

OptiML™ Face Tools

Hardware Accelerated Implementation

OptiML Face Tools are available as embedded software solutions or in hardware-accelerated versions. They are highly scalable and based on an adaptive algorithm that accommodates processing power, memory and image quality for a wide range of digital cameras, cell phones and other platforms. The Hardware Acceleration Platform minimizes the burden on the memory bandwidth & CPU, allowing processing power which cannot be matched by software solutions. laser diode as the source.

Key Features

- Improved performance allows for improved responsiveness and quality of locking and tracking as compared to the software (SW) only solutions
- Hybrid hardware-software (HW-SW) Solution - best use of both hardware and software to provide multiple advanced image processing features with high performance and reduced demands on system resources
- Optimized Partition - hardware acceleration is used for computationally intensive tasks, with the control and configuration done in software
- Multi Use - accelerates and enables a wide range of technologies (such as Face Tools and and detection) which can be used in the same time
- Low Cost - partitioning is designed to provide best price per performance ratio with excellent power consumption
- and flexibility
- Light Requirements - designed to work with minimum resources, both in logic (gates and memory) and software (code size + RAM)
- Future Proof Solution - while the HW component ensures a very low processor usage, the SW component provides the possibility of future upgrades based on new requirements

Digital camera technology is evolving rapidly—converging with cell phones and extending into other camera enabled devices such as tablets, laptops, TVs, security, automotive or medical equipment. In the vast majority of these situations, the main subject of interest of the camera is a person. For instance, over 100 million pictures with faces are uploaded on social networks every day. Camera users still have to contend with less than perfect results: subjects with closed eyes, awkward facial expressions, images that are over-exposed, enhancing the portraits and so on.

The technology is here—and it’s key to your competitive advantage. Industry-leading DigitalOptics Corporation™ (DOC) OptiML Face Tools enable you to deliver advanced imaging features that will improve image quality and simplify picture taking or video conferencing experience on cameras, cell phones and other digital imaging products.

Face Tools Overview

Face Tools includes Face Tracking, Smile Detect, Blink Detect, Accurate Eye Tracking, Face Recognition and Face Beautification technologies that enable your camera-enabled products with capabilities such as automatic color balance correction, focus and exposure, face zooming, smile and blink preservation, person identification, or glassless 3D potential, all to create a unique user experience either if one is taking pictures, video conferencing, watching 3D content or playing games.

The technologies have been developed using regression tests on a huge image collection of millions of frames and still images, taken in a wide range of conditions to cover the variety of human races, gender, age, luminance conditions, face angles, distance to subject, number of subjects in the field of view.



Contact a DOC sales representative for more information.

3025 Orchard Parkway | San Jose, CA 95134 | T +1.704.887.3154 | www.doc.com

Face Tracking

DOC's OptiML technology provides fast, high-performance face detection and tracking capabilities that enable the camera to select optimal settings automatically for the perfect picture. Using innovative face-oriented algorithms, the technology detects straight away the faces in the camera viewfinder, and tracks them moving through the image if the camera is rotated or subjects shift their poses. It enables a camera to automatically adjust focus, color and exposure settings, optimizing portraits even in the most challenging conditions, when subjects are backlit, off-center or over/under exposed. The technology also incorporates advanced tracking algorithms to lock and anticipate the changing position of faces allowing high quality photography when the subject is in motion.



Face Tracking enables automatically-optimized image quality, even under poor lighting conditions.

Key Features

- Excellent general-purpose detection in extreme illumination conditions and face poses
- No restrictions on the number of faces that can be detected. Scene dependent parameters are collected and used to improve accuracy
- Full out-of-plane angle support. Capable of locking and tracking faces from frontal to profiles
- Implements advanced tracking algorithms; not reliant on face detection alone
- Provides face orientation information, when an orientation sensor is not available in the device
- Self-calibrates to difficult lighting conditions. Optimizes and improves the quality of the image and movies
- Uses full color information for a very low false positive ratio
- Flexible and optimized based implementation, able to scale on virtually any target system for multiple resolution images
- Operates to a minimum face size of 14x14 (typically 6-7 pixel between the eyes) in a resolutions up to 720p. This leads to unmatched distance to subject (up to 12 meters for a 60 degree FOV camera)
- Configurable library that can be tuned during integration to provide optimum performance for the available system resource
- Library is optimized for embedded use: integer-only algorithm, having no requirements for embedded FPU unit or any other hardware acceleration
- Simple firmware interface for easy integration into the device, providing a flexible API.
- Inbuilt memory management system for high performance and easy integration and porting. Efficient runtime memory footprint requirements
- Input image formats -YCC and RGB in various configurations: planar or interleaved
- Multi-platforms: x86 (Windows & Linux), Windows CE/Mobile (ARM), Xtensa (Linux), Zoran COACH (MIPS) single and dual core (ThreadX), Fujitsu (FR), TI DM3x DaVinci (ARM), MacOS X (i386, PowerPC), iPhone (ARM), Xilinx (PowerPC). Suitable for single core processors, dual core processors or processor + DSP architectures.

Smile Detect

DOC's Smile Detect technology enables a camera viewfinder to indicate when faces are smiling and can ensure the camera shutter is triggered only when one or more faces are smiling.



Blink Detect

DOC's Blink Detect technology can be used to warn the photographer when the subjects' eyes are closed.

