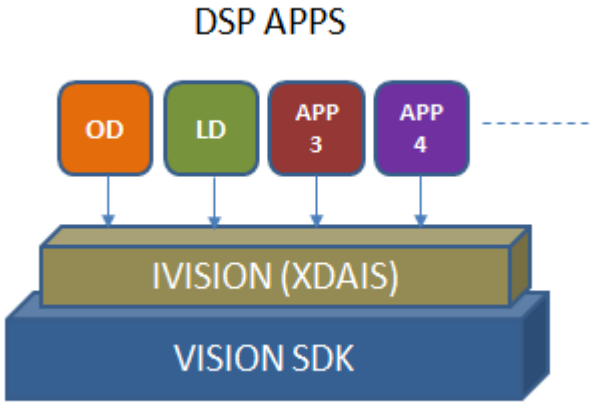
- **IVISION (XDAIS) interface compliant**
- **Validated on TDA2x EVM**
- **Supports CNN based traffic sign classification**
- **Identifies 26 different types of German traffic signs.**



Description

Object classification module is TI's proprietary Vision and Imaging algorithm implemented on TMS320C66x DSP. Objected classification module is validated with Code Composer Studio version 5.1.0.09000 and code generation tools version 7.4.2.

Performance and Memory Summery

Table 1. Configuration Table

CONFIGURATION	ID
CNN based German traffic sign recognition	OBJCLASS_001

Table 2. Performance Table

CONFIGURATION ID	TEST DESCRIPTION	TI C66X DSP PERFORMANCE STATISTICS / OBJECT / FRAME	
		MIN (MEGA CYCLES)	MAX (MEGA CYCLES)
OBJCLASS_001	1280x720 image pyramid with 13 scales, 32% ROI. List of (X, Y, scale) locations of detected windows from OD module. 1 traffic sign detection	2.56	2.57

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

Table 3. Memory Statistics - Generated with Code Generation Tools Version 7.4.2

CONFIGURATION ID	RESOLUTION	MEMORY STATISTICS[1]						
		PROGRAM MEMORY	DATA MEMORY					TOTAL
			INTERNAL	EXTERNAL			STACK	
				PERSISTENT	SCRATCH	CONST		
OBJCLASS_001	1280x720	12.25	224	20.6	240.5	363.75	8	869.1

[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 4. Internal Data Memory Split-up

CONFIGURATION ID	DATA MEMORY – INTERNAL[2]		
	SHARED		INSTANCE[3]
	CONSTANTS	SCRATCH	
OBJCLASS_001	-	224	-

[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 configured entirely as 32kb of cache. L2 memory is split as 224kb of SRAM and 64 kb of cache. Executing object classification module along with other DSP algorithms 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 = 4097.25 K-bytes (For image pyramid of1280x720 resolution, 13 scales, 1 frame, 32% ROI)
  - Input buffer size = 1544 bytes (For detected traffic signs from OD module, max of 32 objects per frame)
  - Output buffer size = 1544 bytes (For classified traffic signs from OC module, max 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

- ObjectClassification_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
CNN	Convolutional Neural Network

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