

# SplatPose & Detect: Pose-Agnostic 3D Anomaly Detection

## Supplementary Material

### 804 A. Experimental Results

805 We report the full results of our quantitative experiments  
806 for all categories in both MAD [46] and the NeRF synthetic  
807 scenes [24].

#### 808 A.1. Anomaly Detection

809 The full remaining results of our anomaly segmentation ex-  
810 periments in Sec. 4.4 are reported in this section. The pixel-  
811 wise AUROC is given in Tab. 1 and the AUPRO in Tab. 2.  
812 Since achieving higher scores in AUPRO is more difficult  
813 than the pixel-wise AUROC, the margins between Splat-  
814 Pose and OmniAD are much larger. Still, SplatPose out-  
815 performs all other methods.

Category	Feat.Emb.	Memory banks		Student-Teacher			Normal. Flow		Synthetic		View Synthesis	
	PaDiM [7]	CFA [19]	PatchCore [29]	RD4AD [8]	AST [32]	STFPM [39]	CFlow [10]	CS-Flow [31]	SimpleNet [22]	DR/EM [45]	OmniAD [46]	SplatPose (ours)
Gorilla	93.0	91.4	88.4	94.8	58.1	93.8	94.7	69.2	92.0	77.7	<b>99.5</b>	<b>99.5</b> ± 0.01
Unicorn	88.8	85.2	58.9	88.8	81.0	89.3	89.9	73.1	87.9	26.0	<u>98.2</u>	<b>99.6</b> ± 0.02
Mallard	85.9	83.7	66.1	85.6	59.1	86.0	87.3	63.3	86.2	47.8	<u>97.4</u>	<b>99.7</b> ± 0.00
Turtle	91.8	88.7	77.5	93.7	56.3	91.0	90.2	73.8	91.5	45.3	<u>99.1</u>	<b>99.5</b> ± 0.01
Whale	90.1	87.9	60.9	90.9	54.2	88.6	89.2	64.4	90.7	55.9	<u>98.3</u>	<b>99.5</b> ± 0.05
Bird	93.4	92.2	88.6	92.3	38.6	90.6	91.8	80.1	91.9	60.3	<u>95.7</u>	<b>99.4</b> ± 0.01
Owl	96.3	93.9	86.3	96.3	83.7	91.8	94.6	75.2	94.3	78.9	<b>99.4</b>	<u>99.2</u> ± 0.03
Sabertooth	94.5	88.0	69.4	92.4	71.5	89.3	93.3	70.5	90.1	26.2	<u>98.5</u>	<b>99.4</b> ± 0.02
Swan	93.2	95.0	73.5	93.5	87.9	90.8	93.1	71.8	93.2	75.9	<u>98.8</u>	<b>99.3</b> ± 0.02
Sheep	94.8	94.1	79.9	94.5	50.5	93.2	94.3	76.2	93.4	70.5	<u>97.7</u>	<b>99.4</b> ± 0.01
Pig	95.2	95.6	83.5	96.8	72.9	94.2	97.1	79.1	96.8	65.6	<u>97.7</u>	<b>99.8</b> ± 0.00
Zalika	87.8	87.7	64.9	89.6	55.7	86.2	89.4	65.7	89.6	66.6	<u>99.1</u>	<b>99.3</b> ± 0.04
Phoenix	88.3	87.0	62.4	87.6	83.6	86.1	87.3	77.7	88.9	38.7	<u>99.4</u>	<b>99.5</b> ± 0.00
Elephant	74.1	77.8	56.2	75.2	84.1	76.8	72.4	76.8	70.7	55.9	<u>99.0</u>	<b>99.7</b> ± 0.00
Parrot	87.7	83.7	70.7	87.2	73.8	84.0	86.8	67.0	78.7	34.4	<b>99.5</b>	<b>99.5</b> ± 0.01
Cat	94.0	95.0	85.6	94.8	55.3	93.7	94.7	61.9	93.9	79.4	<u>97.7</u>	<b>99.3</b> ± 0.07
Scorpion	90.7	92.2	79.9	93.6	82.6	90.7	91.9	72.2	89.1	79.7	<u>95.9</u>	<b>99.3</b> ± 0.01
Obesobeso	95.6	96.2	91.9	95.8	60.0	94.2	95.8	80.1	96.9	89.2	<u>98.0</u>	<b>99.5</b> ± 0.02
Bear	92.2	90.7	79.5	92.8	81.0	90.6	92.2	74.9	92.3	39.2	<u>99.3</u>	<b>99.6</b> ± 0.00
Puppy	87.5	82.3	73.3	89.5	71.6	84.9	89.6	62.0	85.5	45.8	<u>98.8</u>	<b>99.1</b> ± 0.03
mean	90.7	89.4	74.9	91.3	68.1	89.3	90.8	71.7	89.7	58.0	<u>98.4</u>	<b>99.5</b> ± 0.01

Table 1. AUROC ( $\uparrow$ ) for pixel-level anomaly detection performance on MAD. We run our approach  $n = 5$  times and mark the best result in bold and the runner-up underlined

Category	Feat.Emb.	Memory banks		Student-Teacher			Normal. Flow		Synthetic		View Synthesis	
	PaDiM [7]	CFA [19]	PatchCore [29]	RD4AD [8]	AST [32]	STFPM [39]	CFlow [10]	CS-Flow [31]	SimpleNet [22]	DR/EM [45]	OmniAD [46]	SplatPose (ours)
Gorilla	76.7	-	80.8	79.7	30.7	-	-	27.1	75.1	-	94.5	<b>94.6</b> ± 0.19
Unicorn	66.8	-	81.2	74.8	37.3	-	-	19.8	73.1	-	<u>85.4</u>	<b>95.4</b> ± 0.06
Mallard	60.5	-	75.1	62.7	33.5	-	-	19.6	61.0	-	<u>81.5</u>	<b>97.2</b> ± 0.02
Turtle	77.8	-	<u>83.5</u>	81.6	24.2	-	-	32.7	73.3	-	79.7	<b>97.5</b> ± 0.2
Whale	76.4	-	82.1	79.8	18.0	-	-	20.9	82.6	-	<u>93.3</u>	<b>97.5</b> ± 0.25
Bird	80.3	-	<u>81.4</u>	79.7	01.0	-	-	27.2	78.4	-	75.4	<b>95.8</b> ± 0.08
Owl	88.5	-	86.2	88.8	54.8	-	-	30.1	83.1	-	<b>95.2</b>	<u>94.2</u> ± 0.28
Sabertooth	<u>83.8</u>	-	80.4	75.8	45.9	-	-	22.5	74.9	-	83.2	<b>95.4</b> ± 0.15
Swan	81.9	-	87.7	81.7	63.1	-	-	28.3	83.2	-	<u>93.0</u>	<b>96.3</b> ± 0.07
Sheep	87.9	-	<u>89.0</u>	87.6	12.8	-	-	26.2	84.9	-	71.9	<b>96.3</b> ± 0.07
Pig	81.4	-	<u>88.7</u>	84.9	12.3	-	-	27.2	86.0	-	84.0	<b>96.9</b> ± 0.05
Zalika	71.3	-	80.7	74.4	38.2	-	-	31.1	76.6	-	<u>90.3</u>	<b>91.3</b> ± 0.11
Phoenix	72.0	-	81.5	74.4	61.6	-	-	27.9	75.9	-	<u>93.7</u>	<b>93.9</b> ± 0.12
Elephant	64.6	-	74.0	67.7	67.0	-	-	34.3	69.8	-	<u>91.8</u>	<b>95.7</b> ± 0.1
Parrot	72.1	-	84.0	72.2	45.3	-	-	37.2	62.6	-	<u>94.9</u>	<b>95.9</b> ± 0.04
Cat	85.0	-	<u>88.7</u>	88.1	12.6	-	-	22.9	85.8	-	71.4	<b>94.7</b> ± 0.33
Scorpion	77.2	-	<u>88.7</u>	84.1	47.8	-	-	21.5	76.9	-	79.8	<b>96.7</b> ± 0.09
Obesobeso	88.2	-	90.2	90.4	41.7	-	-	29.9	<u>91.3</u>	-	79.9	<b>94.8</b> ± 0.11
Bear	79.5	-	88.8	82.1	62.4	-	-	28.6	84.1	-	<u>97.0</u>	<b>97.6</b> ± 0.03
Puppy	68.3	-	81.0	73.6	42.4	-	-	27.0	68.8	-	<u>96.1</u>	<b>97.4</b> ± 0.08
mean	77.0	-	83.7	79.2	37.6	-	-	27.1	77.4	-	<u>86.6</u>	<b>95.8</b> ± 0.03

Table 2. AUPRO ( $\uparrow$ ) for anomaly segmentation performance on MAD. We run our approach  $n = 5$  times and mark the best result in bold and the runner-up underlined. We only report AUPRO for the methods reproduced by us.

## 816 A.2. Pose Estimation

817 We report the full results of our pose estimation experiments  
818 from Sec. 4.6 on the NeRF synthetic scenes [24] in Tab. 3  
819 and on MAD [46] in Tab. 4. For both translation and rota-  
820 tion, we SplatPose beats iNeRF by clear margins. It should  
821 also be noted, that we match the rotation up to a thousandth  
822 of a radian in most of the categories, showing the precision  
823 of our pose estimation.

Category (NeRF)	Translation Error (total) $\downarrow$			Rotation Error (rad) $\downarrow$		
	Coarse [46]	iNeRF [21]	SplatPose	Coarse [46]	iNeRF [21]	SplatPose
chair	0.548	0.033	<b>0.002</b>	0.074	0.004	<b>0.000</b>
drums	0.616	0.018	<b>0.007</b>	0.083	0.002	<b>0.000</b>
figus	0.805	0.085	<b>0.055</b>	0.111	0.011	<b>0.008</b>
hotdog	0.561	0.041	<b>0.013</b>	0.075	0.005	<b>0.001</b>
lego	0.561	0.014	<b>0.003</b>	0.076	0.002	<b>0.000</b>
materials	0.709	0.071	<b>0.035</b>	0.097	0.010	<b>0.004</b>
mic	0.588	0.135	<b>0.042</b>	0.079	0.017	<b>0.005</b>
ship	0.606	0.045	<b>0.012</b>	0.082	0.005	<b>0.001</b>
mean	0.624	0.055	<b>0.021</b>	0.084	0.007	<b>0.003</b>

Table 3. Error in Translation and Rotation on the NeRF synthetic scenes [24]. Best results in bold.

Category (MAD)	Translation Error (total) ↓			Rotation Error (rad) ↓		
	Coarse [46]	iNeRF [21]	SplatPose	Coarse [46]	iNeRF [21]	SplatPose
Gorilla	0.790	0.029	<b>0.006</b>	0.131	0.010	<b>0.000</b>
Unicorn	0.880	0.156	<b>0.006</b>	0.122	0.025	<b>0.000</b>
Mallard	0.642	0.101	<b>0.003</b>	0.120	0.018	<b>0.000</b>
Turtle	0.649	0.112	<b>0.004</b>	0.127	0.025	<b>0.000</b>
Whale	0.797	0.091	<b>0.005</b>	0.130	0.014	<b>0.001</b>
Bird	0.786	0.272	<b>0.185</b>	0.197	0.089	<b>0.073</b>
Owl	1.433	0.914	<b>0.871</b>	0.492	0.413	<b>0.412</b>
Sabertooth	0.671	0.072	<b>0.004</b>	0.128	0.021	<b>0.001</b>
Swan	0.774	0.189	<b>0.007</b>	0.133	0.041	<b>0.001</b>
Sheep	1.105	0.528	<b>0.449</b>	0.342	<b>0.206</b>	0.224
Pig	0.687	0.043	<b>0.004</b>	0.126	0.007	<b>0.000</b>
Zalika	0.690	0.124	<b>0.004</b>	0.126	0.025	<b>0.000</b>
Phoenix	0.851	<b>0.146</b>	0.148	0.154	<b>0.037</b>	<b>0.037</b>
Elephant	0.818	0.285	<b>0.142</b>	0.155	0.079	<b>0.037</b>
Parrot	0.797	0.178	<b>0.005</b>	0.131	0.036	<b>0.000</b>
Cat	0.684	0.051	<b>0.007</b>	0.134	0.009	<b>0.001</b>
Scorpion	0.743	0.086	<b>0.006</b>	0.136	0.015	<b>0.001</b>
Obesobeso	0.677	0.016	<b>0.006</b>	0.118	0.003	<b>0.001</b>
Bear	0.723	0.054	<b>0.006</b>	0.126	0.017	<b>0.001</b>
Puppy	0.863	0.130	<b>0.006</b>	0.135	0.031	<b>0.001</b>
mean	0.803	0.179	<b>0.094</b>	0.163	0.056	<b>0.040</b>

Table 4. Error in Translation and Rotation on the MAD data set [46]. Best results in **bold**.

824 **A.3. Sparse-View Data**

825 We present the full results of our sparse-view data experi-  
826 ments on MAD [46] from Sec. 4.7. We report the image-  
827 wise results in Tab. 5. For the segmentation task, the pixel-  
828 wise AUROCS are given in Tab. 6, and the AUPROS in  
829 Tab. 7.

830 With NeRFs struggling in sparse-view settings, Splat-  
831 Pose decisively beats OmniAD for all steps of view-  
832 sparsification. Fewer views also result in larger margins.

Sparsity Category	20%		40%		60%		80%	
	OmniAD	SplatPose	OmniAD	SplatPose	OmniAD	SplatPose	OmniAD	SplatPose
Gorilla	71.0	<b>79.1</b>	75.9	<b>83.7</b>	82.7	<b>85.8</b>	<b>93.0</b>	86.6
Unicorn	81.6	<b>91.6</b>	87.1	<b>98.2</b>	87.6	<b>98.8</b>	85.0	<b>98.5</b>
Mallard	80.8	<b>90.6</b>	82.1	<b>95.4</b>	86.1	<b>96.7</b>	86.6	<b>96.7</b>
Turtle	62.5	<b>66.5</b>	98.4	<b>97.2</b>	88.9	<b>97.0</b>	79.5	<b>97.4</b>
Whale	57.1	<b>78.8</b>	76.7	<b>93.5</b>	81.1	<b>92.4</b>	<b>92.8</b>	91.4
Bird	65.0	<b>73.8</b>	77.4	<b>88.5</b>	81.3	<b>91.6</b>	74.9	<b>94.8</b>
Owl	67.2	<b>68.7</b>	<b>73.2</b>	72.3	83.9	<b>87.8</b>	<b>94.9</b>	84.3
Sabertooth	74.2	<b>76.4</b>	93.5	<b>92.7</b>	95.0	<b>94.4</b>	91.9	<b>96.8</b>
Swan	67.0	<b>84.7</b>	80.8	<b>90.2</b>	78.3	<b>89.1</b>	92.6	<b>93.0</b>
Sheep	61.5	<b>75.2</b>	74.0	<b>92.0</b>	70.5	<b>88.6</b>	73.1	<b>93.6</b>
Pig	68.6	<b>77.1</b>	65.4	<b>88.3</b>	78.5	<b>95.9</b>	84.1	<b>96.3</b>
Zalika	68.2	<b>75.8</b>	79.7	<b>82.1</b>	81.7	<b>86.9</b>	88.3	<b>89.2</b>
Phoenix	66.6	<b>68.0</b>	77.1	<b>78.3</b>	76.7	<b>83.6</b>	<b>92.6</b>	81.7
Elephant	68.0	<b>68.1</b>	90.0	<b>88.4</b>	93.3	<b>93.4</b>	88.9	<b>96.8</b>
Parrot	67.7	<b>76.7</b>	84.3	<b>88.2</b>	84.1	<b>93.2</b>	<b>96.9</b>	96.3
Cat	51.6	<b>72.0</b>	51.6	<b>81.0</b>	61.6	<b>83.3</b>	72.4	<b>83.5</b>
Scorpion	63.8	<b>83.4</b>	76.3	<b>92.9</b>	83.7	<b>98.3</b>	79.0	<b>99.4</b>
Obesobeso	56.2	<b>79.3</b>	61.7	<b>91.0</b>	63.2	<b>92.8</b>	79.1	<b>92.8</b>
Bear	78.1	<b>85.0</b>	93.9	<b>98.4</b>	98.5	<b>98.7</b>	96.6	<b>98.1</b>
Puppy	66.2	<b>81.2</b>	82.6	<b>93.9</b>	87.7	<b>95.6</b>	92.8	<b>94.2</b>
mean	67.2	<b>77.6</b>	79.1	<b>89.3</b>	82.2	<b>92.2</b>	86.8	<b>93.1</b>

Table 5. All AUROC scores ( $\uparrow$ ) measuring the image-wise anomaly detection performance for the sparse-view on MAD. Best results in **bold**.

Sparsity Category	20%		40%		60%		80%	
	OmniAD	SplatPose	OmniAD	SplatPose	OmniAD	SplatPose	OmniAD	SplatPose
Gorilla	95.8	<b>97.6</b>	98.4	<b>99.1</b>	98.9	<b>99.4</b>	99.3	<b>99.4</b>
Unicorn	93.6	<b>97.8</b>	96.7	<b>99.4</b>	96.3	<b>99.5</b>	97.0	<b>99.5</b>
Mallard	94.5	<b>98.6</b>	95.5	<b>99.6</b>	97.6	<b>99.7</b>	96.8	<b>99.7</b>
Turtle	87.9	<b>96.4</b>	93.2	<b>99.0</b>	92.9	<b>99.5</b>	95.0	<b>99.5</b>
Whale	90.3	<b>96.6</b>	96.0	<b>99.3</b>	98.4	<b>99.1</b>	98.2	<b>99.4</b>
Bird	92.4	<b>97.3</b>	94.2	<b>99.0</b>	93.8	<b>99.1</b>	95.2	<b>99.4</b>
Owl	97.0	<b>97.6</b>	97.5	<b>97.9</b>	99.0	<b>99.1</b>	<b>99.3</b>	99.1
Sabertooth	92.4	<b>96.9</b>	94.8	<b>99.2</b>	97.7	<b>99.3</b>	97.9	<b>99.4</b>
Swan	95.7	<b>98.1</b>	97.9	<b>98.9</b>	98.0	<b>99.2</b>	98.5	<b>99.3</b>
Sheep	92.8	<b>97.7</b>	94.1	<b>99.0</b>	93.6	<b>98.8</b>	93.6	<b>99.3</b>
Pig	95.2	<b>98.1</b>	94.6	<b>99.1</b>	96.3	<b>99.7</b>	96.9	<b>99.8</b>
Zalika	95.2	<b>96.7</b>	97.7	<b>98.4</b>	98.3	<b>99.2</b>	98.6	<b>99.3</b>
Phoenix	96.3	<b>96.6</b>	98.4	<b>99.0</b>	98.9	<b>99.4</b>	99.3	<b>99.4</b>
Elephant	91.3	<b>93.1</b>	97.8	<b>99.0</b>	98.7	<b>99.6</b>	98.3	<b>99.7</b>
Parrot	93.3	<b>96.3</b>	97.8	<b>98.2</b>	98.4	<b>99.4</b>	<b>99.5</b>	<b>99.5</b>
Cat	92.6	<b>98.4</b>	94.2	<b>99.2</b>	94.8	<b>99.3</b>	93.6	<b>99.3</b>
Scorpion	90.9	<b>96.3</b>	91.6	<b>97.4</b>	93.5	<b>99.1</b>	94.7	<b>99.3</b>
Obesobeso	93.8	<b>98.0</b>	95.1	<b>99.3</b>	94.9	<b>99.3</b>	95.5	<b>99.5</b>
Bear	96.2	<b>98.0</b>	98.7	<b>99.5</b>	99.1	<b>99.5</b>	99.2	<b>99.6</b>
Puppy	91.7	<b>96.9</b>	94.4	<b>98.8</b>	96.8	<b>99.1</b>	97.8	<b>98.7</b>
mean	93.4	<b>97.2</b>	95.9	<b>98.9</b>	96.8	<b>99.3</b>	97.2	<b>99.4</b>

Table 6. All AUROC scores ( $\uparrow$ ) measuring the pixel-wise anomaly segmentation performance for the sparse-view on MAD. Best results in **bold**.

Sparsity Category	20%		40%		60%		80%	
	OmniAD	SplatPose	OmniAD	SplatPose	OmniAD	SplatPose	OmniAD	SplatPose
Gorilla	80.0	<b>86.8</b>	88.2	<b>92.3</b>	91.7	<b>94.2</b>	93.0	<b>94.2</b>
Unicorn	72.0	<b>85.5</b>	83.4	<b>93.7</b>	81.8	<b>94.8</b>	85.0	<b>94.8</b>
Mallard	76.9	<b>92.0</b>	80.0	<b>95.8</b>	87.9	<b>97.0</b>	86.6	<b>97.0</b>
Turtle	59.8	<b>86.9</b>	73.4	<b>95.8</b>	75.3	<b>97.5</b>	79.5	<b>97.5</b>
Whale	66.3	<b>87.4</b>	85.6	<b>96.6</b>	93.1	<b>95.6</b>	92.8	<b>97.1</b>
Bird	70.0	<b>87.2</b>	71.1	<b>94.1</b>	70.9	<b>94.5</b>	74.9	<b>95.7</b>
Owl	85.6	<b>87.4</b>	89.4	<b>90.3</b>	92.7	<b>93.4</b>	<b>94.9</b>	93.8
Sabertooth	72.9	<b>86.1</b>	80.3	<b>94.6</b>	91.6	<b>94.9</b>	91.9	<b>95.3</b>
Swan	82.2	<b>91.4</b>	90.1	<b>94.9</b>	90.0	<b>95.3</b>	92.6	<b>96.4</b>
Sheep	70.5	<b>89.4</b>	71.6	<b>94.7</b>	71.1	<b>93.7</b>	73.1	<b>95.9</b>
Pig	77.5	<b>89.6</b>	75.3	<b>94.0</b>	81.5	<b>96.7</b>	84.1	<b>96.9</b>
Zalika	74.9	<b>80.2</b>	84.0	<b>87.0</b>	87.6	<b>90.5</b>	88.3	<b>90.7</b>
Phoenix	77.7	<b>79.5</b>	87.8	<b>89.9</b>	89.8	<b>93.2</b>	92.6	<b>93.0</b>
Elephant	65.1	<b>72.8</b>	85.5	<b>92.2</b>	90.1	<b>94.9</b>	88.9	<b>95.7</b>
Parrot	74.4	<b>81.3</b>	<b>90.0</b>	<b>90.0</b>	92.4	<b>95.3</b>	<b>96.9</b>	95.7
Cat	70.3	<b>90.7</b>	73.0	<b>94.4</b>	75.7	<b>94.7</b>	72.4	<b>94.8</b>
Scorpion	66.9	<b>84.6</b>	69.2	<b>89.5</b>	74.6	<b>95.8</b>	79.0	<b>96.8</b>
Obesobeso	74.8	<b>89.1</b>	77.0	<b>93.4</b>	76.7	<b>93.8</b>	79.1	<b>94.6</b>
Bear	85.6	<b>91.9</b>	94.5	<b>96.9</b>	96.2	<b>97.1</b>	96.6	<b>97.6</b>
Puppy	71.4	<b>90.5</b>	80.3	<b>96.6</b>	88.7	<b>97.2</b>	92.8	<b>96.1</b>
mean	73.7	<b>86.5</b>	81.5	<b>93.3</b>	85.0	<b>95.0</b>	86.8	<b>95.5</b>

Table 7. All AUPRO scores ( $\uparrow$ ) measuring the anomaly segmentation performance for the sparse-view on MAD. Best results in **bold**.