

Detecto Object Detector

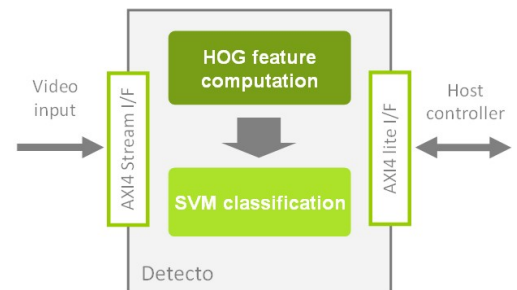
GENERAL DESCRIPTION

Detecto is a learning-based object detection IP core, developed for embedded vision applications. The algorithm follows a discriminative approach: it combines a HOG-based descriptor and a SVM classifier. HOG (Histogram of Oriented Gradients) is a descriptor encoding the object structure. SVM (Support Vector Machine) is a non probabilistic binary linear classifier. The core supports multiple scales to detect objects moving in an arbitrary range of distance.

Detecto is provided with a built-in pedestrian detection classifier trained on a wide range of automotive scenarios. User-defined classifiers can be created with the support of STK Software Training Kit and loaded via software API. Multiple SVM blocks can be instantiated to detect different objects.



ARCHITECTURE



APPLICATIONS

- Driving assistance systems
- Video surveillance
- Robot navigation
- Biomedical imaging
- Machine vision
- Content based indexing
- Advanced human-machine interfaces

CORE FEATURES

Xilinx® family target	Zynq®-7000 AP SoC
Design file format	Encrypted VHDL (Vivado Core)
Register interface	ARM AMBA AXI4 compliant
Input interface	AXI4 Stream slave
Input format	RGB/YUV Image size up to 4096x4096 Support for image pyramid
Template size	Up to 128x64
Classifier	Runtime loadable
Multiple object detection	Up to 4 SVM classifiers in parallel
Input data rate	> 120 Mpixel/sec
Throughput	> 7.6 GMAC/sec
Detection range	1 to 10m with 1 Mpixel camera, 180° FOV 2 to 50m with 1 Mpixel camera, 50° FOV
Additional items	SW drivers, API and post processing library available

IMPLEMENTATION STATISTICS FOR XILINX FPGAS

Family (Device)	Fmax (Mhz)	FFs	LUTs	BRAM18	DSP48	Design Tools
Zynq-7000 (XC7Z045-2)	240	7,797	5,480	45	35	Vivado 2016.4

eVS CONTACTS:

eVS embedded Vision Systems Srl
c/o Computer Science Park
Strada Le Grazie, 15, 37134 - Verona, Italy
tel/fax: +39 045 8027027

web: www.embeddedvisionsystems.it
email: info@evsys.it
To request a quotation:
email: sales@evsys.it



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