FINGERPRINTS

IMAGE COLLECTION USER GUIDE

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FINGERPRINTS

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BEFORE GETTING STARTED – WHAT YOU NEED TO KNOW

FINGER PLACEMENT

The finger shall be placed flat with a very low angle towards the sensor surface. Avoid using the tip of your finger. Place your finger so that it covers the entire sensor area as shown below.

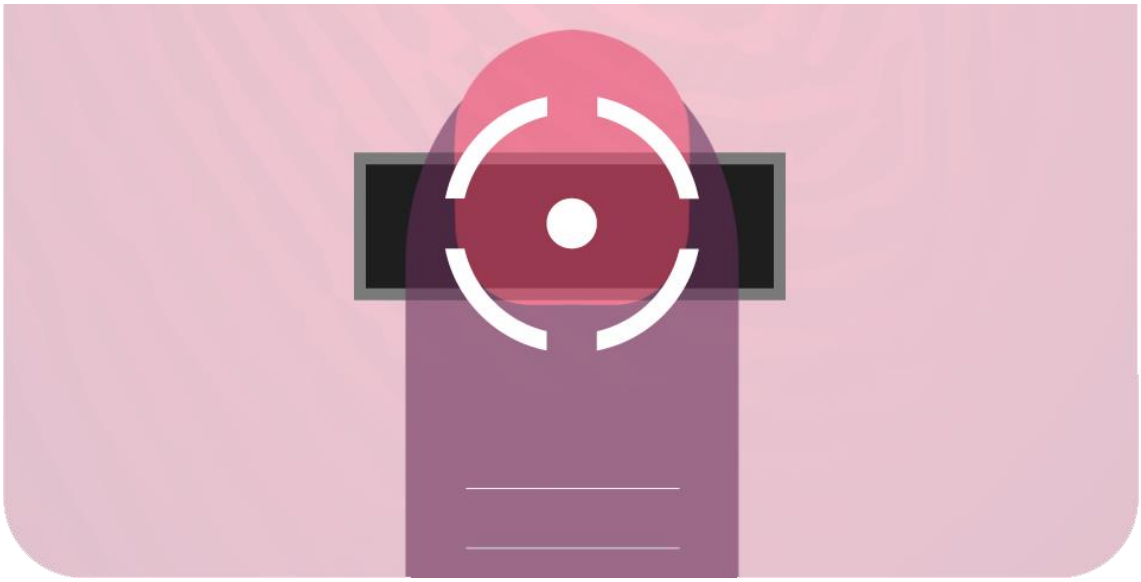

Figure 1 - Finger Placement

FINGERPRINT CAPTURE

Apply a normal pressure on the sensor and try to not touch it too lightly. Be patient and hold the finger still while the fingerprint image is being captured. Avoid tapping the finger too fast. Ensure a constant, good contact with the *bezel* (the metal frame that energizes the finger).

SENSOR CLEANING

Make sure that the sensor always is clean and free from dust. It is suggested that the sensor is cleaned on a regular basis.

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GETTING STARTED WITH IMAGE COLLECTION

INSTALL THE APPLICATION

The application can be installed in two different ways.

1. **Signed APK:**
    a. Install the application.
        i. **adb install –r [Path to .apk]**
2. **Unsigned APK:**
    a. Verify the application is not already installed.
        i. **adb shell "pm list packages | grep imagecollection"**
    b. If the application is already installed, find the location and remove it manually.
        i. **adb shell "pm path com.fingerprints.imagecollection"**
    c. Ensure that you have write privileges to the system.
        i. **adb root**
        ii. **adb remount**
    d. Push the application.
        i. **adb push [Path to .apk] /system/priv-app/ImageCollection/ImageCollection.apk** or **/vendor/app/ImageCollection/ImageCollection.apk** if the device is running Android O or later.
    e. Restart your device.
        i. **adb reboot**

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START THE APPLICATION

Go to your Home Screen of your device and locate the Image Collection application. Press on the icon and the application will launch.

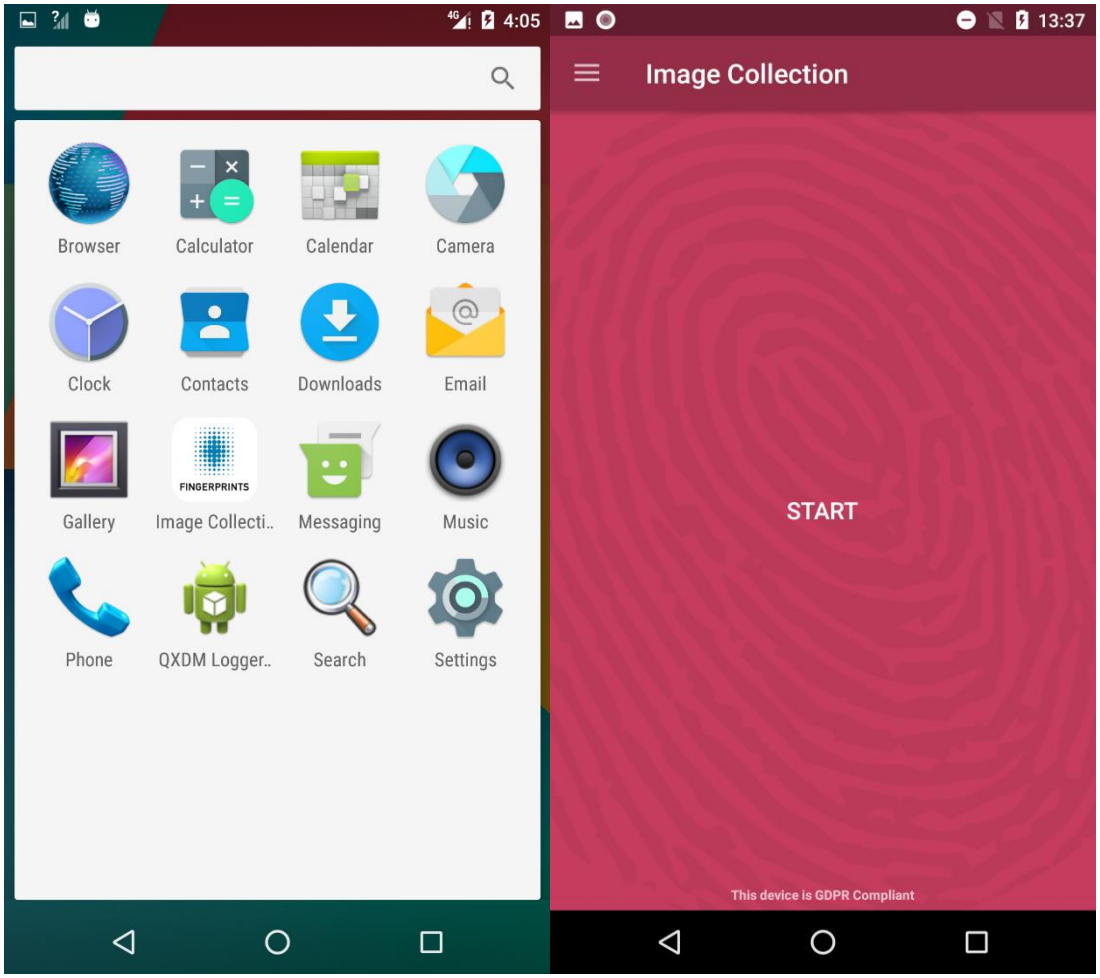

Figure 2- Starting Image Collection

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IMAGE COLLECTION

Image Collection page is used for collecting a pre-defined (or) custom set of fingerprint images by a configuration. All images are saved to phone storage in FMI format.

CONFIGURATION

By pressing app icon in the action bar (or) swipe a finger from the left edge of the screen, the Configuration page will be shown as seen in Figure 3. In this page you can modify pre-defined configuration to collect custom set of fingerprint images. The configuration page will be disabled if you use XML configuration (see appendix), and it will also be locked once you have started a session.

VERIFY OPTIONS

Verify is normally done with “0°” and optional “90°”, user can select “90°” if needed. Default number of Verify repetitions are 72, user can change it for both “0°” and “90°”.

You may also select if you want the images collected during the verify phase to be matched / authenticated against the enrolled finger.

The default finger map may be different between different type of sensors.

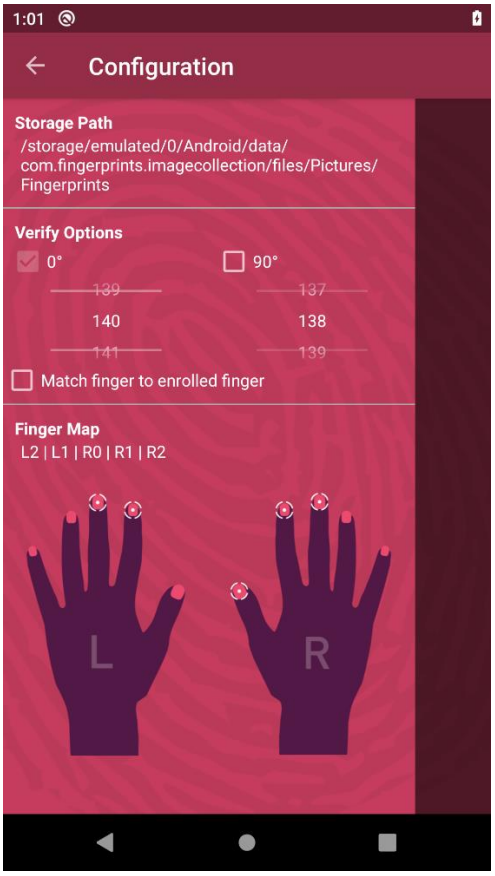

Figure 3 - Default Configuration

CHANGE FINGER

When the Image Collection is started and the collection for a single finger is completed, the user will be prompted to change their finger before proceeding, as shown in Figure 4.

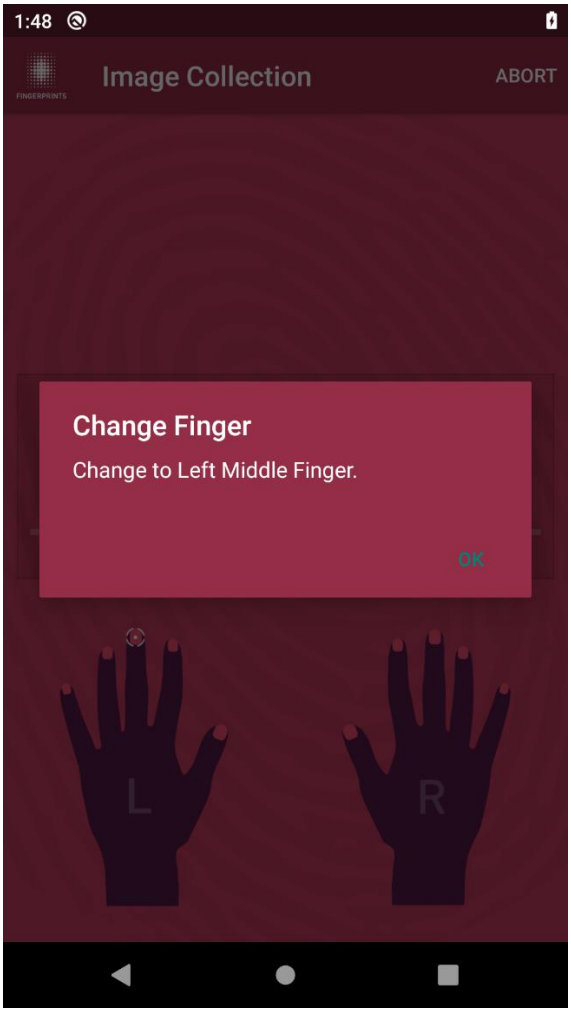

Figure 4 - Change Finger

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ENROLL

In the enroll phase both successful and failed fingerprint images are collected.

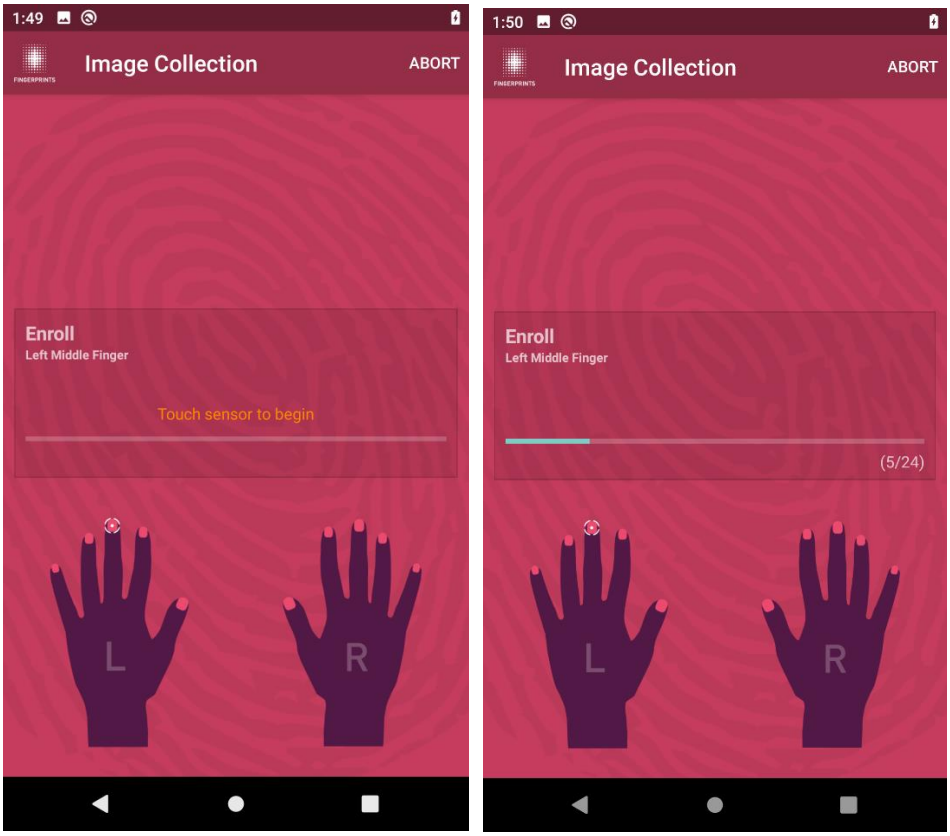

Figure 8.2 - Enroll Image Collection

Verify 0°

After enrolling is finished, the user is asked to perform a verification phase. To begin image collection for Verify 0°, touch the indicated finger on center of the sensor and keep the finger on the sensor until you see the progress indicator move. This is shown in Figure 5.

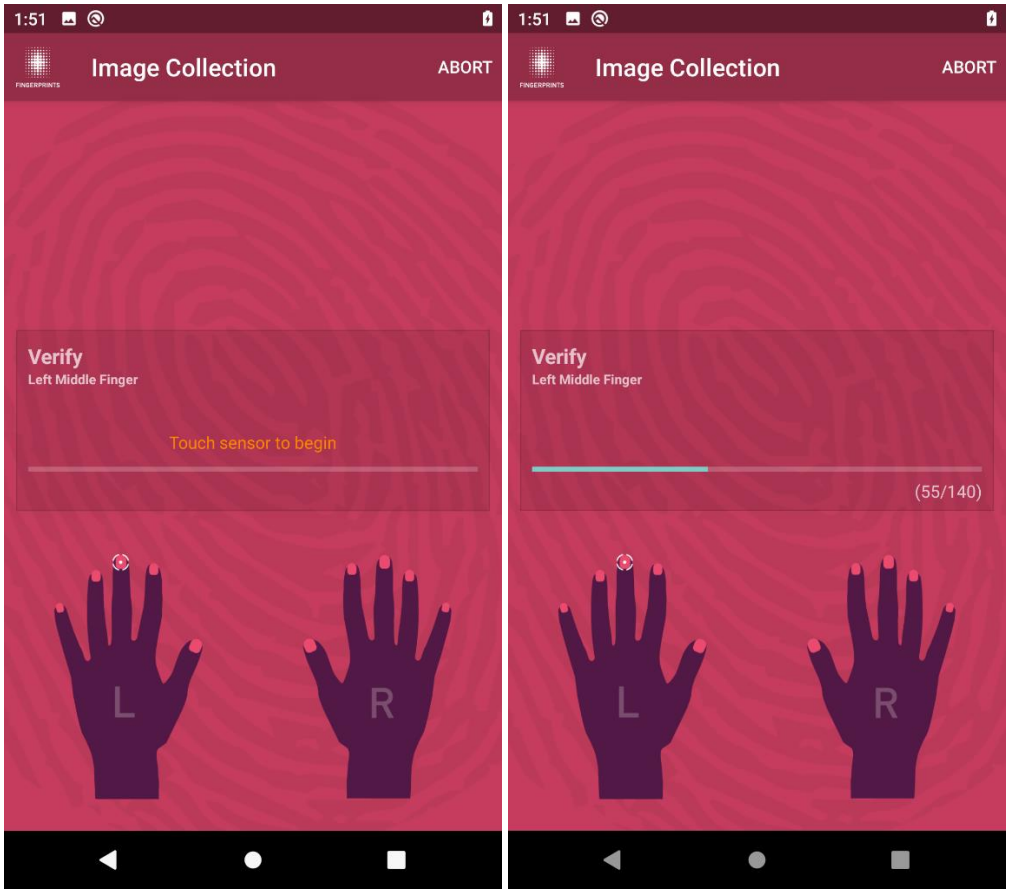

Figure 5 - Verify

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Verify 90° (Optional)

If the Verify 90° option is selected, the user will be prompted to rotate their finger before proceeding, as shown in Figure 6.

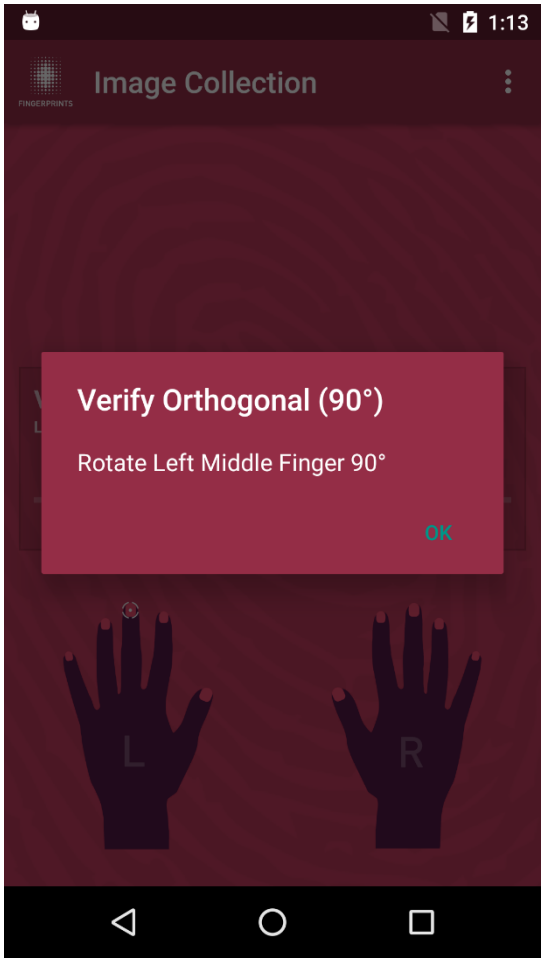

Figure 6 - Rotate Finger

COMPLETED

Image Collection is completed when all fingerprint images have been collected according to the Configuration.

ABORT

At any time during the Image Collection, you may abort your collection session. Press the menu key in the right upper corner and then confirm by pressing the OK in the dialog shown in the center of the screen.

CLOSE AND RESUME

At any time during the verify stage(es) in image collection, you may press the HOME key which send application to the background and you can open again to resume the collection. **Note**, this is only possible in verify. Pressing home during Enroll will fail the enrollment!

VIEW THE IMAGES

By default, all scanned images will be placed in the folder

/storage/emulated/0/Android/data/com.fingerprints.imagecollection/files/Pictures/Fingerprints.

The Fingerprints folder will have numbered sub-folders starting from index '0000', one for each collection round.

Folder Structure:

- *Enroll* – Images collected during a successful enroll phase.
- *Enroll_FTE* – Images collected during one or more unsuccessful enroll phases.
- *Verify* – Images collected during verify phase.
- *VerifyOrthogonal* – Images collected during verify orthogonal phase.

Each of these folders will contain fingerprint images in FMI format, which you can access either by the Android Debug Bridge (adb) or by mounting the device filesystem onto your PC.

LOG

You will find a xml log file containing information in the root folder for each collection. The information in the log-file varies depending on the settings. The log file is relatively new and may be subject to change. See appendix for example.

APPENDIX

FMI FILE NAME FORMAT

The file names are saved according to the following standardized format:

<DATE>_<FINGER INDEX>_<SAMPLE INDEX> for accepted images, or

<DATE>r_<FINGER INDEX> _<SAMPLE INDEX>, with the added “r” for rejected images.

Where
DATE = YYYYMMDDHHmmss,
FINGER INDEX = ‘00’ (Left Thumb) to ‘09’ (Right Little Finger)
SAMPLE INDEX = ‘000’ for first sample, ’001’ for second sample, etc.

XML CONFIGURATION

The settings can, in addition to manually changing them, be configured using an XML-file.

This is an example of such a configuration file.

```
<ImageCollectionConfig numberOfImages="10" leftIndexes="1" rightIndexes="2,3,4" imageDisplay="true">
  <Verify angle="0" position="" description=""/>
  <Verify angle="45" position="" description="Tilt finger 45 degrees"/>
  <Verify angle="90" position="" description="Tilt finger 90 degrees"/>
  <Verify angle="45" position="sit" description="Sit down"/>
  <Verify angle="0" position="stand" description="Stand up"/>
  <Verify angle="0" position="walk" description="Walk" numberOfImages="20"/>
</ImageCollectionConfig>
```

When using XML configuration, each collection (see the Verify-tags in the XML example) will end up in its own folder.

The XML should be put on the device under /sdcard/Android/data/com.fingerprints.imagecollection/files/Pictures/fpc_scenario_config.xml to have effect. If an XML-file is used the normal settings menu will be disabled. If you intend to make your own XML-configuration, and need to verify that the XML is correct, then please contact FPC to get a XML validation schema.

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XML Log file example

The log file contains information from the collection which can be used to calculate biometric metrics. One log file is stored per completed collection. This is an example of a short collection:

```
<ImageCollection time="40526182815" device="AOSP on BullHead">
 <Collection fingerType="L0">
  <Enroll status="COMPLETED">
   <File name="19710415011624_00_000.fmi" id="0" status="ACCEPTED"/>
   <File name="19710415011625_00_001.fmi" id="1" status="ACCEPTED"/>
   <File name="19710415011625_00_002.fmi" id="2" status="ACCEPTED"/>
   <File name="19710415011626_00_003.fmi" id="3" status="ACCEPTED"/>
   <File name="19710415011626_00_004.fmi" id="4" status="ACCEPTED"/>
   <File name="19710415011627_00_005.fmi" id="5" status="ACCEPTED"/>
   <File name="19710415011628r_00_006.fmi" id="6" status="REJECTED" errMsgId="6"/>
   <File name="19710415011629r_00_007.fmi" id="7" status="REJECTED" errMsgId="6"/>
   <File name="19710415011630_00_008.fmi" id="8" status="ACCEPTED"/>
   <File name="19710415011631_00_009.fmi" id="9" status="ACCEPTED"/>
  </Enroll>
  <Verify position="" angle="0" numberImages="15” decisionFeedback="true" accepted="8"
rejected="7">
   <File name="19710415011633_00_000.fmi" id="0" status="ACCEPTED"/>
   <File name="19710415011634_00_001.fmi" id="1" status="ACCEPTED"/>
   <File name="19710415011634_00_002.fmi" id="2" status="ACCEPTED"/>
   <File name="19710415011635r_00_003.fmi" id="3" status="REJECTED"/>
   <File name="19710415011636r_00_004.fmi" id="4" status="REJECTED"/>
   <File name="19710415011636r_00_005.fmi" id="5" status="REJECTED"/>
   <File name="19710415011637_00_006.fmi" id="6" status="ACCEPTED"/>
   <File name="19710415011637_00_007.fmi" id="7" status="ACCEPTED"/>
   <File name="19710415011638_00_008.fmi" id="8" status="ACCEPTED"/>
   <File name="19710415011638r_00_009.fmi" id="9" status="REJECTED"/>
   <File name="19710415011639r_00_010.fmi" id="10" status="REJECTED"/>
   <File name="19710415011641r_00_011.fmi" id="11" status="REJECTED"/>
   <File name="19710415011641_00_012.fmi" id="12" status="ACCEPTED"/>
   <File name="19710415011642_00_013.fmi" id="13" status="ACCEPTED"/>
   <File name="19710415011643r_00_014.fmi" id="14" status="REJECTED"/>
  </Verify>
 </Collection>
</ImageCollection>
```

Tag description:

- *ImageCollection* – Root node, one per collection containing timestamp (milliseconds since 1970) and device name.
- *Collection* – One per collected finger, contains finger type information (see Configuration)
- *Enroll* – Node containing files from one enroll. It has one attribute, status, stating if the enroll was successful or not (note: There can be one or more *Enroll*-nodes per *Collection* depending on number of failures)
- *Verify* – Node containing files from one verify. Its attributes contain position, angle and number of images. It also contains how many of the images that was accepted/rejected (if decision feedback was used, see *Configuration*).
- *File* – Node representing one file / image. Contains information about name, sequence id and status.

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Revision history

Rev	Date	Changes	Author
Dev-6.06	2020-12-25	Adapt to the newest app	Dave Xu

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