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Armatura PalmLite SDK

Overview

Armatura PalmLite SDK encapsulates Armatura near-Infrared palm recognition algorithm and provides rich programming interfaces to the full cycle palm recognition operations, including palm detection, liveness detection, palm template extraction and matching.

The PalmLite SDK also wraps libusb function calls to support USB 2.0 compatible communication protocols with Armatura palm modules. The SDK supports popular operating systems including Windows, Android and Linux (on request). In summary, PalmLite SDK offers transparent, intuitive, and self-contained integration interfaces to application integrators/developers, flatting the learning curve on biometric recognition development, and simplifying the hardware communication implementation with software. The combination of infrared palm modules and PalmLite SDK makes biometric features available to a wide range of business systems, such as access control devices, time attendance clocks, POS, ATM, lockbox and more.

Features

Armatura PalmLite recognition solution is built on near-infrared (NIR) imaging technologies, the infrared palm modules capture infrared palm print and under-skin palm vein images in grayscale representation, then PalmLite algorithm identifies key palm feature points by scanning the image, analyzes the liveness likelihood to ensure a real person's palm, generates template to represent palm features and performs enrollment and matching operations.

The hemoglobin in the blood carries oxygen when flowing from the lung to the body through the arteries. After releasing oxygen to the tissues, the deoxidized hemoglobin flows back to the lungs through veins. The oxygenated and deoxidized hemoglobin have different rate to absorb infrared light. When scanned by infrared light at certain range of wavelength which can penetrate the skin, the veins form a grayscale pattern. Such bio-characteristics patterns are unique, stable and age-invariant to individuals. This is how palm vein image is captured by Armatura infrared palm modules.

Armatura infrared palm modules employs near-infrared light (NIR) to evenly illuminate the palm and take an image of palm prints and palm veins in grayscale representation. Different from visible light images, such grayscale image removes the uneven brightness and darkness from palm, make it superior for palm recognition.
PalmLite algorithm scans the input grayscale images to identify palm vein patterns, such patterns are not visible from visible light images, make it ideal for liveness detection to ensure a real person's face. The algorithm then generates template to represent palm features and performs enrollment and matching operations.

The infrared light-based palm recognition algorithm provides more features:

- Adaptable to Various Environments

Armatura infrared palm modules utilizes PalmLite algorithm auto focusing method to optimize the exposure time on palm. This approach prevents the ambient light's interference on infrared palm vein images. As a result, it ensures the consistent high-accuracy palm identification for all indoor and most outdoor environments.

- Highly Adaptable to Palm Posture

Highly adaptable to varying palm postures is one of the unique features of PalmLite algorithm, it can identify the palm from tightly tensed postures to relaxed natural ones, or palm in wide yaw, pitch or roll angles. The algorithm provides super user experience allowing individual to perform enrolment and matching operation in a natural and comfort posture regardless of the height.

- Highly Accurate and Robust Palm Recognition

The PalmLite algorithm selects the key features of palm prints & veins and breaks into multi-dimensional vector data, such as palm print & vein spacing, bifurcations, minutiae, textures, and curvatures for recognition process. Such features are rich in details, long-lasting, distinguishable, and unique to individuals.
PalmLite algorithm takes averaging approach on multiple templates (5 by default) collected in sequence to merge into a stable and robust enrollment template.
The combination of above processes ensures the algorithm to achieve highly accurate and robust recognition performance.

- Highly Secure Liveness Detection

The pattern from live subcutaneous tissues is invisible to human eyes and impossible to duplicate, naturally it provides strong security for anti-spoofing protection from forgery attack. The fusion of Armatura infrared palm modules and PalmLite algorithm makes the palm recognition super secure over traditional biometrics.

- High-Speed Palm Matching

PalmLite algorithm uses a multi-level matching mode to provide a high-speed verification/identification while ensuring robust verification/identification accuracy. The performance test on the single-core CPU from standard PC achieved 1 million matching times per second.

- Algorithm Integrity

Powered by Armatura infrared palm modules, PalmLite algorithm ensures the palm image data integrity and makes palm recognition unbreakable, authentic, and reliable.

Algorithm and SDK Specifications		
SDK Name	Armatura PalmLite Algorithm Ver 12.0	
SDK Size	Android Jar Lib	< 5MB
	Windows DLL lib	< 6MB
Minimal Image Size	160W * 120H (pixel)	
Pose Range	Yaw ≤ 20°, Pitch ≤ 20°, Roll ≤ 90°, Bend ≤ 15°,	
Template Size	8848 Bytes	
Performance*	Palm Detection Time	< 50ms
	Template Extraction Time	< 220ms
	Identification Time (1:6000)	< 150ms
Match Mode	1:1 for verification, 1:N for identification	
1:N Capacity	6,000 templates	
Accuracy**	TAR =98.2% when FAR = 0.05%	
Operation System	Windows	Windows XP, 7, 10 (x86 & x64)
	Android	Android 4.1 and above
	Linux	Provided on request
Program Language	C/C++, C#, Java	

Note:

*The algorithm performance is assessed based on image resolution of 480 * 640 and Quad-Core Cortex A9 CPU@1.5GHz platform.

** The accuracy is assessed based on the proprietary infrared light palm image data set.

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

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