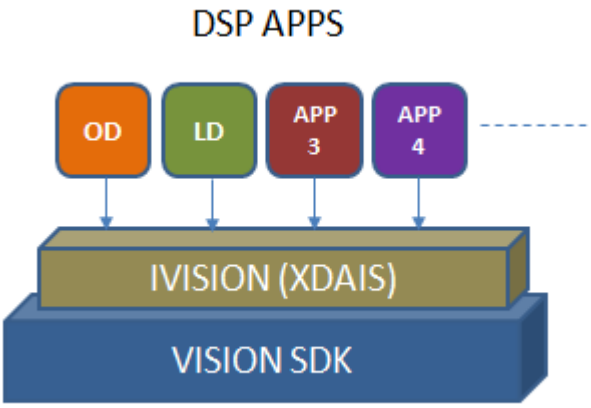
- **IVISION (XDAIS) interface compliant**
- **Validated on TDA2x EVM**
- **Supports pedestrian detection and traffic sign recognition.**
- **Tracks upto 32 pedestrians and 32 traffic signs per frame.**
- **Identifies 43 different types of German traffic signs.**
- **Supports user controlled parameters to control between accuracy and run time performance**
- **Supports user controlled thresholds to control the accuracy (False positive vs True Negative)**



Description

Object detection module is TI's proprietary Vision and Imaging algorithm implemented on TMS320C66x DSP. Objected detection module is validated with Code Composer Studio version 5.1.0.09000 and code generation tools version 7.4.4.

Performance and Memory Summery

Table 1. Configuration Table

CONFIGURATION	ID
Pedestrian Detection + Traffic Sign Recognition	OBJDET_001
Pedestrian Detection Only	OBJDET_002
Traffic Sign Recognition Only	OBJDET_003

CONFIGURATION ID	TEST DESCRIPTION	TI C66X DSP PERFORMANCE STATISTICS / FRAME	
		MIN (MHZ)	MAX(MHZ)
OBJDET_001	Resolution = 1280x720, Number of scales/octave = 6 Number of scales/frame= 21 % ROI in base scale = 25% with grow by 1.12 in each successive scale 2x2 block sum done on EVE	21.1	24.3
OBJDET_002		4.9	6.1
OBJDET_003		17.6	19.6
OBJDET_001	Resolution = 1280x720, Number of scales/octave = 6 Number of scales/frame= 21 % ROI in base scale = 20% with grow by 1.12 in each successive scale 2x2 block sum done on EVE	18.6	21.1
OBJDET_002		3.8	4.8
OBJDET_003		15.3	19.6
OBJDET_001	Resolution = 1280x720, Number of scales/octave = 6 Number of scales/frame= 21 % ROI in base scale = 25% with grow by 1.12 in each successive scale 2x2 block sum done on DSP	22.3	25.8
OBJDET_002		6.4	7.4
OBJDET_003		19.0	21.1
OBJDET_001	Resolution = 1280x720, Number of scales/octave = 6 Number of scales/frame= 21 % ROI in base scale = 20% with grow by 1.12 in each successive scale 2x2 block sum done on DSP	19.2	22.0
OBJDET_002		4.9	5.9
OBJDET_003		16.8	18.3

[1] Performance is validated by running on TDA2x platform. DDR-532Mhz, DSP-600Mhz. The scene comprises of 1 pedestrian and 4 traffic signs. The performance of the algorithm will vary depending on the number of objects available in the scene.

Table 2. Memory Statistics - Generated with Code Generation Tools Version 7.4.4

CONFIGURATION ID	RESOLUTION	MEMORY STATISTICS[1]						
		PROGRAM MEMORY	DATA MEMORY					TOTAL
			INTERNAL	EXTERNAL			STACK	
				PERSISTENT	SCRATCH	CONST		
OBJDET_001	1280x720	72.5	248	519.6	10.6	297.7	6	1154.4
OBJDET_002	1280x720	72.5	169	519.6	10.6	138.4	6	916.1
OBJDET_003	1280x720	72.5	94	519.6	10.6	160.2	6	862.9

[1] All memory requirements are expressed in kilobytes (1 K-byte = 1024 bytes) and there could be a variation of around 1-2% in the numbers.

Table 3. Internal Data Memory Split-up

CONFIGURATION ID	DATA MEMORY – INTERNAL[2]		
	SHARED		INSTANCE[3]
	CONSTANTS	SCRATCH	
OBJDET_001	199	49	-
OBJDET_002	137	32	-
OBJDET_003	62	32	-

[2] Internal memory refers to on chip memory. All memory requirements are expressed in kilobytes and there could be a variation of around 1-2% in numbers. L1D memory is split into 24kb of SRAM, 8kb of cache. L2 memory is split as 224kb of SRAM and 64 kb of cache. Executing object detection module along with other DSP algorithm which requires different L1D configuration could hinder performance.
[3] I/O buffers are not included. Some of the instance memory buffers could be scratch.

notes

- I/O buffers:
  - Input buffer size = 3481.83 K-bytes (For 1280x720 resolution , 21 scales, 1 frame, 25% ROI)
  - Output buffer size = 16.5 K-bytes (For a maximum of 32 objects per frame)
  - Total data memory for N non pre-emptive instances = Constants + Runtime Tables + Scratch + N * (Instance + I/O buffers + Stack)
- Total data memory for N pre-emptive instances = Constants + Runtime Tables + N * (Instance + I/O buffers + Stack + Scratch)

references

- ObjectDetection_DSP_UserGuide.pdf

glossary

Constants	Elements that go into .const memory section
Scratch	Memory space that can be reused across different instances of the algorithm
Shared	Sum of Constants and Scratch
Instance	Persistent-memory that contains persistent information - allocated for each instance of the algorithm

acronyms

DMA	Direct Memory Access
EVM	Evaluation Module

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