

PDIoT App Installation Guide (Group X1)

Requirement:

SDK API 34+ (Android 13 or higher)

Minimum SoC: snapdragon 625 or higher performance SoC

Minimum ROM: 1GB free space

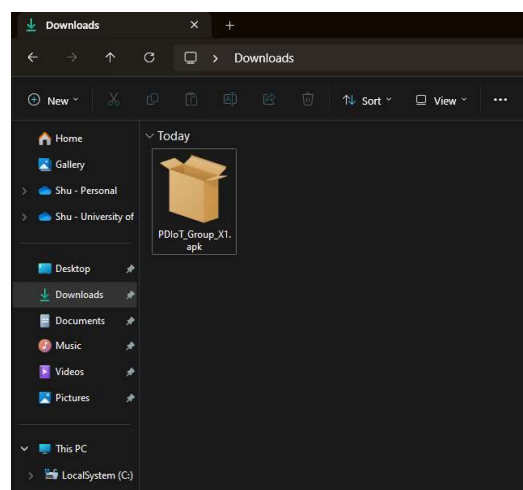
Minimum RAM: 512MB

Step 1. Download app to your phone

- **Method 1** – download {PDIoT_Group_X1.apk} to your computer, then copy it to target phone (**WARNING: Mac OS may not support this, if you are using Mac OS please go directly to Step 1 Method 2**)

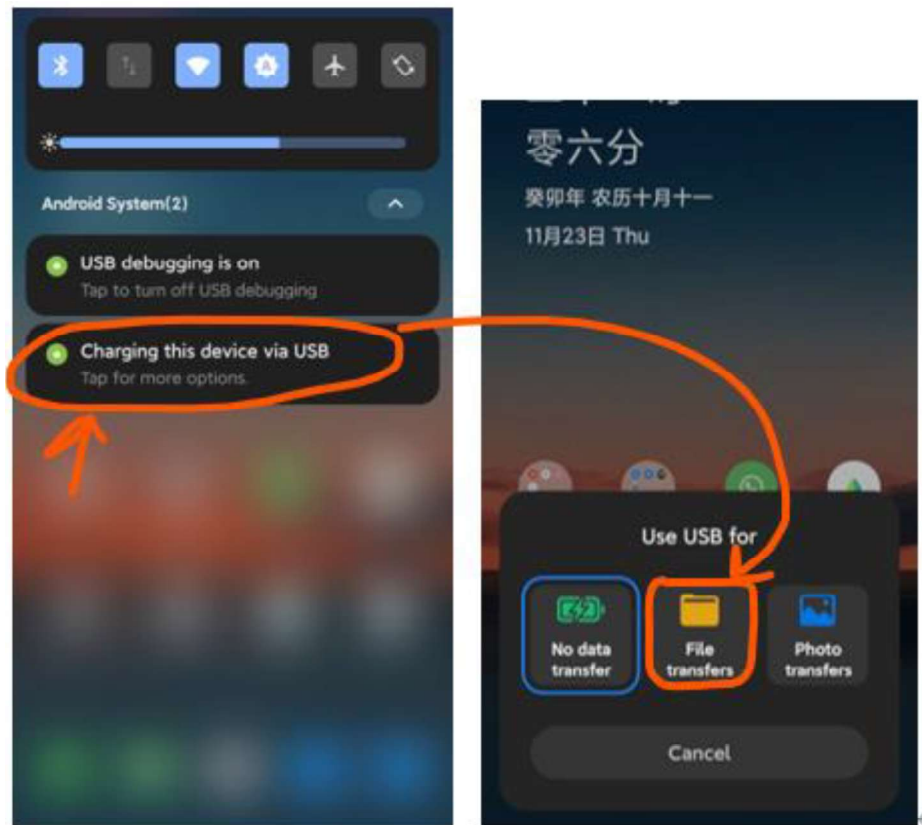
1.1.1 Download the {PDIoT_Group_X1.apk} from learn page

1.1.2 Locate the apk file in your computer, for Windows system its default path is C:\Users\YourUserName\Downloads

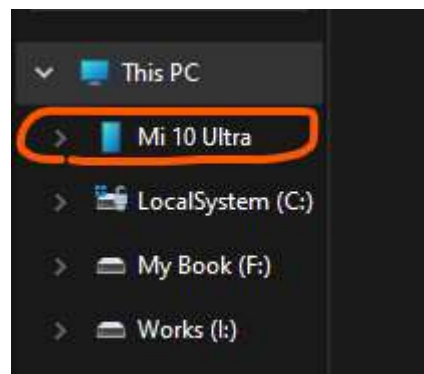


1.1.3 Connect your phone using cable

1.1.4 Change your phone's connection type to "File Transfers" (on different phone it might be different name, sometimes it is called "MTP Mode" or "Multi-Media Transfer Mode", but definitely **NOT** "Photo Transfer Mode" or "Charging Only")



1.1.5 You will now be able to find your phone is connected to your computer as multi-media device



1.1.6 Copy and paste the apk file to your phone's directory

- **Method 2** – download { PDIoT_Group_X1.apk} directly on your phone using browser

1.2.1

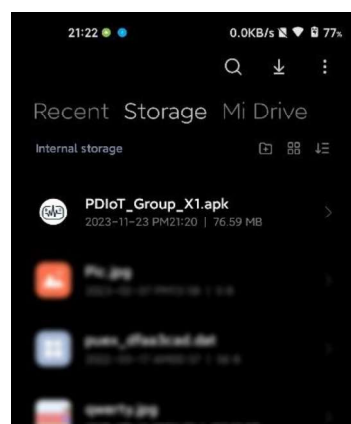
Open your browser, you may download the apk file from learn page,

or directly download from the github repository:

https://github.com/Shu-Gu/PDIoT_X1_Public/releases/tag/v1.0

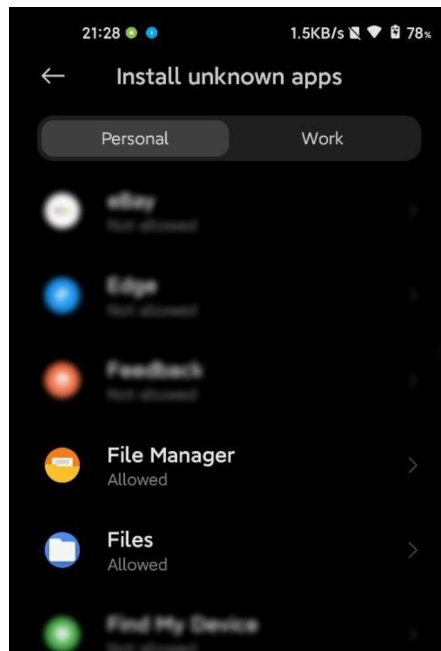
Step 2. Install the apk file on your phone

2.1.1 Open the file explorer on your phone, and locate the apk file you just copied, if the apk file is downloaded using browser, you may directly find it in the browser's download tab or the notification bar

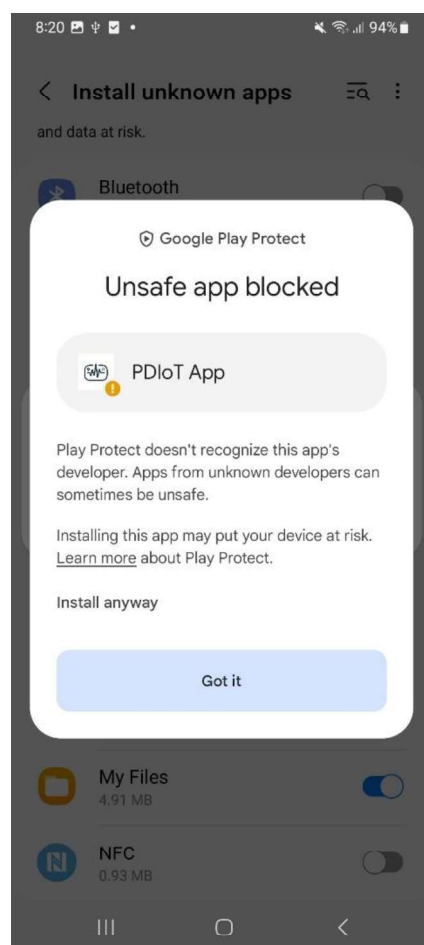


2.1.2 Click this apk file to install

2.1.3 If the system tells you that you are not allowed to install apps from unknown source, please make sure that the app you are using to open and install the apk is allowed (similarly, if you are used browser to download the apk, turn on the "install unknown apps" permission of your browser



- 2.1.4 The installation process may also be blocked by google play store, make sure you choose “install anyway”



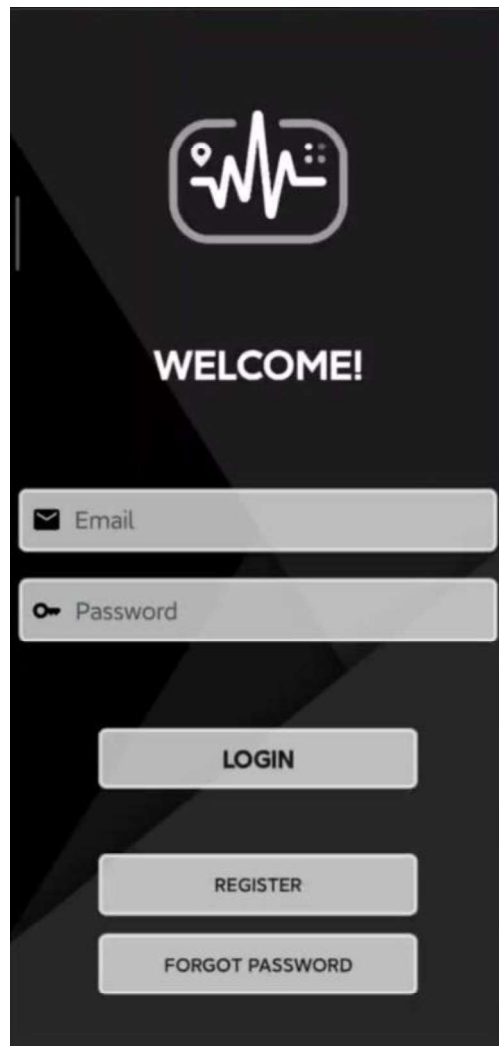
1 Implementation Description

1.1 Login System

After double-clicking to enter the app, you will see this login interface. For new users, you need to register your own account. After clicking "REGISTER", follow the tutorial in section 1.1.1 to register a new account.

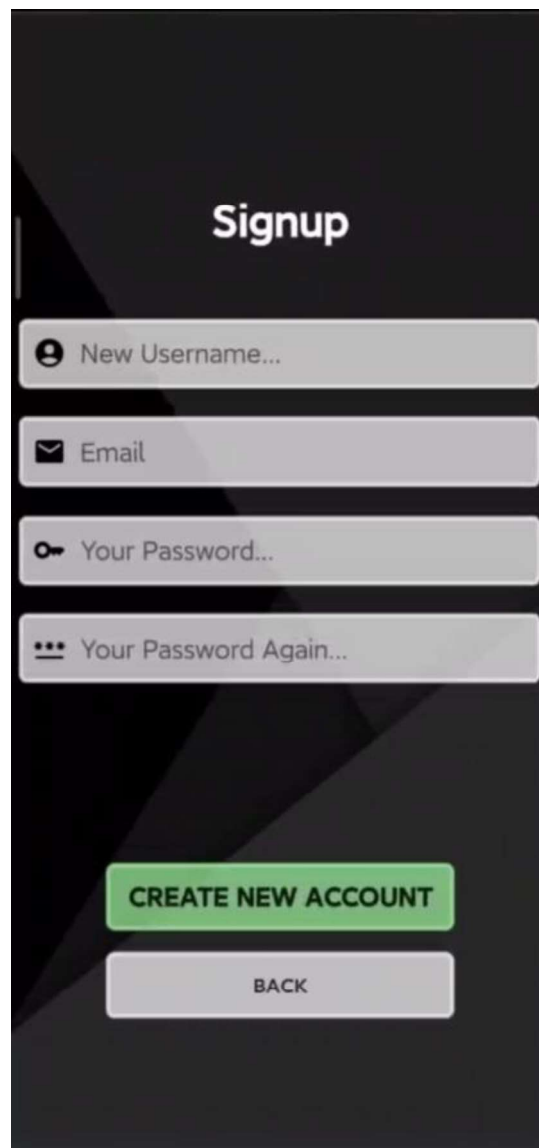
If you already have an account, please enter your email and password on this login interface, then press the "LOGIN" button to enter the app. And proceed to section 1.2 to view further tutorials.

If you have forgotten your password, please click on "FORGOT PASSWORD" to reset your password. For detailed instructions, please refer to section 1.1.2.



1.1.1 Creating an account

In this page, please enter your username, email, and repeat the same password twice. After checking that all the information is correct, click "CREATE NEW ACCOUNT" to create a new account. Subsequently, click "BACK" to return to the login page. Follow the instructions in section 1.1 to login.

A mobile app interface for a 'Signup' screen. The background is dark with a subtle geometric pattern. At the top, the word 'Signup' is centered in a white sans-serif font. Below it are four input fields, each with a light gray background and rounded corners. The first field has a person icon and the placeholder text 'New Username...'. The second field has an envelope icon and the placeholder text 'Email'. The third field has a key icon and the placeholder text 'Your Password...'. The fourth field has three dots and the placeholder text 'Your Password Again...'. At the bottom of the form are two buttons: a green button with the text 'CREATE NEW ACCOUNT' and a light gray button with the text 'BACK'.

Signup

New Username...

Email

Your Password...

Your Password Again...

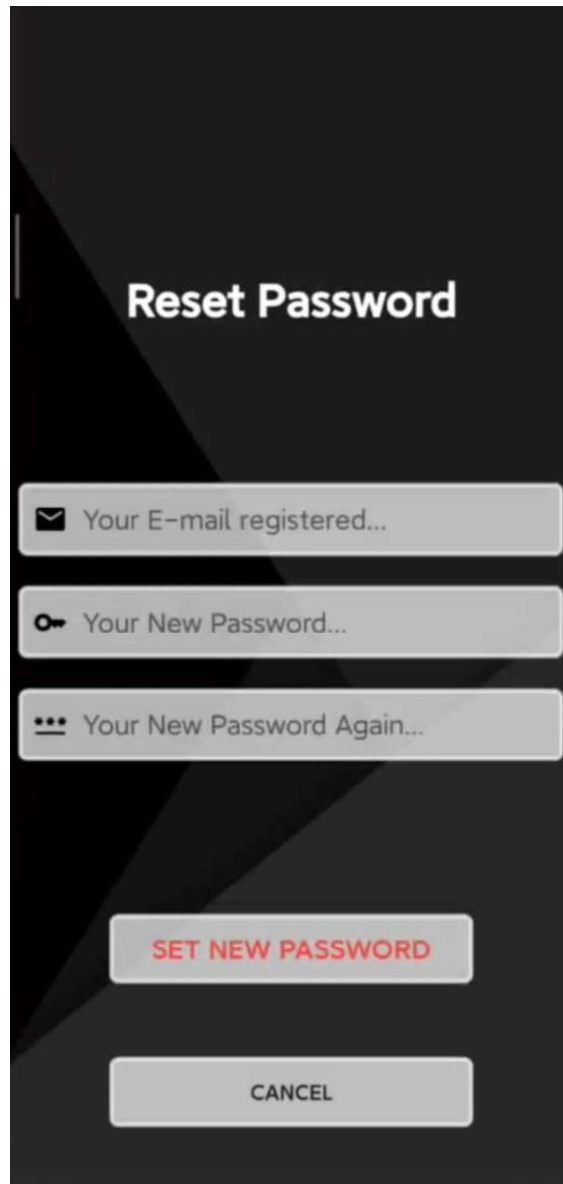
CREATE NEW ACCOUNT

BACK

1.1.2 Reset Password

You can reset the password through this page. First, enter the email address of your original account. Then, enter the new password twice. After all information is correct, click "SET NEW

PASSWORD" to reset your password. Finally, click "CANCEL" to return to the login page. Follow the instructions in section 1.1 to login.

A mobile app interface for resetting a password. The background is dark gray with a subtle geometric pattern. At the top, the title "Reset Password" is displayed in white. Below the title are three input fields, each with a light gray background and rounded corners. The first field has an envelope icon and the placeholder text "Your E-mail registered...". The second field has a key icon and the placeholder text "Your New Password...". The third field has three dots icon and the placeholder text "Your New Password Again...". At the bottom of the form are two buttons: a red button with the text "SET NEW PASSWORD" and a gray button with the text "CANCEL".

Reset Password

✉ Your E-mail registered...

🔑 Your New Password...

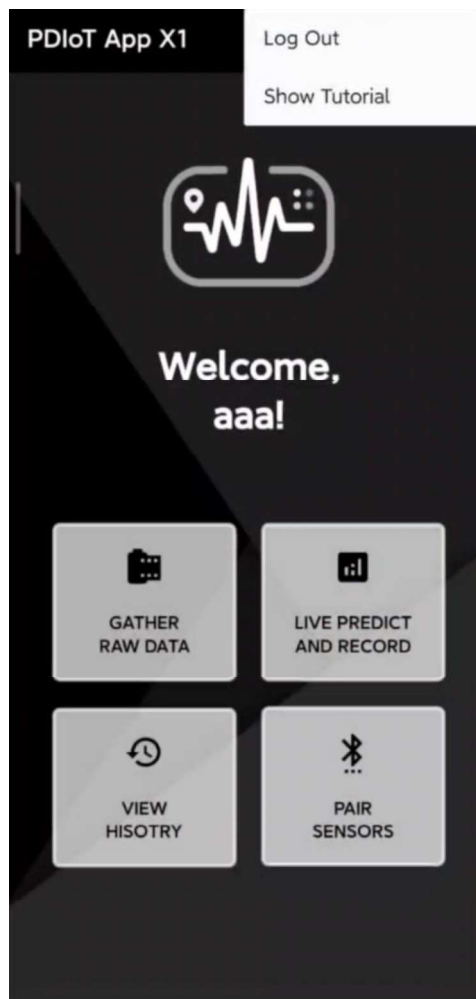
... Your New Password Again...

SET NEW PASSWORD

CANCEL

1.2 Main Menu

Below is a display of the main page interface:



First, click on "PAIR SENSORS" to pair the sensor. Detailed instructions are shown in section 1.2.1.

After clicking on "LIVE PREDICT AND RECORD", the user can check whether the corresponding sensor has been successfully connected (section 1.2.2).

"LIVE PREDICT AND RECORD" can also do live recognition (section 1.2.4). "GATHER RAW DATA" is used for recording and saving raw data (section 1.2.3). The collected data can be viewed through "VIEW HISTORY"(section 1.2.5).

After you finish using the app, click on the "..." in the top right corner and then "Log Out" to exit the current software and return to the original login page.

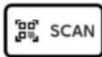
1.2.1 Connecting the sensors

To connect the sensor(s), first click "PAIR SENSORS". This will get you to a page that looks like:

Pair Sensors

● Respeck

If your phone supports NFC, tap it against the white surface of the Respeck to obtain the ID.
You can also find the ID on the Respeck label, or scan the Respeck QR code by pressing the Scan QR button.

Respeck ID
Enter Respeck ID 

● Thingy

If your phone supports NFC, tap it against the top of the Thingy to obtain the ID.
The Thingy ID is also written on a label under the black rubber case.

Thingy ID
Enter Thingy ID

▲ Always connect both sensors!

[PAIR SENSORS](#) [REBOOT SERVICE](#)

After turning on Bluetooth, you can connect your Respeck, Thingy, or both simultaneously. You can connect by entering the ID found on the back of the sensor or by scanning the QR code after clicking "SCAN". Ensure the sensor is activated, then press "PAIR SENSORES" to establish the connection. A blue light will flash on the Respeck when it is successfully connected; and a green light will flash on the Thingy when it is successfully connected.

1.2.2 Watching live data from your sensor(s)

To watch live data from sensors, click on “LIVE PREDICT AND RECORD”. This will get you to a page that looks like:



When you have successfully connected Respeck or Thingy, the corresponding box will be checked and display “RESPECK ON” or “THINGY ON”. Also, under the respective “Respeck Live Data” or “Thingy Live Data”, you can see a continuously changing graph; if not connected, there will show a white blank box.

1.2.3 Recording Data

After clicking on "GATHER RAW DATA", you can start collecting data. And this will get you to the following page:

Raw Data Record

Sensor type
Respeck

Activity type/subtype
Sitting

Normal

Subject ID (UUN)
s1234567

Notes
Enter note

START RECORDING

CANCEL

STOP RECORDING

Thingy Live Data
Accel =
Gyro =
Mag =

Respeck Live Data
Accel =
Gyro =

First, select the connected sensor, the type of activity that will be done, your Edinburgh student number, and extra notes if you want. Then, you can start recording by clicking "START RECORDING". Click "CANCEL" to cancel the current recording; click "STOP RECORDING" to stop and save this recording, with the saved data being stored in a .csv file. You can view it through section 1.2.5.

1.2.4 Live Recognition

In this section, you will learn how to use the app and sensors to predict your gesture and breathing activity based on machine learning model. **But please, be sure that you have already worn and paired sensors correctly before using this function**, otherwise the output result will not be promised to be correct for invalid input.



1.2.4.1 Introduction of using live recognition function

This is the most important function of the application. By using live recognition function, you can view the real-time data flow received from the Respeck sensor, and the processed

result of recognition shown by image and text. Also, when you stop the recognition, the results will be automatically saved for future usage.

1.2.4.2 Selecting the sensors

By ticking the sensors, you would like to use as the data source, the app will pick the most appropriate model for your choice. **Be cautious, the current version of the app does not support Thingy as recognition data source (only use Respeck as data source), please DO NOT tick Thingy as source, otherwise it will force the app go back to main page (activity crash).**

1.2.4.3 Start recognition

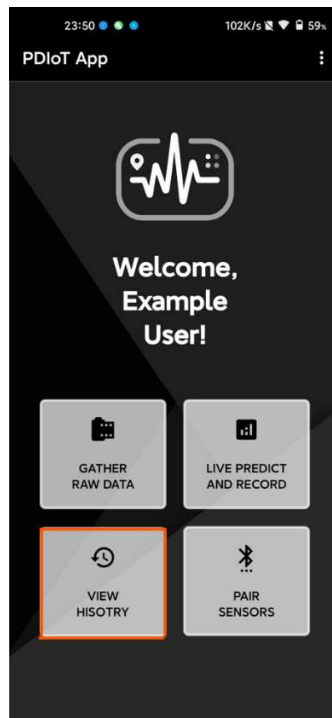
By clicking the green “START RECOG.” After 2 to 5 seconds, you will see the recognition result start to show with real-time processing.

1.2.4.4 Stop recognition

After you finished all activities, you can click the red “STOP RECOG.” Button, the result will be saved as csv file for future usage, and the recognition process will be stopped. Be cautious, if you go back to other pages or exit the application (and killed the background process of it – some of the phones will do it automatically), all data will be discarded. You may get warned by the app if you tried to go back to the last page, but by exit the app or killing the app you will not be notified about it.

1.2.5 View Past Activity

In this section, you will be taught how to find and read the history data of activity recognition using the in-app .csv file reader.



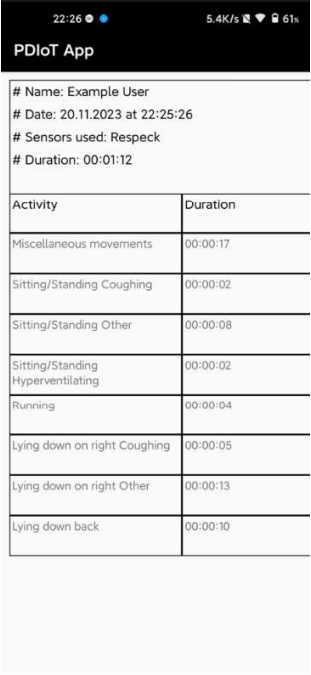
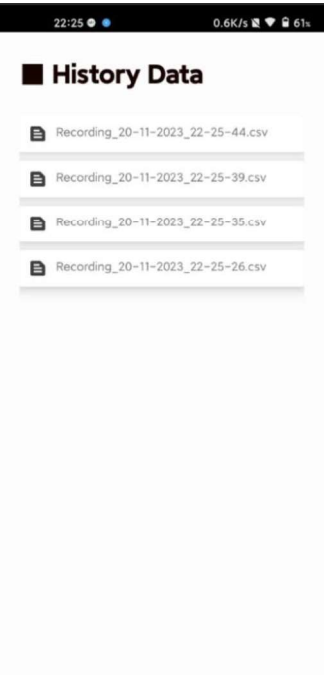
1.2.5.1 Introduction of Viewing Past Activity Data

When you are using the live prediction and recording function (1.2.4), each time when you accomplish a full cycle of recognition (start recognition, performing varies of activities, and stop recognition), a .csv file that records your activity recognition result and corresponding time will be generated under direction: *0/android/data/com.specknet.pdiotappX1/files/user@example.com*

You may manually find those files and open them using external file readers, but you can also use the integrated reader.

1.2.5.2 – Past activity data viewing using integrated file reader

1. Go to main page, and click “VIEW HISTORY”
 2. You will see a list of saved csv files
 3. Read the file – click the name of the file
 4. If you want to delete the file – long press the name of the file
-
-



2 classification mode capabilities

2.1.1 Overall Model Performance (On device)

Average LOOXV Accuracy:

Task 1: 96.48% Task 2: 85.71% Task 3: 72.03%

2.1.2 Activity that can be classified (On device)

ASCENDING_STAIRS("Ascending stairs"),

DESCENDING_STAIRS("Descending stairs"),

LYING_DOWN_BACK("Lying down back"),

LYING_DOWN_BACK_HYPERVENTILATING("Lying down back Hyperventilating"),

LYING_DOWN_BACK_COUGHING("Lying down back Coughing"),

LYING_DOWN_BACK_OTHER("Lying down back Other"),

LYING_DOWN_ON_STOMACH("Lying down on stomach"),

LYING_DOWN_ON_STOMACH_HYPERVENTILATING("Lying down on stomach Hyperventilating"),

LYING_DOWN_ON_STOMACH_COUGHING("Lying down on stomach Coughing"),

LYING_DOWN_ON_STOMACH_OTHER("Lying down on stomach Other"),

LYING_DOWN_ON_LEFT("Lying down on left"),

LYING_DOWN_ON_LEFT_HYPERVENTILATING("Lying down on left Hyperventilating"),

LYING_DOWN_ON_LEFT_COUGHING("Lying down on left Coughing"),

LYING_DOWN_ON_LEFT_OTHER("Lying down on left Other"),

LYING_DOWN_ON_RIGHT("Lying down on right"),

LYING_DOWN_ON_RIGHT_HYPERVENTILATING("Lying down on right Hyperventilating"),

LYING_DOWN_ON_RIGHT_COUGHING("Lying down on right Coughing"),

LYING_DOWN_ON_RIGHT_OTHER("Lying down on right Other"),

MISCELLANEOUS_MOVEMENTS("Miscellaneous movements"),

NORMAL_WALKING("Normal walking"),

RUNNING("Running"),

SHUFFLE_WALKING("Shuffle walking"),

SITTING_OR_STANDING("Sitting/Standing"),

SITTING_OR_STANDING_HYPERVENTILATING("Sitting/Standing Hyperventilating"),

SITTING_OR_STANDING_COUGHING("Sitting/Standing Coughing"),

SITTING_OR_STANDING_OTHER("Sitting/Standing Other"),
