
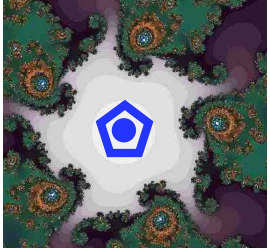

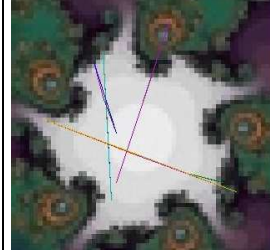
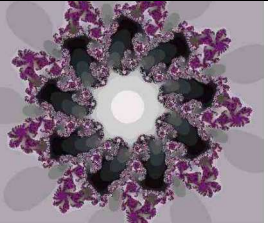
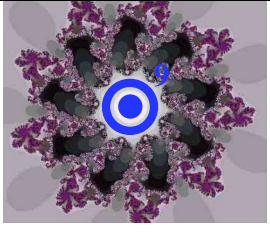
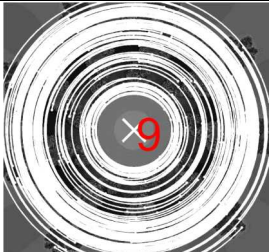
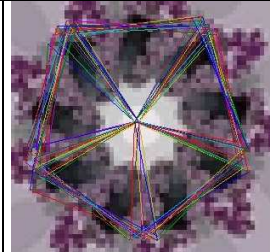
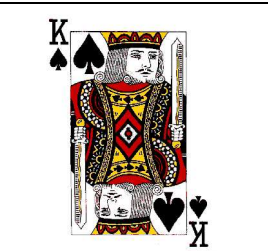
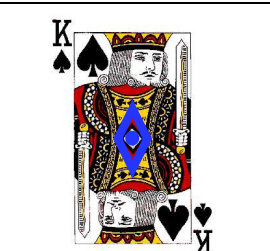
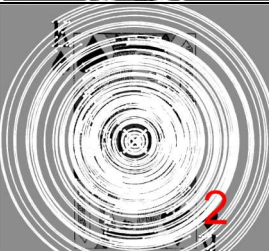

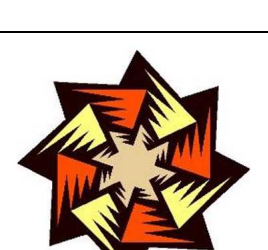
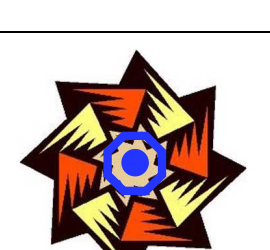
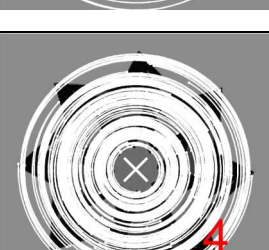
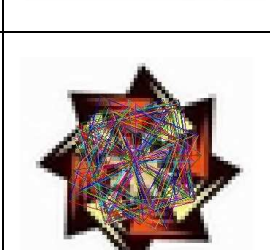
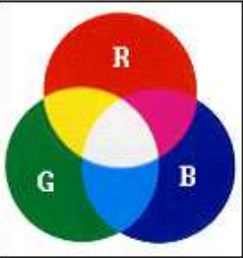
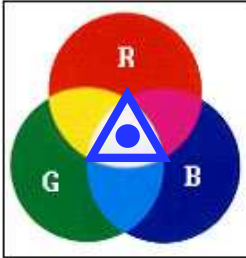
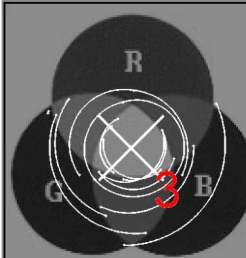
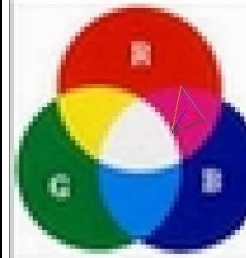


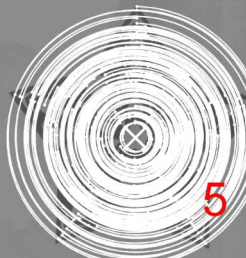
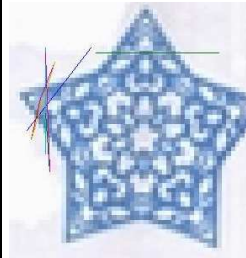


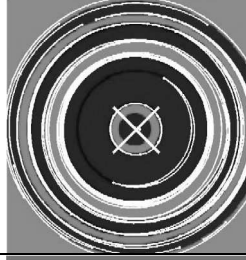
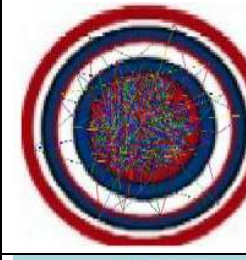
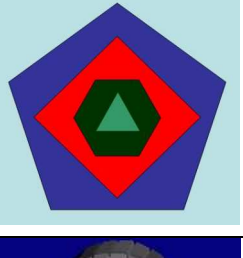
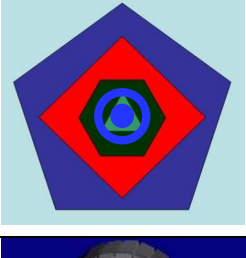


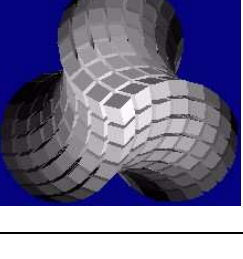
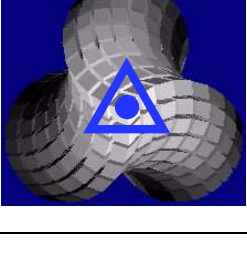

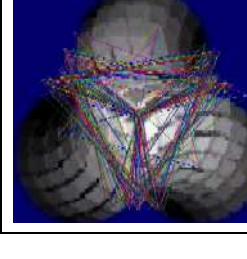
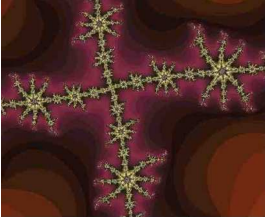
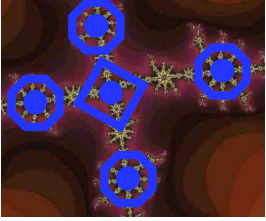

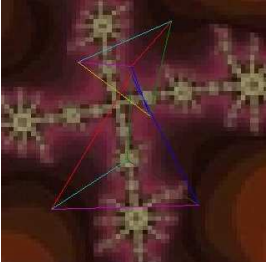

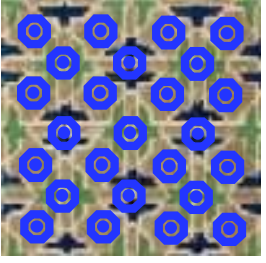
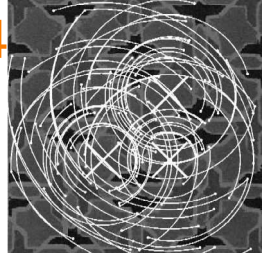


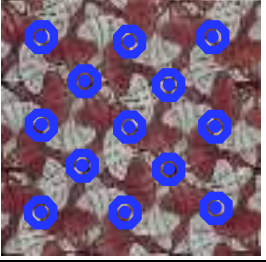
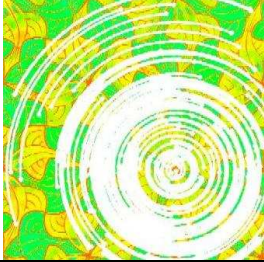


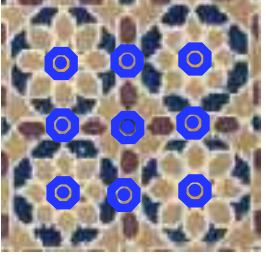
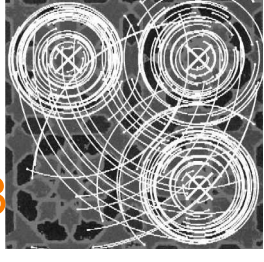
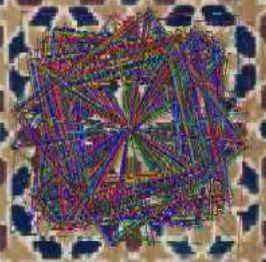



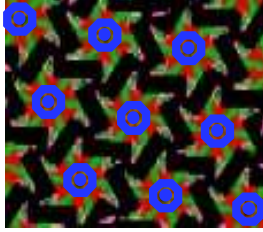
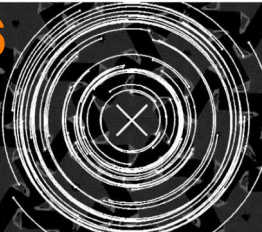
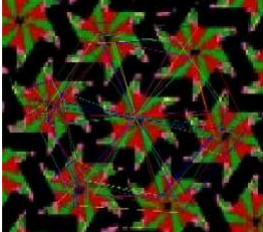

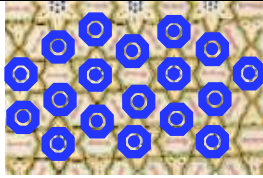
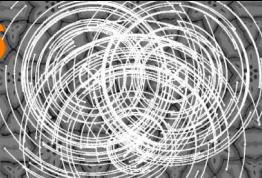
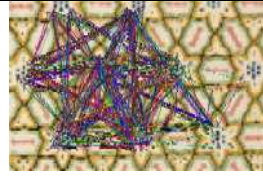

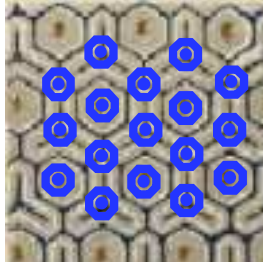
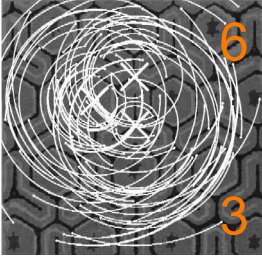
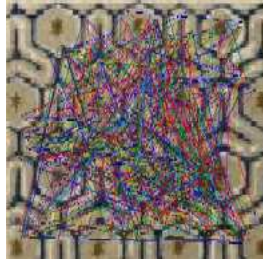

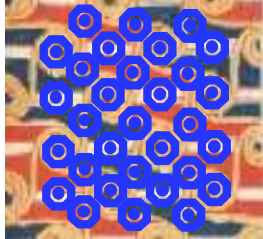
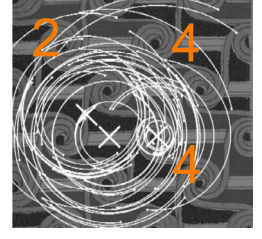
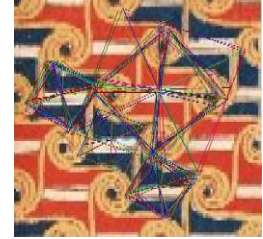

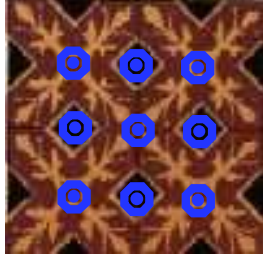


**\* Synthetic image – single symmetry (Rot\_SS, nine images total)**




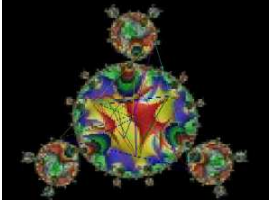






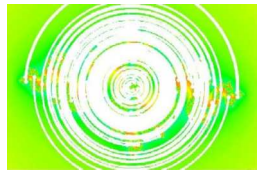
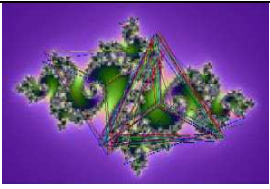
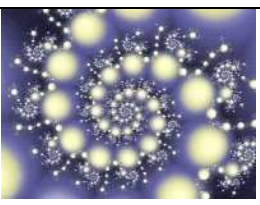

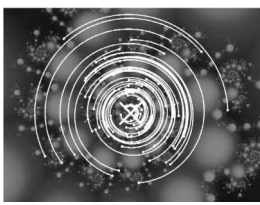
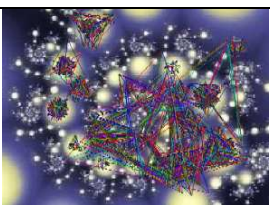
Image Number	Original Image	Ground Truth	Description /Challenges	Loy and Eklundh 2006	Prasad and Davis 2005	Loy and Eklundh 2006			Prasad and Davis 2005		
						S1	S2	GT,TP,FP	S1	S2	GT,TP,FP
Rot_SS1			[C5] Color variation; Global and local.			1	1	1,1,0	0	-1	1,0,1
Rot_SS2			[C9] Color variation; Global and local.			1	1	1,1,0	1	0	1,1,0
Rot_SS3			[C2] Complex texture.			1	1	1,1,0	1	0	1,1,0
Rot_SS4			[C8] Color difference.			1	1	1,1,0	1	0	1,1,0

Rot_SS5			[D3] Color difference; Low texture.			1	1	1,1,0	0	-1	1,0,1
Rot_SS6			[D5] Paper Cutting			1	1	1,1,0	0	-1	1,0,1
Rot_SS7			[SO(2)] No texture			1	1	1,1,0	1	1	1,1,0
Rot_SS8			[D5][D4][D3] [D6] Multi fold fir same center			1	1	1,1,0	1	1	1,1,0
Rot_SS9			[C3] texture			1	-1	1,1,2	1	1	1,1,0


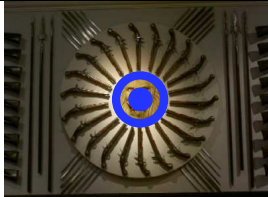

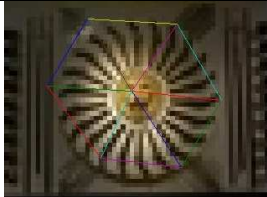

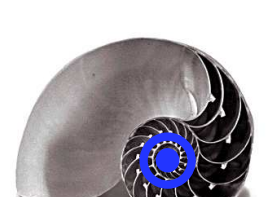
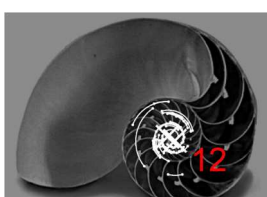








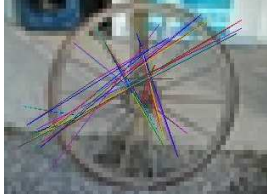
**\* Synthetic image – multiple symmetry (Rot\_SM, 13 images total)**







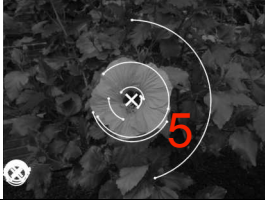




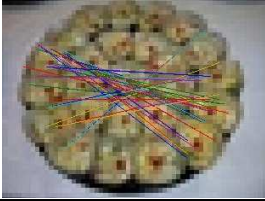



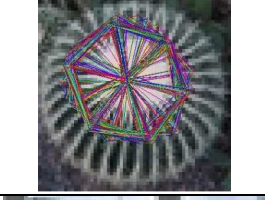


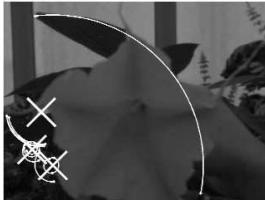
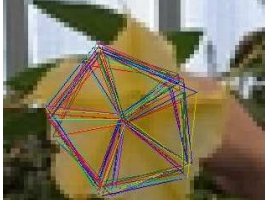

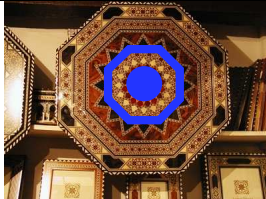
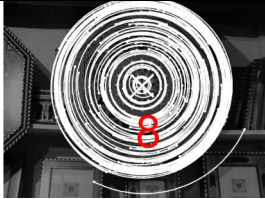
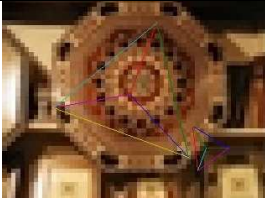
Num	Original Image	Ground Truth	Description /Challenges	Loy and Eklundh 2006	Prasad and Davis 2005	Loy and Eklundh 2006			Prasad and Davis 2005		
						S1	S2	GT/TP/FP	S1	S2	GT/TP/FP
Rot_SM1			[D8, D16] Color variation; Global and local.			0.6	0.6	5/3/0	0	-0.4	5/0/2
Rot_SM2			PMM, [D2][D4] multiple symmetries,	4 		0.12	0.12	25/3/0	0.16	0.16	25/4/0
Rot_SM3			P4, [C4] multiple rotation centers,			0.077	0.077	13/1/0	0.231	0.231	13/3/0
Rot_SM4			P4M [D2][D4][D8]	8 		0.33	0.33	9/3/0	0.333	0.333	9/3/0




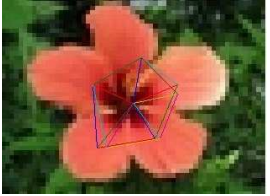



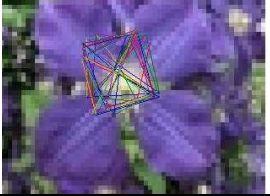










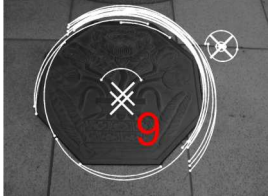

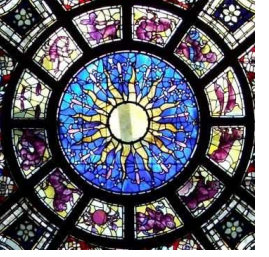

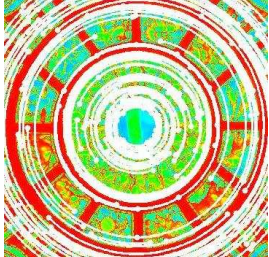

Rot_SM5			P6, [C6] multiple rotation centers, pure cyclic subgroups			0.111	0.111	9/1/0	0.444	0.444	9/4/0
Rot_SM6			P6M, [D3][D6] local and global symmetries			0.167	0.167	18/3/0	0.444	0.444	18/8/0
Rot_SM7			P3M1[D3][D6] Multiple- symmetry centers, local and global symmetries, low color- contrast			0.158	0.158	19/3/0	0.526	0.368	19/10/17
Rot_SM8			P2, [D2][D6] multiple rotation centers, color- symmetry			0.097	0.097	31/3/0	0.129	0.129	31/4/0
Rot_SM9			P4M, [D4] multiple rotation symmetry cetners			0.111	0.111	9/1/0	0.111	0	9/1/1

Rot_SM10			[D3] Approximate local and global symmetries			0.25	0.25	4/1/0	0.25	0.25	4/1/0
Rot_SM11			Near-regular, local symmetries			0.333	0.167	6/2/1	0	$\bar{0.667}$	6/0/4
Rot_SM12			[C2]			0.333	0.333	3/1/0	0.333	$\bar{0.667}$	3/1/3
Rot_SM13			Spiral, approximate [C2] symmetry			0.077	0.077	13/1/0	0.615	0.154	13/8/6


















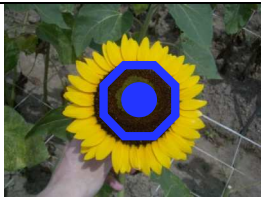






**\* Real photo – single symmetry (Rot\_RS, 25 images total)**













Num	Original Image	Ground Truth	Description /Challenges	Loy and Eklundh 2006	Prasad and Davis 2005	Loy and Eklundh 2006			Prasad and Davis 2005		
						S1	S2	GT,TP,FP	S1	S2	GT,TP,FP
Rot_RS1			[C22] Intensity variation; High order rotation.			1	1	1,1,0	1	1	1,1,0
Rot_RS2			Near-regular			1	1	1,1,0	0	-1	1,0,1
Rot_RS3			[C4] Cluttered background			1	0	1,1,1	0	-1	1,0,1
Rot_RS4			[D24] Cluttered background Inside the rotation region			1	1	1,1,0	0	-1	1,0,1

Rot_RS5			Near-regular; Higher order rotation.			1	1	1,1,0	1	1	1,1,0
Rot_RS6			[D5] Cluttered background.			1	0	1,1,1	1	1	1,1,0
Rot_RS7			[D9] Skewed.			0	-2	1,0,3	0	-1	1,0,1
Rot_RS8			[D33] High order rotation.			1	1	1,1,0	1	1	1,1,0
Rot_RS9			[D5] Blurred; Skewed; Cluttered background.			0	-3	1,0,3	1	1	1,1,0
Rot_RS10			[D8] Skewed. High texture			1	1	1,1,0	0	-1	1,0,1

Rot_RS11			[D5] Skewed.			1	1	1,1,0	1	1	1,1,0
Rot_RS12			[D4] Skewed.			1	0	1,1,1	1	1	1,1,0
Rot_RS13			[D4] Cluttered background			1	0	1,1,1	0	0	1,0,0
Rot_RS14			[D3] Skewed			1	-1	1,0,2	0	0	1,0,0
Rot_RS15			[D8] Skewed.			1	0	1,1,1	0	-1	1,0,1
Rot_RS16			[D12] High texture			1	1	1,1,0	1	1	1,1,0


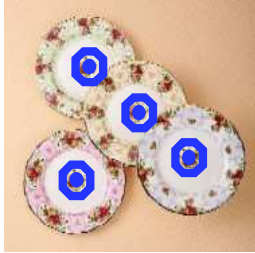
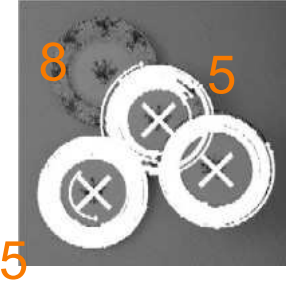






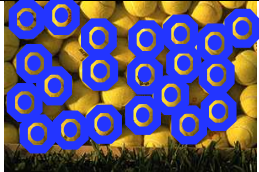
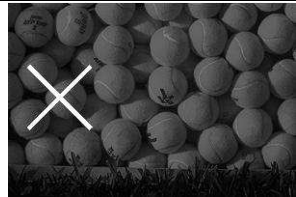


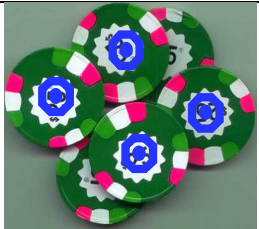
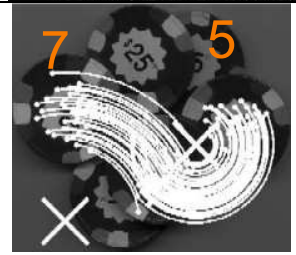
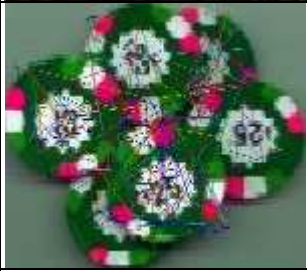
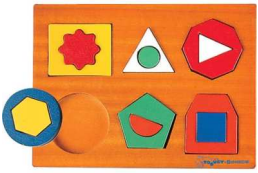
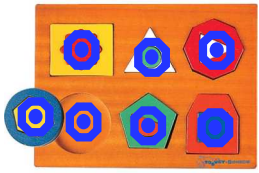




Rot_RS17			Near-regular			1	0	1,1,1	1	1	1,1,0
Rot_RS18			[D22] Occluded High fold			1	1	1,1,0	0	-1	1,0,1
Rot_RS19			Near-regular Intensity difference			1	0	1,1,1	1	1	1,1,0
Rot_RS20			[D6] Near-regular High texture			1	-1	1,1,2	0	-1	1,0,1
Rot_RS21			High fold			1	1	1,1,0	1	0	1,1,1
Rot_RS22			[D14]Near- regular			1	1	1,1,0	1	1	1,1,0



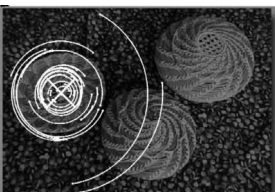
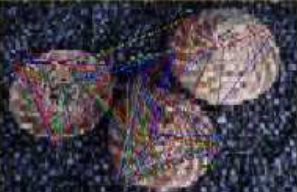

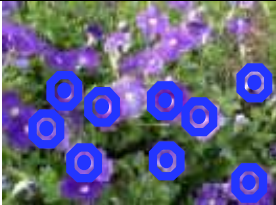




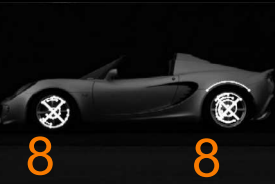



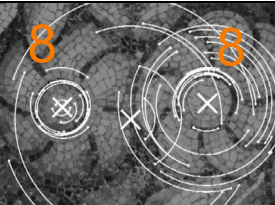
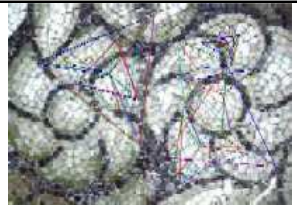


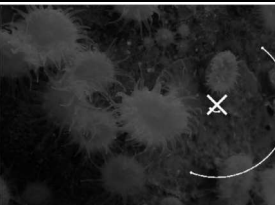



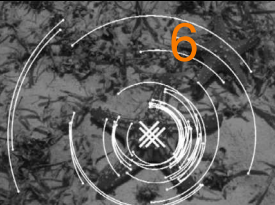

Rot_RS23			[C14] High texture			1	1	1,1,0	1	-2	1,1,3
Rot_RS24			Near-regular texture, $D_{\{2 \times 2\}}$			1	1	1,1,0	0	-1	1,0,1
Rot_RS25			Near-regular			1	1	1,1,0	1	0	1,1,1



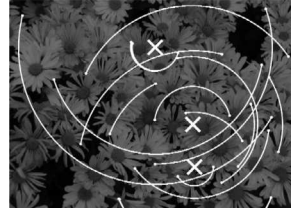





## \* Real photo – multiple symmetry (Rot\_RM, 24 images)

Num	Original Image	Ground Truth	Description /Challenges	Loy and Eklundh 2006	Prasad and Davis 2005	Loy and Eklundh 2006			Prasad and Davis 2005		
						S1	S2	GT,TP,FP	S1	S2	GT,TP,FP
Rot_RM1			[D29][D14] High texture Near-regular			1	1	2/2/0	1/2	0	2/1/1
Rot_RM2			[D13][D12] Multiple symmetry centers			1/3	1/3	6/2/0	1/6	1/6	6/1/0
Rot_RM3			[D4] Skewed; Global and local symmetries			0	0	12/0/0	0	-1/6	12/0/0
Rot_RM4			[D16][D8][D4] Skewed High texture			1/3	1/3	3/1/0	0	-1/3	3/0/1
Rot_RM5			[D13][D14] [D15] multiple symmetry centers, Highly textured			3/14	3/14	14/3/0	1/14	1/14	14/1/0

Rot_RM6			[D8][D5] Occlusion Different fold			3/4	3/4	4/3/0	1/2	1/2	4/2/0
Rot_RM7			Near-regular, perspective skew, large scale differences, high, inexact folds			0	$\frac{-}{3/10}$	10/0/3	0	-1/10	10/0/3
Rot_RM8			[SO(2)] Multiple centers of rotation, near regular, occlusion			0	$\frac{-}{1/21}$	21/0/1	0	-2/21	21/0/1
Rot_RM9			[D3][D12] Occlusion, off- centered, non- symmetrical center regions, purely cyclic color-symmetry			0	-1/2	4/0/2	1/2	-5/2	4/2/12
Rot_RM10			[D8][D6][D5] [D3] Multiple symmetries, different rotation folds			2/7	2/7	7/2/0	3/7	3/7	7/3/0

Rot_RM11			High fold, near-regular			1/2	1/2	2/1/0	1	1	2/2/0
Rot_RM12			[D6][D12] Off-centered symmetries, BG clutters			1	1	2/2/0	0	-1/2	2/0/1
Rot_RM13			[D4] clean but real, global and local symmetries			1/9	1/9	9/1/0	1/3	1/3	9/3/0
Rot_RM14			[D5] Near-regular			1/4	-1/4	4/1/2	1/2	1/2	4/2/0
Rot_RM15			[SO(2)] Skewed, non-discrete			0	-3/5	5,0,3	0	-11/5	5,0,11
Rot_RM16			Near-regular, no precise folds			0	-1/3	9,0,3	4/9	4/9	9,4,0

Rot_RM17			[C15] Cyclic Skewed, highly textured (FG and BG)			1/3	1/3	3,1,0	1	-1/3	3,3,4
Rot_RM18			Near-regular, occlusion, skewed			0	-1/3	9,0,3	0	-2/9	9,0,2
Rot_RM19			[D8] Off centered symmetries			1	1	2,2,0	0	-1/2	2,0,1
Rot_RM20			[D6][D7] Highly textured locally, near- regular			1	1	2,2,0	1/2	-5/2	2,1,6
Rot_RM21			Near-regular, unfocused			0	-1/7	7,0,1	0	-3/7	7/0/3
Rot_RM22			[D5] Cluttered background, oblique angle			1/2	1/2	2,1,0	0	-3	2,0,6

Rot_RM23			Near-regular, very cluttered, occluded, non-frontal and skewed views, high # of rotation centers			0	$\bar{1}/10$	30,0,3	0	$\bar{11}/30$	30,0,1
Rot_RM24			[D2][D3][D4][D5] Different folds with Dihedral symmetry groups (rotation + reflection symmetry)			0	$-1/5$	5/0/1	1/5	1/5	5/1/0