

SOFTWARE
DEVELOPMENT
KIT

SDK



Armatura MultiBio SDK 2.1

Overview

Armatura MultiBio SDK 2. (AKA MultiBio SDK) 1 is a developer-friendly software development kit that encapsulates the programming interfaces to communicate with Armatura Multimodal modules on firmware configuration, face & palm enrollment and authentication operations, and more. The supported multimodal modules include AMT-FAPVS-21 and AMT-FAPVR-21.

MultiBio SDK supports USB 2.0 compatible UVC video streaming and HID data communication protocols, encapsulates the function calls to the on-chip face & palm algorithms that are running directly on the module. The on-chip algorithms do not rely on host computing resources and provide full-cycle multi-biometric recognition operations, including face & palm detection, liveness detection, template extraction, face-attribute analysis, face & palm matching operations. The transparent, intuitive, and self-contained SDK interfaces make biometric recognition integration easy to pick up and simple to implement.

Besides access to module-built-in algorithms, the SDK also provides high-performance on-host face & palm matching operations which only requires limited host computing resources. It provides the flexibility to the application integration and simplifies the solution by managing and matching templates directly on application side.

MultiBio SDK supports popular operating systems including Windows, Android, and Linux (on request). In short, MultiBio SDK is a developer-friendly software toolkit to empower the biometric features on wide range of hardware/software applications, especially for embedded hardware devices with very limited computing sources, such as access control devices, time clocks, POS terminal, ATM, lockbox and more.

Features

- **High-performance and High-accuracy Face and Palm Recognition**

With the cutting-edge, deep learning-based computer vision technologies, face and palm can be recognized within a second from a large user base.

- **Rich Communication Interfaces with Module**

Hardware being supported by UVC and HID protocols, the user can remotely send the command to the module from the application, managing hardware module configuration, user data synchronization, templates enrollment and retrieving matching result from the module.

- **Support Wide Range of Hardware Platforms**

Usually, it requires high-performance computing resources to run AI-based face & palm recognition. Through MultiBio SDK, the application can perform the liveness detection, template enrollment operations on the module, it alleviates the computing resources demand on host devices and makes biometric features possible on a wide range of hardware platforms, for example, MCU-based devices.

- **Flexible Matching Options: On-Chip Matching and On-Host Matching**

When the host platform has limited computing resources (say MCU based) or limited memory, we can utilize the high-performance computing power on Armatura multimodal modules to perform face & palm enrollment and identification. If we want to simplify hardware-application integration solution, enhance the data security by managing sensitive personal biometric data inside host platform instead of the module, we can utilize the module to generate template, send the template to the host application, and call SDK matching on-host interface for identification and authentication.

- **Face Attribute Analysis**

The face recognition interfaces provide face attribute analysis functions which can estimate the age, gender, emotion classification, and detect beard, glasses, hat, and face mask. Such functions are very suitable for public business application where anonymity is required.

- **Highly Accurate Liveness Detection**

Empowered by Artificial Intelligent liveness detection model trained and probed by near infrared and visible light images, MultiBio SDK can effectively prevent forgery hacking from digital photos, printed color, black and white photos, and videos.

- **Highly Adaptable to Various Face and Palm Postures**

The module built-in algorithms interfaced by MultiBio SDK are not only adaptable to a wide range of face's or palm's pitch, yaw and roll angles, it also effectively identifies various palm shapes from tensed to naturally bended postures. The high posture adaptability provides super user experience, allowing user's palm or face stay in a natural way for recognition operation.

- **Fit to Most Environments**

Face & palm auto focusing and exposure algorithm enhances the face & palm image quality. This method effectively reduces interference from ambient light, making it fit to most indoor and outdoor environments.

- **Support for Multiple Operating Systems**

The standard MultiBio SDK supports Windows and Android operating systems, upon customer request, we can customize the SDK and fit to multiple Linux variants from PC to embedded systems.

Algorithm and SDK Specifications			
SDK Name	Armatura MultiBio SDK 2.1		
Operation System	Windows	Windows XP, 7, 10 (x86 & x64)	
	Android	Android 4.1 and above	
	Linux	Provided on request	
Hardware binding	AMT-FAPVS-21, AMT-FAPVR-21		
Communication	UVC and HID		
Template Generation Mode	Generate on Module		
Template Size	Face: 1024 Bytes, Face: 8844 Bytes		
Template Matching Mode	Match on Host, Match on Module		
Match Mode	1:1 for verification, 1:N for identification		
Minimal Image Size	Face: 128 * 128 (pixel)		
	Palm: 160W * 120H (pixel)		
Pose Adaptability	Face: Yaw $\leq 30^\circ$, Pitch $\leq 30^\circ$, Roll $\leq 45^\circ$		
	Palm: Yaw $\leq 20^\circ$, Pitch $\leq 20^\circ$, Roll $\leq 90^\circ$, Bend $\leq 15^\circ$		
Performance ^[1]		Face	Palm
	Detection Time	< 50ms	< 50ms
	Template Extraction Time	< 350ms	< 220ms
	Matching Time	< 100ms(1:50,000)	< 150ms (1:6,000)
1:N Capacity	Face: 50,000 on Module, 100,000 on Host		
	Palm: 6,000 on Module, 10,000 on Host		
Accuracy ^[2]	Face: TAR =99.2% when FAR = 0.001%		
	Palm: TAR =98.2% when FAR = 0.05%		
Programing Language	C/C++, C#, Java		

Notes:

^[1] The Facial algorithm is assessed on Intel® Core™ i5-3210M, 2.5GHz processor and 8GB DRAM.

The palm algorithm is assessed on Quad-Core Cortex A9 CPU@1.5GHz platform.

^[2] The accuracy is assessed on the proprietary face and palm image data set.

TAR: True Acceptance Rate, FAR: False Acceptance Rate.

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