



FaceMe®

The World's Top Cross-Platform AI Facial Recognition Engine

CyberLink

CyberLink Corp. is the world leader in AI facial recognition technology. Powered by deep learning algorithms, CyberLink's Facial Recognition Engine FaceMe® achieves up to 99.70% True Acceptance Rate (TAR) under the conditions that False Match Rate(FMR) is as low as 0.0001 (1E-4). It is ranked among the world's top facial recognition technologies in the NIST Face Recognition Vendor Test.



Why CyberLink FaceMe® ?

Highly Accurate & Secure

High precision facial recognition offering both anti-spoofing & image pre-processing for higher accuracy and security.

Optimized for Cross-Platform Solutions

Supporting Windows, Linux, Android, and iOS platforms, FaceMe® is ideal for cross-platform solutions for server and edge devices.

Encompassing All Edge Computing Configurations

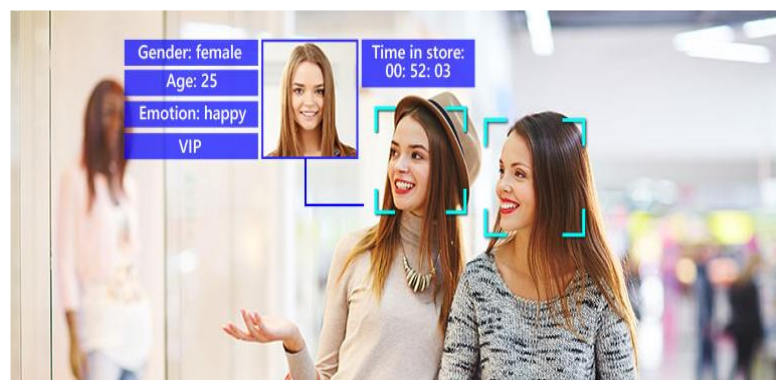
Developers can choose to enable CPU and GPU acceleration, harnessing performance with Intel® OpenVINO™, Movidius™, NVIDIA® CUDA™, Jetson™ and ARM.

FaceMe® Facial Recognition Use Cases



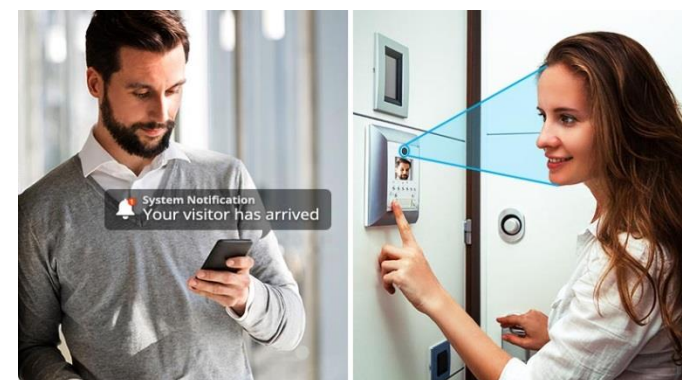
Security

With IP security camera systems, FaceMe® can identify staff, VIP visitors or blacklisted people and send instant phone notifications to security staff.



Retail

Detect gender, age, and emotions to understand customer demographics and behaviors. Retailers can be notified when VIP customers enter the store, through facial recognition and identification.



Office

Integrate facial recognition to door access systems to securely control and track employees or visitors entering or leaving. U Alerts can automatically notify staff when visitors arrive.



Factory

Use facial recognition to control access to restricted areas, machinery, and equipment operation.



Banking

FaceMe® provides multiple anti-spoofing methods – through 3D/2D cameras and even a web browser to prevent hacking. Banking system integrators can build reliable smart banking solutions.



Home

By integrating with smart doorbells and locks, FaceMe® can recognize the face of a family member or a pre-registered visitor to grant access or send alerts.

Technical Specifications

FaceMe® Accuracy from NIST

National Institute of Standards and Technology (NIST)

NIST FRVT 1:1	
VISA - True Acceptance Rate (TAR) when FAR set to 0.0001 (1E-4)	99.70%
VISA - True Acceptance Rate (TAR) when FAR set to 0.000001 (1E-6)	98.95%
VISA Border - True Acceptance Rate (TAR) when FAR set to 0.000001 (1E-6)	99.06%
WILD - True Acceptance Rate (TAR) when FAR set to 0.0001 (1E-4)	97.17%

- * CyberLink FaceMe® is ranked 18th globally and ranked 6th in NIST FRVT 1:1(WILD 1E-4) on Mar 2020. if China & Russia vendors are excluded.
- * VISA images are photos taken from the passport. The mean interocular distance (IOD) in the VISA images are 69 pixels.
- Wild images are non-constraint, photojournalism-style photos. Resolution varies widely. A wide yaw and pitch angle may be present.
- VISA Border are comparing VISA image to WebCam images.

FaceMe® Accuracy

FaceMe® Model	Ultra High Precision (UH3)	Very High Precision (VH)	High Precision Model (H3)
Recommended Platform	Server, Workstation	PC, Premium Mobile	Mobile, Light-weight IoT/AIoT Devices
True Acceptance Rate (@FAR 1E-4)	99.05%	98.95%	98.35%
True Acceptance Rate (@FAR 1E-5)	99.05%	98.95%	97.03%
True Acceptance Rate (@FAR 1E-6)	98.89%	97.99%	94.98%
Model Size (MB)	250 MB	17 MB	6.7 MB
Template Size (KB)	3 KB	3 KB	3 KB

Technical Specifications

Performance Numbers

For Workstation or Server

CPU	Core i7-7700K			Core i7-7700K		
GPU / VPU	—			NV RTX 2080 Ti		
FaceMe® Extraction Model	UH3	VH	H3	UH3	VH	H3
Execution Time (ms) Detection + Extraction	69.5 ms	16.5 ms	14.4 ms	19.3 ms	14.2 ms	12.8 ms
Frames per second (fps)	14.4 fps	60.7 fps	69.6 fps	51.7 fps	70.4 fps	78.3 fps
Face Match Time (ms)	0.0011 ms	0.0011 ms	0.0011 ms	0.0011 ms	0.0011ms	0.0011 ms

For Industrial PC

CPU	Celeron G4920			Celeron G4920			Jetson Nano	Jetson TX2
GPU / VPU	1x VPU (Movidius Myriad X)			8x VPU (Movidius Myriad X)			—	—
FaceMe® Extraction Model	UH3	VH	H3	UH3	VH	H3	VH	UH3
Execution Time (ms) Detection + Extraction	100.5 ms	54.4 ms	46.4 ms	26.2 ms	19.8 ms	18.8 ms	67.4 ms	92.3 ms
Frames per second (fps)	10.0 fps	18.4 fps	21.5 fps	38.2 fps	50.6 fps	53.2 fps	14.8 fps	10.8 fps
Face Match Time (ms)	0.0016 ms	0.0016 ms	0.0016 ms	0.0016 ms	0.0016 ms	0.0016 ms	0.0075 ms	0.0031 ms

* 1080p images, 1 face per image
* Face Match Time: Time taken to match two templates. A template extracted face image can enable a person to be identified from a large database. For example, matching a template with 1,000 people would require 1,000 separate matches.

For Mobile Devices & IoT/ AIoT Devices

SoC	Snapdragon 845		Snapdragon 650		Snapdragon 410		A12X	
Device	Google Pixel 3		Sony Xperia X		TASHI MT430		iPad Pro 12.9” 2018	
Extraction Model	VH	H3	VH	H3	VH	H3	VH	H1
Execution Time (ms) Detection + Extraction	41.9 ms	27.8 ms	163.7 ms	112.3 ms	343.7 ms	175.3 ms	29 ms	22 ms
Frames per second (fps)	23.9 fps	36.0 fps	6.1 fps	8.9 fps	2.9 fps	5.7 fps	34.5 fps	45.5 fps
Face Match Time (ms)	0.0009 ms	0.0009 ms	0.0075 ms	0.0065 ms	0.0080 ms	0.0080 ms	0.0025 ms	0.0009 ms

* 720p images, 1 face per image

Technical Specifications

FaceMe® Technology

Feature List	
Face Detection	Yes
Face Recognition	Yes
Face Tracking	Yes
Face Attributes Recognition	Gender, Age, Emotion, Pose
Real-time Video Support	Yes
RTSP/H.264 Support	Yes
Emotion Detection	Happy, Sad, Angry, Surprised, Neutral
Images Pre-Processing	Lighting Enhancement, Edge Sharpening, Upsampling
Anti-Spoofing with 3D-Cameras	Yes
Anti-Spoofing with 2D-Cameras (with user interactions)	Yes
Anti-Spoofing with 2D-Cameras (without user interactions)	Yes
Chipsets (CPU/GPU/VPU)	Intel®x64, ARM64™, NVIDIA® GPU, NVIDIA® Jetson, Intel®Movidius VPU
Programming Interface	C++, HTTP, C#, Perl
AI Inference Engines	TensorFlow, TensorRT, OpenVINO, CoreML

Images/ Cameras Conditions

	Minimum	Recommended
Face Pose – Yaw	< 60°	< 45°
Face Pose – Pitch	< 50°	< 30°
Face Pose – Roll	< 60°	< 45°
Lighting	450 lux	550 lux
Face Size (pixels between eyes)	36 pixels	50 pixels
Face Enrollment	1 image	5 images - Straight, Left/Right (15°~45°), Up (5°~30°), Down (15°~30°)

Anti-spoofing using 3D-Depth Camera

Supported 3D-Depth Cameras	Intel® RealSense, Orbbec® Astra Pro, Himax®, Altek®, eYs3D®
True Positive Rate	98.2%
True Negative Rate	100%

Fast Search Algorithm for an Enormous Database

People in Database	Time to Search in Database (ms)	
Algorithm	One-by-one Compare	Fast Search
1 Million People	1,860 ms	1.2 ms
6 Million People	11,200 ms	1.6 ms

* With Fast Search algorithm, FaceMe can search a face within a 6 million person database for about 1.6 ms.
* Tested on a i7-7700K with 24GB memory PC. A database of 30 million faces would require 128GB memory.

Accuracy of Face Attributes Detection

Detection Attributes	Accuracy Rate
Gender	98%
Emotion	Up to 86%
Age	5.8 y/o (Mean Average Error)

* Tested with 68,000 images.

System Requirements

For Workstation or Server

Ultra High Precision Model (UH3)		Very High Precision Model (VH) High Precision Model (H3)
CPU	Intel® Xeon® Processor E3 Family with 4 cores (E5 Family with 8 cores recommended)	
GPU	NV GTX 1080 or T4	—
Memory	64 GB (128 GB recommended)	
OS	Windows, Linux (Ubuntu 16, RedHat 7, CentOS 7)	

For Computers

Ultra High Precision Model (UH3)		Very High Precision Model (VH) High Precision Model (H3)
CPU	Intel® Celeron Processor (Core i7 recommended)	Intel® Celeron Processor (Core i5 recommended)
GPU	NVIDIA® GTX 1060 (GTX 1080 recommended)	—
Memory	4 GB (16 GB recommended)	
OS	Windows 7/10 (x64), Ubuntu 16 (x64)	

For IoT Edge Devices

Android ARM64		Linux ARM64	NVIDIA Jetson
CPU	Snapdragon 410 (4x Cortex-A53) Rockship RK3399 (2x A72 + 4x A53)		Jetson™ Nano, TX2 Xavier
Memory	1 GB (1.5 GB recommended)	4 GB or above	
OS	Android 5.0	Ubuntu 16, Debian	JetPack 4.3
Runtime Memory	500 MB	1 GB	1 GB

For Mobile Devices

Android ARM64		iOS
CPU	Snapdragon 410 (835 recommended)	Apple A8 (A10 recommended)
Memory	1 GB (1.5 GB recommended)	1 GB (1.5 GB recommended)
OS	Android 5.0	iOS 11
Runtime Memory	500 MB	500 MB

