is for a Singapore resident to access government services such as CPF, IRAS by remote biometric authentication using the SingPass app. The main objective is to retire remote password-based authentication in the current SingPass app. This is different from local biometric authentication through the phone to access the app itself. The figure illustrate the setup of PBio. The system flows are described as follows:

1. Immigration and Checkpoints Authority (ICA) prepares the encrypted biometric template based on the Singapore resident's biometric database.
2. A first encrypted partial template is stored by the cloud provider who will assist the data subscribers in authenticating an individual.
3. A second encrypted partial template is stored by an agency e.g. CPF, IRAS, HealthHub, MyHDB, OneMotoring, and etc. There can be many agencies.
4. User installs PBio app, choose the agency and authenticate to access the agency's service page.



The Objectives of this Experiment

The main objective of this experiment is to emulate the scenario of accessing a government service using a Singpass app via remote biometric authentication. It is also the objective to survey the usability of PBio and to evaluate its performance.

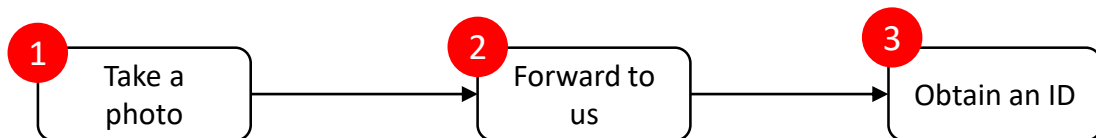
At the moment we only have an Android version of the app.

Experiment Guidelines

The experiment consists of two phases.

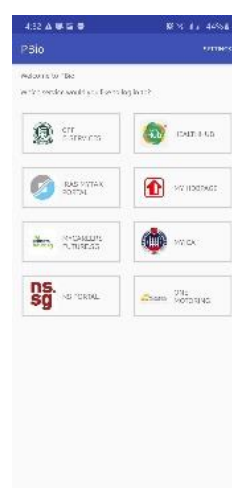
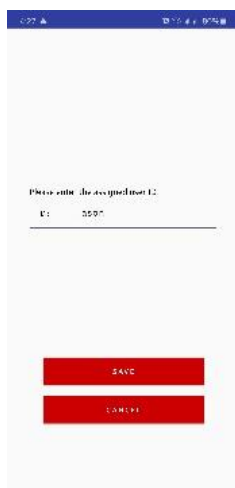
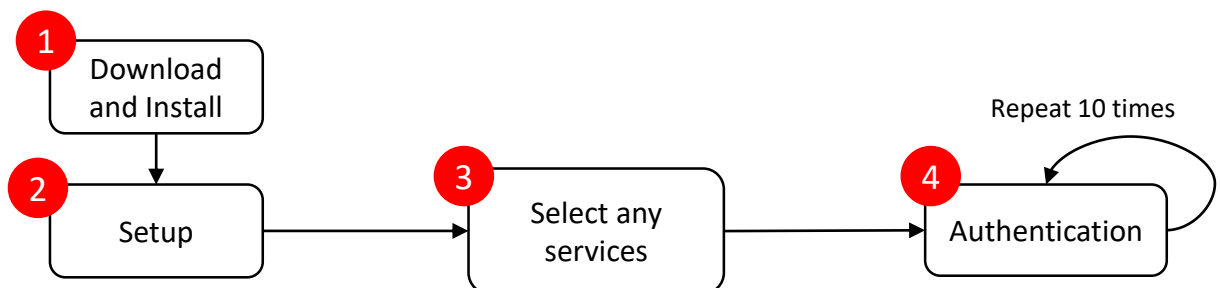
Collection Phase:

1. A photo of you. Ideally a scanned passport photo. Alternatively a front-facing selfie (similar posture as in a passport photo).
2. Please upload your photo through <http://18.141.184.136:5001/>. We will not store your photo, the photo will be purged once the feature template is extracted.
3. You will be assigned a user ID once the feature is successfully extracted.



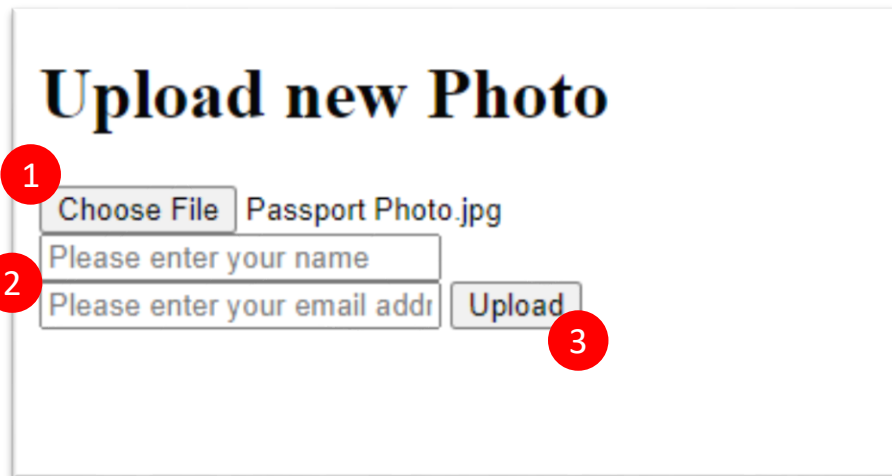
Authentication Phase:

1. Please download and install the PBio app to your android device using the following link: <https://drive.google.com/file/d/1imlaSOJDGjESvmXysfGXLShEUc-UQFVK/view?usp=sharing>
2. For first-time usage, the app will show the setup page requiring the assigned user ID to be entered and saved.
3. Please choose any of the services.
4. It will lead to the authentication page. You will notice the success or failure of the face authentication attempt. The experiment results are collected automatically. Please repeat the authentication process for at least 10 times.



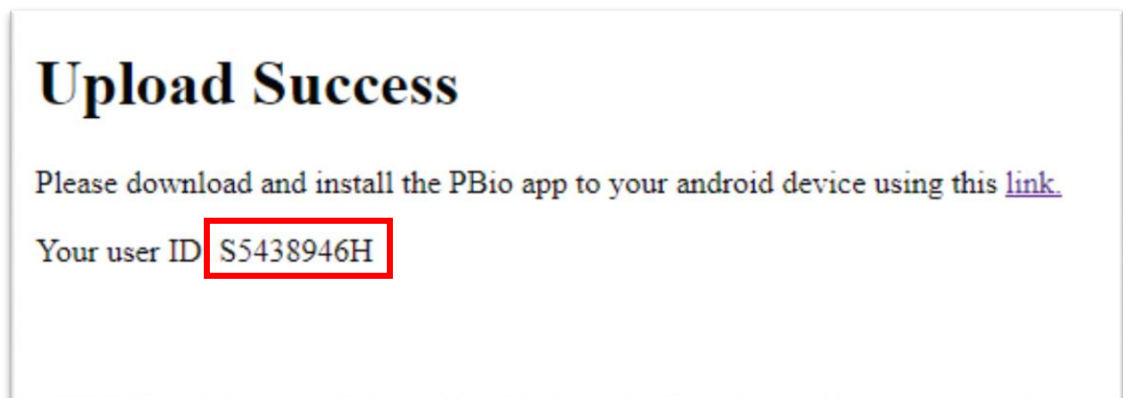
Collection

- Please navigate to <http://18.141.184.136:5001/>, you should see the following webpage:



The screenshot shows a web form titled "Upload new Photo". It contains a "Choose File" button followed by the text "Passport Photo.jpg". Below this are two input fields: "Please enter your name" and "Please enter your email address". To the right of these fields is an "Upload" button. Three red circles with numbers are overlaid on the form: circle 1 points to the "Choose File" button, circle 2 points to the "Please enter your name" field, and circle 3 points to the "Upload" button.

1. Please choose the photo to upload. The supported image formats are “.jpg”, “.jpeg”, and “.png” only.
2. Enter your name and email.
3. Hit the upload button.



The screenshot shows a success message titled "Upload Success". The text reads: "Please download and install the PBio app to your android device using this [link](#)." Below this, it says "Your user ID" followed by a red-bordered box containing the text "S5438946H".

- You should see the above message if you successfully uploaded the photo.
- Please note down the assigned user ID for the setup later.

Troubleshoot (Invalid Photo)

Upload Failure

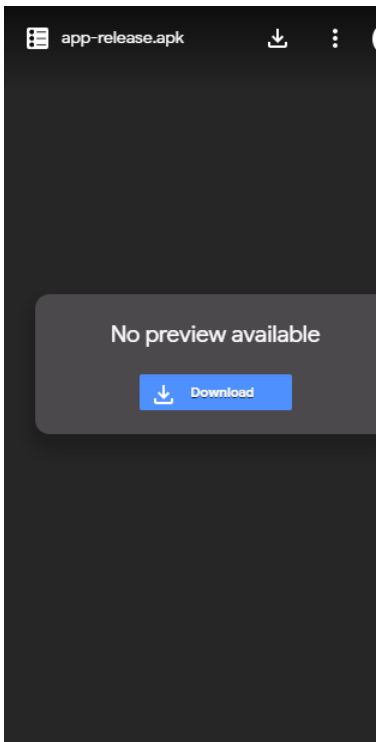
Unable to detect facial landmark.

Please ensure to upload a passport photo or a front-facing selfie.

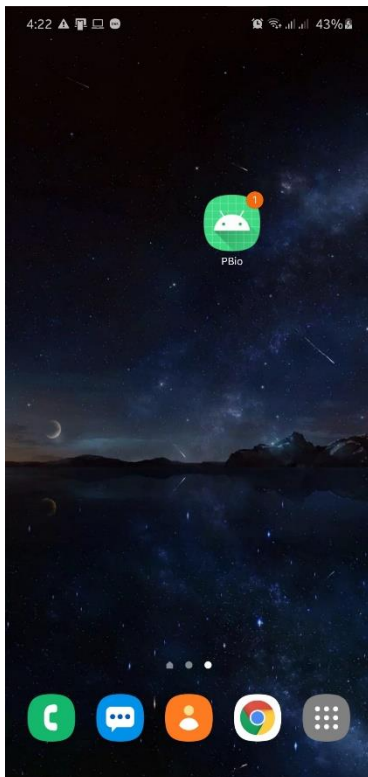
If you receive the above error message

- Please ensure that your image format is either “.jpg”, “.jpeg”, and “.png”.
- Please also ensure to upload a passport photo or a front-facing selfie.
- Please contact us at dcsljc@nus.edu.sg if you meet any error message.

Installation

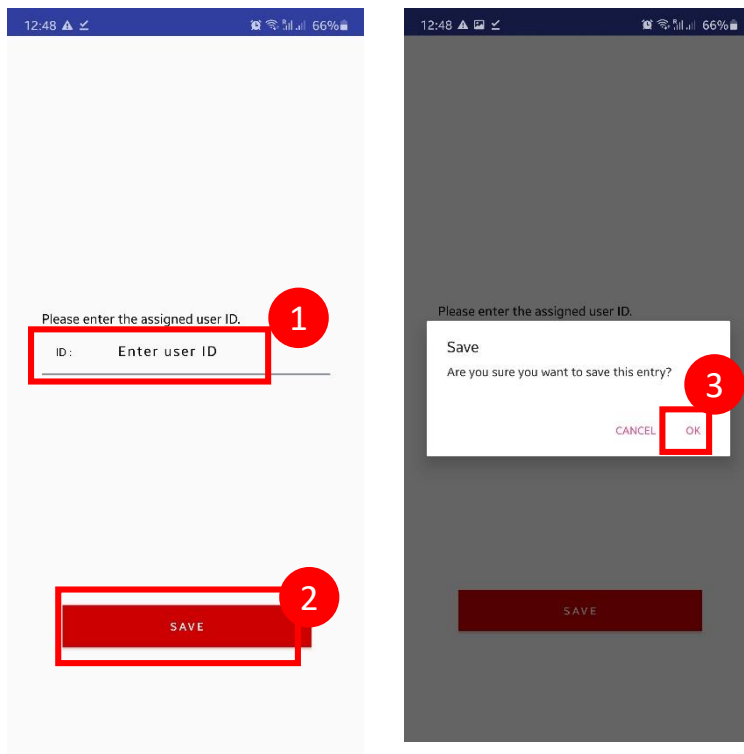


- Download PBio .apk from <https://drive.google.com/file/d/1imlaSOJDGiESvmXysfGXLSHEUc-UQFVK/view?usp=sharing>



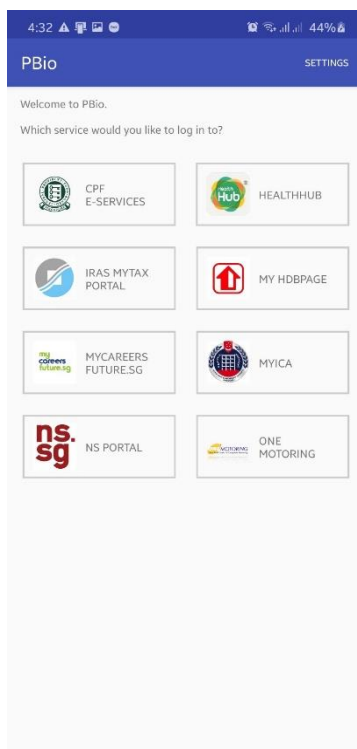
- PBio app should appear once it is successfully installed
- Note: The app is still under development and uses Chaquopy, a Python SDK for android. We have yet to acquire a license for Chaquopy. A message will appear in your notification denoting this fact when you launch the application.

Setup



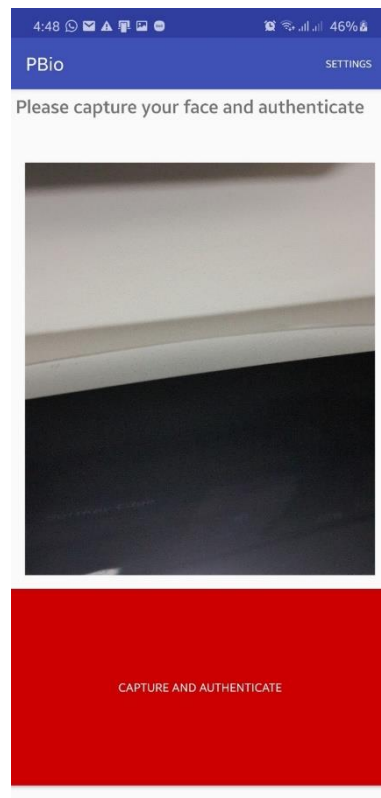
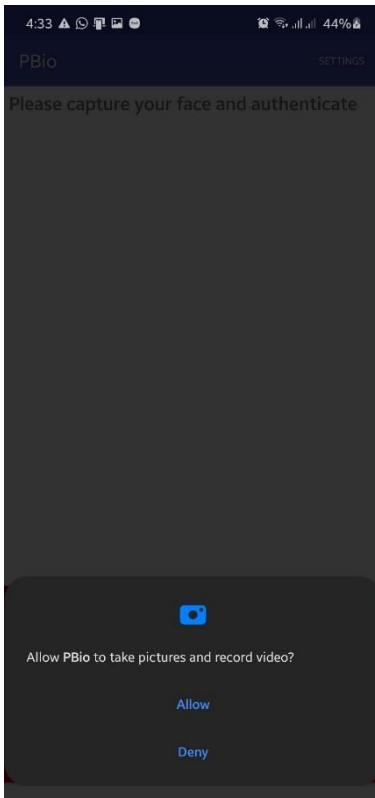
1. Enter the assigned ID
2. Click “Save” button
3. Click “Ok” to save the changes

Authentication Services

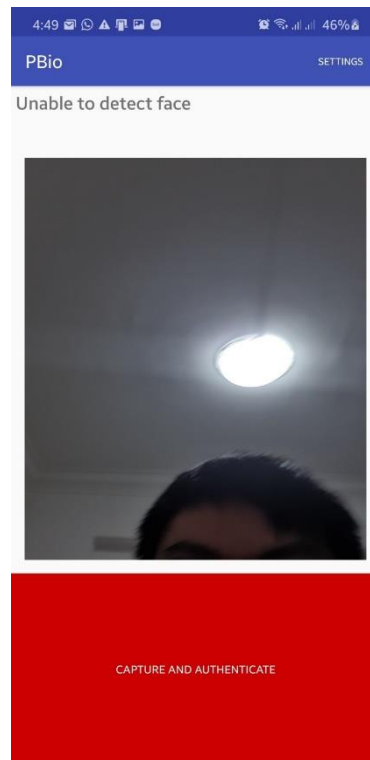
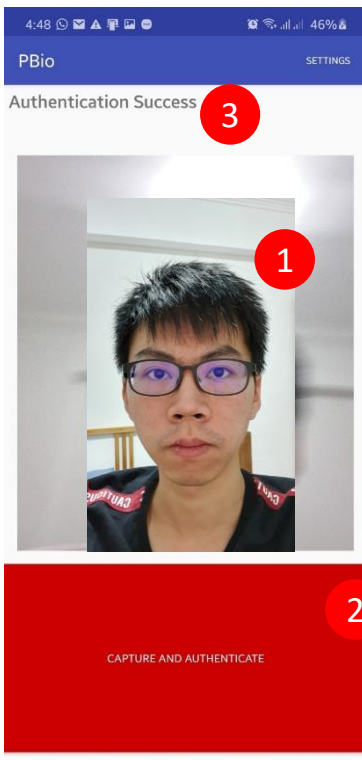


- Please select any of the services to proceed with authentication

Authentication



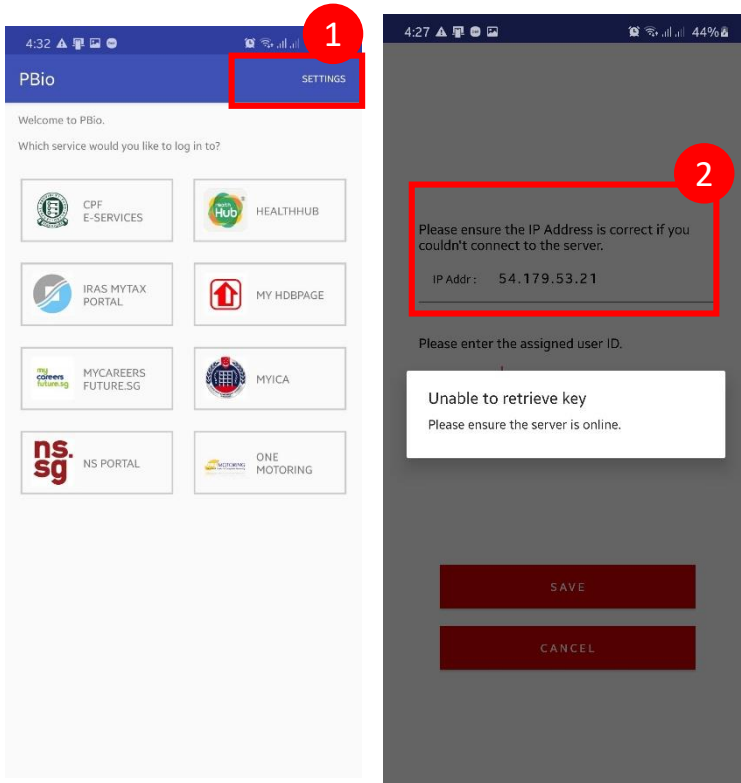
- Please “Allow” all the requested permissions
- You should see a camera preview that allows you to capture your face



1. Press “Capture and Authenticate” button to proceed
2. You should see the authentication result on top of the camera preview
3. Please repeat the authentication process 10 times for the experiment purpose

*You should see an error message if there is any problem

Troubleshoot (Server Error)

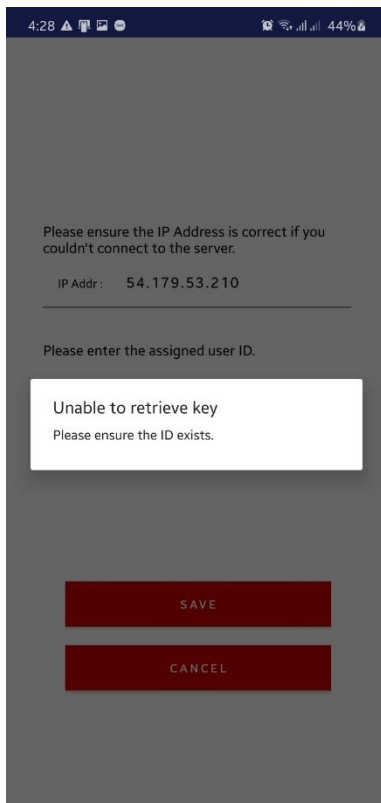


If you receive an error message that shows “Server Error”

1. Please go to the “Settings” page
2. Try the same steps as in Setup. You shall see an additional field for the server IP Address

*Please ensure the IP Address is “54.179.53.210”

Troubleshoot (Undefined ID)



- Please ensure you enter the correct ID. It is case-sensitive
- Please contact us at dcsljc@nus.edu.sg if you still see the same error message