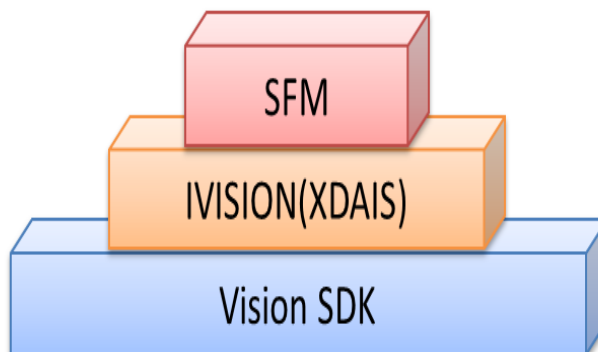




- IVISION (XDAIS) interface compliant
- Validated on TDA2x EVM
- Supports sparse 3D reconstruction from tracked feature points in image
- Supports single precision 32 bit floating point format for out 3D reconstructed points
- Format supported for input 2D image feature points is fixed point format of 16 bit with programmable Q format (number of bits for fraction precision).
- Supports user controlled parameters to control between accuracy and run time performance
- Supports user controlled thresholds to control the accuracy



Description

Structure from Motion (SFM) module is TI's proprietary Vision and Imaging algorithm implemented on TMS320C66x DSP. SFM module is validated with Code Composer Studio version 5.4.0.00091 and code generation tools version 7.4.19.



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PRODUCT PREVIEW



Performance and Memory Summary

Table 1. Configuration Table

CONFIGURATION	ID
Number of Input Tracks = 4865 Number of tracks for triangulation = 4829 Maximum Triangulation Iteration = 3 Number of output 3D points = 2531	SFM_001

Table 2. Cycle Performance Statistics

CONFIGURATION ID	TEST DESCRIPTION	TI C66X DSP PERFORMANCE STATISTICS	
		MIN (MEGA CYCLE PER CALL)	MAX(MEGA CYCLE PER CALL)
SFM_001	Pre Recorded Parking Scene	9.3	9.3

¹ Performance is validated by running on TDA2x platform. DDR-532Mhz, DSP-600Mhz. Performance number is heavily dependent on input data.

Table 3. Memory Statistics

CONFIGURATION ID	MAXIMUM FEATURE POINTS	MEMORY STATISTICS ¹						
		PROGRAM MEMORY	INTERNAL	EXTERNAL			STACK	TOTAL
				PERSISTENT	SCRATCH	CONST		
SFM_001	12000	2 ¹	48(L2)/14(L1)	394	0	0.1	6	483.1

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	
SFM_001	0	48(L2)/14(L1)	-

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. ³ I/O buffers are not included. Some of the instance memory buffers could be scratch. For L1D 16KB is configured as cache, whereas for L2D 128 KB is configured as cache.

Notes

- I/O buffers:
 - Input buffer size = $66 \cdot N$, where N is the maximum number of track, $N = 12000$ in SFM_001 config.
 - Output buffer size = $24 \cdot N$, where N is the maximum number of track, $N = 12000$ in SFM_001 config.
 - Total data memory for N non pre-emptive instances = Constants + Runtime Tables + Scratch + $N \cdot (\text{Instance} + \text{I/O buffers} + \text{Stack})$
- Total data memory for N pre-emptive instances = Constants + Runtime Tables + $N \cdot (\text{Instance} + \text{I/O buffers} + \text{Stack} + \text{Scratch})$

References

- StructureFromMotion_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

SFM	Structure From Motion
CIF	Common Intermediate Format
DMA	Direct Memory Access
DMAN3	DMA Manager
EVM	Evaluation Module
MV	Motion Vector
QCIF	Quarter Common Intermediate Format
QVGA	Quarter Video Graphics Array
SQCIF	Sub Quarter Common Intermediate Format
UMV	Unrestricted Motion Vectors
VGA	Video Graphics Array

DRAFT

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