

# Determining the Relevance of Features for Black Box Predictors – Supplementary Material

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## 1 P-Values for the Independent Tests for the Individual Classes in MS COCO

We present the table of the results of the significance test for each feature, each classifier, and each class. The values are computed using the RCOT test. Values that do not indicate significance are indicated in bold.

### 1.1 Multi-Label Image Recognition with Graph Convolutional Networks

The values for this classifier can be found in the following tables: the area feature in Table 1, the horizontal half feature in Table 2, the horizontal position feature in Table 3, the vertical half feature in Table 4, the vertical position feature in Table 5, the angle feature in Table 6

### 1.2 Spatial Regularization with Image-level Supervisions for Multi-label Image Classification

The values for this classifier can be found in the following tables: the area feature in Table 7, the horizontal half feature in Table 8, the horizontal position feature in Table 9, the vertical half feature in Table 10, the vertical position feature in Table 11, the angle feature in Table 12

**Table 1.** The area is calculated as its fraction of the image. If multiple instances of the object exist in the image, we consider the sum of all of their areas. We report the significance as determined by the RCOT

Area in the Image			Area in the Image		
	Class	p-value		Class	p-value
1	Person	0.0000	46	wine glass	0.0000
2	Bicycle	0.0000	47	cup	0.0000
3	Car	0.0000	48	fork	0.0000
4	Motorcycle	0.0000	49	knife	0.0000
5	Airplane	0.0001	50	spoon	0.0000
6	Bus	0.0000	51	bowl	0.0000
7	Train	0.0000	52	banana	0.0000
8	Truck	0.0000	53	apple	0.0000
9	Boat	0.0000	54	sandwich	0.0000
10	Traffic light	0.0000	55	orange	0.0000
11	Fire hydrant	0.0000	56	broccoli	0.0000
13	Stop sign	0.0000	57	carrot	0.0000
14	parking meter	0.0000	58	hot dog	0.0000
15	bench	0.0000	59	pizza	0.0000
16	bird	0.0000	60	donut	0.0000
17	cat	0.0000	61	cake	0.0000
18	dog	0.0000	62	chair	0.0000
19	horse	0.0000	63	couch	0.0000
20	<b>sheep</b>	<b>0.0094</b>	64	potted plant	0.0000
21	cow	0.0000	65	bed	0.0000
22	<b>elephant</b>	<b>0.0377</b>	67	dining table	0.0000
23	<b>bear</b>	<b>0.0055</b>	70	toilet	0.0000
24	zebra	0.0004	72	tv	0.0000
25	<b>giraffe</b>	<b>0.0208</b>	73	laptop	0.0000
27	backpack	0.0000	74	mouse	0.0006
28	umbrella	0.0000	75	remote	0.0000
31	handbag	0.0000	76	keyboard	0.0000
32	tie	0.0000	77	cell phone	0.0000
33	suitcase	0.0000	78	microwave	0.0000
34	frisbee	0.0001	79	oven	0.0000
35	skis	0.0000	80	<b>toaster</b>	<b>0.4218</b>
36	snowboard	0.0003	81	sink	0.0000
37	sports ball	0.0000	82	refrigerator	0.0000
38	<b>kite</b>	<b>0.2170</b>	84	book	0.0000
39	baseball bat	0.0000	85	clock	0.0000
40	baseball glove	0.0000	86	vase	0.0000
41	skateboard	0.0002	87	scissors	0.0000
42	surfboard	0.0000	88	teddy bear	0.0000
43	tennis racket	0.0000	89	<b>hair drier</b>	<b>0.0274</b>
44	bottle	0.0000	90	toothbrush	0.0002

**Table 2.** The horizontal half in which the object appears. We report the significance as determined by the RCOT

Horizontal Half			Horizontal Half		
	Class	p-value		Class	p-value
1	person	<b>0.8898</b>	46	wine glass	<b>0.7947</b>
2	bicycle	<b>0.0848</b>	47	cup	<b>0.7423</b>
3	car	<b>0.5030</b>	48	fork	<b>0.7039</b>
4	motorcycle	<b>0.2969</b>	49	knife	<b>0.1843</b>
5	airplane	<b>0.3451</b>	50	spoon	<b>0.1114</b>
6	bus	<b>0.2854</b>	51	bowl	<b>0.0113</b>
7	train	<b>0.3749</b>	52	banana	<b>0.8891</b>
8	truck	<b>0.9027</b>	53	apple	<b>0.7954</b>
9	boat	<b>0.3893</b>	54	sandwich	<b>0.2331</b>
10	traffic light	<b>0.1867</b>	55	orange	<b>0.2046</b>
11	fire hydrant	<b>0.0256</b>	56	broccoli	<b>0.6596</b>
13	stop sign	<b>0.9604</b>	57	carrot	<b>0.9273</b>
14	parking meter	<b>0.0265</b>	58	hot dog	<b>0.6570</b>
15	bench	<b>0.5164</b>	59	pizza	<b>0.5823</b>
16	bird	<b>0.0106</b>	60	donut	<b>0.7464</b>
17	cat	<b>0.3981</b>	61	cake	<b>0.2015</b>
18	dog	<b>0.6002</b>	62	chair	<b>0.3298</b>
19	horse	<b>0.1464</b>	63	couch	<b>0.3920</b>
20	sheep	<b>0.1775</b>	64	potted plant	<b>0.7727</b>
21	cow	<b>0.7124</b>	65	bed	<b>0.8112</b>
22	elephant	<b>0.8674</b>	67	dining table	<b>0.0696</b>
23	bear	<b>0.6179</b>	70	toilet	<b>0.9686</b>
24	zebra	<b>0.0279</b>	72	tv	<b>0.2875</b>
25	giraffe	<b>0.4272</b>	73	laptop	<b>0.7520</b>
27	backpack	<b>0.4008</b>	74	mouse	0.0000
28	umbrella	<b>0.6119</b>	75	remote	<b>0.2530</b>
31	handbag	<b>0.6449</b>	76	keyboard	<b>0.0804</b>
32	tie	<b>0.8788</b>	77	cell phone	<b>0.1958</b>
33	suitcase	<b>0.5825</b>	78	microwave	<b>0.1043</b>
34	frisbee	<b>0.4725</b>	79	oven	<b>0.8913</b>
35	skis	<b>0.1150</b>	80	toaster	<b>0.6745</b>
36	snowboard	<b>0.4774</b>	81	sink	<b>0.4928</b>
37	sports ball	<b>0.6273</b>	82	refrigerator	<b>0.9874</b>
38	kite	<b>0.8233</b>	84	book	<b>0.6132</b>
39	baseball bat	<b>0.6699</b>	85	clock	<b>0.4306</b>
40	baseball glove	<b>0.4718</b>	86	vase	<b>0.6208</b>
41	skateboard	<b>0.4630</b>	87	scissors	<b>0.3619</b>
42	surfboard	<b>0.1331</b>	88	teddy bear	<b>0.4593</b>
43	tennis racket	<b>0.3163</b>	89	hair drier	<b>0.1844</b>
44	bottle	<b>0.0341</b>	90	toothbrush	<b>0.0317</b>

**Table 3.** The horizontal position in the image. We report the significance as determined by the RCOT

Horizontal Position			Horizontal Position		
	Class	p-value		Class	p-value
1	person	0.0004	46	wine glass	<b>0.1731</b>
2	bicycle	<b>0.0034</b>	47	cup	<b>0.0020</b>
3	car	0.0000	48	fork	<b>0.2180</b>
4	motorcycle	<b>0.0068</b>	49	knife	<b>0.2852</b>
5	airplane	<b>0.3959</b>	50	spoon	<b>0.0844</b>
6	bus	<b>0.5481</b>	51	bowl	<b>0.0025</b>
7	train	<b>0.1481</b>	52	banana	<b>0.2107</b>
8	truck	<b>0.1209</b>	53	apple	<b>0.8384</b>
9	boat	<b>0.8618</b>	54	sandwich	<b>0.2388</b>
10	traffic light	<b>0.0039</b>	55	orange	<b>0.1110</b>
11	fire hydrant	<b>0.0120</b>	56	broccoli	<b>0.9252</b>
13	stop sign	<b>0.1568</b>	57	carrot	<b>0.8268</b>
14	parking meter	<b>0.0073</b>	58	hot dog	<b>0.3840</b>
15	bench	0.0001	59	pizza	<b>0.3481</b>
16	bird	<b>0.0287</b>	60	donut	<b>0.8296</b>
17	cat	<b>0.8376</b>	61	cake	<b>0.0339</b>
18	dog	<b>0.8263</b>	62	chair	<b>0.0126</b>
19	horse	<b>0.1861</b>	63	couch	<b>0.4183</b>
20	sheep	<b>0.2103</b>	64	potted plant	<b>0.9423</b>
21	cow	<b>0.8608</b>	65	bed	0.0000
22	elephant	<b>0.7194</b>	67	dining table	0.0000
23	bear	<b>0.3440</b>	70	toilet	<b>0.4585</b>
24	zebra	<b>0.1277</b>	72	tv	<b>0.2740</b>
25	giraffe	<b>0.0464</b>	73	laptop	<b>0.1910</b>
27	backpack	<b>0.2611</b>	74	mouse	0.0000
28	umbrella	<b>0.0270</b>	75	remote	<b>0.3556</b>
31	handbag	<b>0.2137</b>	76	keyboard	<b>0.0068</b>
32	tie	0.0000	77	cell phone	<b>0.1582</b>
33	suitcase	<b>0.0041</b>	78	microwave	<b>0.0311</b>
34	frisbee	<b>0.5446</b>	79	oven	<b>0.0167</b>
35	skis	<b>0.0021</b>	80	toaster	<b>0.4427</b>
36	snowboard	<b>0.1736</b>	81	sink	<b>0.0017</b>
37	sports ball	<b>0.5760</b>	82	refrigerator	<b>0.3310</b>
38	kite	<b>0.1112</b>	84	book	<b>0.5174</b>
39	baseball bat	<b>0.3140</b>	85	clock	0.0000
40	baseball glove	<b>0.8549</b>	86	vase	0.0000
41	skateboard	<b>0.4087</b>	87	scissors	<b>0.6677</b>
42	surfboard	<b>0.2661</b>	88	teddy bear	<b>0.2395</b>
43	tennis racket	<b>0.3731</b>	89	hair drier	<b>0.2025</b>
44	bottle	0.0009	90	toothbrush	<b>0.0348</b>

**Table 4.** The vertical half in which the object appears in the image. We report the significance as determined by the RCOT

Vertical Half			Vertical Half		
	Class	p-value		Class	p-value
1	person	0.0000	46	wine glass	<b>0.0066</b>
2	bicycle	0.0000	47	cup	0.0000
3	car	0.0000	48	fork	<b>0.6532</b>
4	motorcycle	<b>0.1558</b>	49	knife	<b>0.9412</b>
5	airplane	<b>0.0366</b>	50	spoon	<b>0.6822</b>
6	bus	<b>0.0193</b>	51	bowl	<b>0.0129</b>
7	train	0.0000	52	banana	<b>0.5169</b>
8	truck	0.0000	53	apple	<b>0.5909</b>
9	boat	<b>0.0336</b>	54	sandwich	0.0000
10	traffic light	<b>0.0040</b>	55	orange	<b>0.4704</b>
11	fire hydrant	<b>0.0235</b>	56	broccoli	<b>0.0437</b>
13	stop sign	<b>0.2002</b>	57	carrot	<b>0.1284</b>
14	parking meter	<b>0.0071</b>	58	hot dog	<b>0.0202</b>
15	bench	0.0000	59	pizza	<b>0.2813</b>
16	bird	0.0000	60	donut	<b>0.2616</b>
17	cat	<b>0.0207</b>	61	cake	<b>0.2327</b>
18	dog	<b>0.2941</b>	62	chair	0.0000
19	horse	0.0000	63	couch	0.0000
20	sheep	<b>0.1067</b>	64	potted plant	<b>0.3981</b>
21	cow	<b>0.7462</b>	65	bed	0.0000
22	elephant	<b>0.0953</b>	67	dining table	<b>0.0067</b>
23	bear	<b>0.7343</b>	70	toilet	<b>0.1812</b>
24	zebra	<b>0.3226</b>	72	tv	<b>0.3848</b>
25	giraffe	0.0000	73	laptop	<b>0.0045</b>
27	backpack	<b>0.0421</b>	74	mouse	0.0007
28	umbrella	0.0000	75	remote	<b>0.0139</b>
31	handbag	<b>0.0054</b>	76	keyboard	<b>0.3135</b>
32	tie	0.0000	77	cell phone	<b>0.2618</b>
33	suitcase	<b>0.2860</b>	78	microwave	<b>0.9576</b>
34	frisbee	<b>0.0159</b>	79	oven	0.0000
35	skis	0.0000	80	toaster	<b>0.7272</b>
36	snowboard	<b>0.2075</b>	81	sink	0.0000
37	sports ball	0.0003	82	refrigerator	0.0000
38	kite	<b>0.0785</b>	84	book	0.0000
39	baseball bat	<b>0.0017</b>	85	clock	<b>0.0195</b>
40	baseball glove	<b>0.0563</b>	86	vase	0.0000
41	skateboard	<b>0.0849</b>	87	scissors	<b>0.8739</b>
42	surfboard	<b>0.0486</b>	88	teddy bear	<b>0.2685</b>
43	tennis racket	<b>0.0880</b>	89	hair drier	<b>0.1100</b>
44	bottle	<b>0.1540</b>	90	toothbrush	0.0005

**Table 5.** The vertical position in the image. We report the significance as determined by the RCOT

Vertical Position in the Image			Vertical Position in the Image		
	Class	p-value		Class	p-value
1	person	0.0000	46	<b>wine glass</b>	<b>0.0015</b>
2	bicycle	0.0000	47	cup	0.0000
3	car	0.0000	48	<b>fork</b>	<b>0.0106</b>
4	motorcycle	0.0000	49	<b>knife</b>	<b>0.3398</b>
5	airplane	0.0000	50	<b>spoon</b>	<b>0.0188</b>
6	bus	0.0000	51	bowl	0.0000
7	train	0.0000	52	<b>banana</b>	<b>0.0049</b>
8	truck	0.0000	53	<b>apple</b>	<b>0.1438</b>
9	boat	0.0000	54	sandwich	0.0000
10	traffic light	0.0000	55	<b>orange</b>	<b>0.0196</b>
11	fire hydrant	0.0000	56	broccoli	0.0001
13	<b>stop sign</b>	<b>0.0172</b>	57	<b>carrot</b>	<b>0.1106</b>
14	parking meter	0.0000	58	<b>hot dog</b>	<b>0.0017</b>
15	bench	0.0000	59	pizza	0.0000
16	bird	0.0000	60	donut	0.0001
17	cat	0.0000	61	<b>cake</b>	<b>0.1419</b>
18	dog	0.0000	62	chair	0.0000
19	horse	0.0000	63	couch	0.0000
20	<b>sheep</b>	<b>0.0026</b>	64	<b>potted plant</b>	<b>0.0127</b>
21	<b>cow</b>	<b>0.0108</b>	65	bed	0.0000
22	<b>elephant</b>	<b>0.0366</b>	67	dining table	0.0000
23	<b>bear</b>	<b>0.8115</b>	70	toilet	0.0000
24	<b>zebra</b>	<b>0.0014</b>	72	tv	0.0000
25	giraffe	0.0000	73	laptop	0.0000
27	backpack	0.0003	74	mouse	0.0009
28	umbrella	0.0000	75	remote	0.0004
31	handbag	0.0000	76	<b>keyboard</b>	<b>0.0406</b>
32	tie	0.0000	77	cell phone	0.0000
33	<b>suitcase</b>	<b>0.0060</b>	78	<b>microwave</b>	<b>0.5127</b>
34	frisbee	0.0004	79	oven	0.0000
35	skis	0.0000	80	<b>toaster</b>	<b>0.1372</b>
36	<b>snowboard</b>	<b>0.0996</b>	81	sink	0.0000
37	sports ball	0.0000	82	refrigerator	0.0000
38	<b>kite</b>	<b>0.0904</b>	84	book	0.0000
39	baseball bat	0.0005	85	clock	0.0000
40	<b>baseball glove</b>	<b>0.0029</b>	86	vase	0.0000
41	<b>skateboard</b>	<b>0.1608</b>	87	<b>scissors</b>	<b>0.0331</b>
42	surfboard	0.0000	88	teddy bear	0.0000
43	<b>tennis racket</b>	<b>0.0455</b>	89	<b>hair drier</b>	<b>0.1704</b>
44	<b>bottle</b>	<b>0.0017</b>	90	toothbrush	0.0003

**Table 6.** The angle of the object in the image. We report the significance as determined by the RCOT

Angle in the Image			Angle in the Image		
	Class	p-value		Class	p-value
1	person	0.0007	45	wine glass	<b>0.0046</b>
2	bicycle	0.0000	46	cup	<b>0.0012</b>
3	car	0.0000	47	fork	<b>0.7475</b>
4	motorcycle	<b>0.0577</b>	48	knife	<b>0.8003</b>
5	airplane	<b>0.0157</b>	49	spoon	<b>0.4078</b>
6	bus	<b>0.0151</b>	50	bowl	<b>0.0500</b>
7	train	0.0000	51	banana	<b>0.4565</b>
8	truck	0.0000	52	apple	<b>0.7693</b>
9	boat	<b>0.0684</b>	53	sandwich	0.0000
10	traffic light	<b>0.0042</b>	54	orange	<b>0.1904</b>
11	fire hydrant	<b>0.1848</b>	55	broccoli	<b>0.0162</b>
13	stop sign	<b>0.2617</b>	56	carrot	<b>0.1616</b>
14	parking meter	<b>0.0060</b>	57	hot dog	<b>0.0685</b>
15	bench	0.0000	58	pizza	<b>0.1481</b>
16	bird	0.0000	59	donut	<b>0.6490</b>
17	cat	<b>0.2048</b>	60	cake	<b>0.1005</b>
18	dog	<b>0.7138</b>	61	chair	0.0000
19	horse	0.0000	62	couch	0.0000
20	sheep	<b>0.1000</b>	63	potted plant	<b>0.6730</b>
21	cow	<b>0.9663</b>	64	bed	0.0000
22	elephant	<b>0.0547</b>	67	dining table	<b>0.0032</b>
23	bear	<b>0.8669</b>	70	toilet	<b>0.4146</b>
24	zebra	<b>0.2737</b>	72	tv	<b>0.3322</b>
25	giraffe	0.0000	73	laptop	<b>0.0101</b>
27	backpack	<b>0.1298</b>	74	mouse	0.0000
28	umbrella	0.0000	75	remote	<b>0.1060</b>
31	handbag	<b>0.0816</b>	76	keyboard	<b>0.0634</b>
32	tie	0.0000	77	cell phone	<b>0.4599</b>
33	suitcase	<b>0.1410</b>	78	microwave	<b>0.5249</b>
34	frisbee	<b>0.1547</b>	79	oven	0.0000
35	skis	0.0000	80	toaster	<b>0.3867</b>
36	snowboard	<b>0.1121</b>	81	sink	0.0000
37	sports ball	0.0010	82	refrigerator	0.0000
38	kite	<b>0.1711</b>	84	book	0.0000
39	baseball bat	<b>0.0026</b>	85	clock	<b>0.0199</b>
40	baseball glove	<b>0.1760</b>	86	vase	0.0000
41	skateboard	<b>0.0603</b>	87	scissors	<b>0.6169</b>
42	surfboard	<b>0.0461</b>	88	teddy bear	<b>0.4628</b>
43	tennis racket	<b>0.4192</b>	89	hair drier	<b>0.1337</b>
44	bottle	<b>0.1517</b>	90	toothbrush	0.0004

**Table 7.** The area is calculated as its fraction of the image. If multiple instances of the object exist in the image, we consider the sum of all of their areas. We report the significance as determined by the RCOT

Area in the Image			Area in the Image		
	Class	p-value		Class	p-value
1	person	0.0000	46	wine glass	0.0000
2	bicycle	0.0000	47	cup	0.0000
3	car	0.0000	48	fork	0.0000
4	motorcycle	0.0000	49	knife	0.0000
5	airplane	0.0000	50	spoon	0.0000
6	bus	0.0000	51	bowl	0.0000
7	train	0.0000	52	<b>banana</b>	<b>0.6216</b>
8	truck	0.0000	53	apple	0.0000
9	<b>boat</b>	<b>0.0895</b>	54	sandwich	0.0000
10	traffic light	0.0000	55	<b>orange</b>	<b>0.2377</b>
11	fire hydrant	0.0000	56	broccoli	0.0000
13	stop sign	0.0000	57	carrot	0.0001
4	parking meter	0.0000	58	hot dog	0.0000
15	<b>bench</b>	<b>0.0017</b>	59	pizza	0.0000
16	bird	0.0000	60	donut	0.0000
17	cat	0.0000	61	cake	0.0000
18	dog	0.0000	62	<b>chair</b>	<b>0.0178</b>
19	horse	0.0000	63	couch	0.0000
20	sheep	0.0001	64	potted plant	0.0000
21	cow	0.0000	65	bed	0.0000
22	elephant	0.0000	67	dining table	0.0000
23	bear	0.0000	70	toilet	0.0000
24	zebra	0.0000	72	tv	0.0000
25	giraffe	0.0000	73	laptop	0.0000
27	backpack	0.0000	74	mouse	0.0000
28	umbrella	0.0000	75	remote	0.0000
31	handbag	0.0000	76	keyboard	0.0000
32	tie	0.0007	77	cell phone	0.0000
33	suitcase	0.0000	78	microwave	0.0000
34	frisbee	0.0000	79	oven	0.0000
35	skis	0.0000	80	<b>toaster</b>	<b>0.0031</b>
36	<b>snowboard</b>	<b>0.0631</b>	81	sink	0.0000
37	<b>sports ball</b>	<b>0.0713</b>	82	refrigerator	0.0000
38	kite	0.0000	84	<b>book</b>	<b>0.0083</b>
39	baseball bat	0.0006	85	clock	0.0000
40	baseball glove	0.0009	86	vase	0.0000
41	<b>skateboard</b>	<b>0.0180</b>	87	scissors	0.0000
42	surfboard	0.0000	88	teddy bear	0.0000
43	tennis racket	0.0001	89	<b>hair drier</b>	<b>0.0588</b>
44	bottle	0.0000	90	toothbrush	0.0000



**Table 8.** The horizontal position in the image. We report the significance as determined by the RCOT

Horizontal Position			Horizontal Position		
	Class	p-value		Class	p-value
1	person	<b>0.1200</b>	46	wine glass	<b>0.1172</b>
2	bicycle	<b>0.6833</b>	47	cup	<b>0.7298</b>
3	car	<b>0.5168</b>	48	fork	<b>0.4803</b>
4	motorcycle	<b>0.4569</b>	49	knife	<b>0.0540</b>
5	airplane	<b>0.9772</b>	50	spoon	<b>0.0018</b>
6	bus	<b>0.4784</b>	51	bowl	<b>0.6438</b>
7	train	<b>0.6634</b>	52	banana	<b>0.6373</b>
8	truck	<b>0.7957</b>	53	apple	<b>0.8845</b>
9	boat	<b>0.6073</b>	54	sandwich	<b>0.6027</b>
10	traffic light	<b>0.2838</b>	55	orange	<b>0.0669</b>
11	fire hydrant	<b>0.1115</b>	56	broccoli	<b>0.0319</b>
13	stop sign	<b>0.0944</b>	57	carrot	<b>0.7789</b>
14	parking meter	<b>0.5587</b>	58	hot dog	<b>0.7549</b>
15	bench	<b>0.6285</b>	59	pizza	<b>0.1372</b>
16	bird	<b>0.3257</b>	60	donut	<b>0.5241</b>
17	cat	<b>0.3121</b>	61	cake	<b>0.9333</b>
18	dog	<b>0.0568</b>	62	chair	<b>0.1892</b>
19	horse	<b>0.8103</b>	63	couch	<b>0.2253</b>
20	sheep	<b>0.7809</b>	64	potted plant	<b>0.3016</b>
21	cow	<b>0.7679</b>	65	bed	<b>0.8749</b>
22	elephant	<b>0.1942</b>	67	dining table	<b>0.9858</b>
23	bear	<b>0.7744</b>	70	toilet	<b>0.4596</b>
24	zebra	<b>0.4593</b>	72	tv	<b>0.0360</b>
25	giraffe	<b>0.2761</b>	73	laptop	<b>0.1084</b>
27	backpack	<b>0.9749</b>	74	mouse	0.0005
28	umbrella	<b>0.0879</b>	75	remote	<b>0.3581</b>
31	handbag	<b>0.3330</b>	76	keyboard	<b>0.2876</b>
32	tie	<b>0.2334</b>	77	cell phone	<b>0.4844</b>
33	suitcase	<b>0.4229</b>	78	microwave	<b>0.4623</b>
34	frisbee	<b>0.0461</b>	79	oven	<b>0.7727</b>
35	skis	<b>0.9657</b>	80	toaster	<b>0.6067</b>
36	snowboard	<b>0.7607</b>	81	sink	<b>0.4065</b>
37	sports ball	<b>0.6064</b>	82	refrigerator	<b>0.6239</b>
38	kite	<b>0.4559</b>	84	book	<b>0.8610</b>
39	baseball bat	<b>0.5301</b>	85	clock	<b>0.4322</b>
40	baseball glove	<b>0.1182</b>	86	vase	<b>0.5954</b>
41	skateboard	<b>0.8894</b>	87	scissors	<b>0.7964</b>
42	surfboard	<b>0.6357</b>	88	teddy bear	<b>0.2919</b>
43	tennis racket	<b>0.9231</b>	89	hair drier	<b>0.9657</b>
44	bottle	<b>0.1747</b>	90	toothbrush	<b>0.6711</b>

**Table 9.** The horizontal position in the image. We report the significance as determined by the RCOT

Horizontal Position			Horizontal Position		
	Class	p-value		Class	p-value
1	person	0.0000	46	wine glass	<b>0.0623</b>
2	bicycle	<b>0.3347</b>	47	cup	<b>0.0235</b>
3	car	0.0007	48	fork	0.0003
4	motorcycle	<b>0.4635</b>	49	knife	<b>0.3462</b>
5	airplane	<b>0.1555</b>	50	spoon	<b>0.0012</b>
6	bus	0.0001	51	bowl	<b>0.1250</b>
7	train	<b>0.4530</b>	52	banana	<b>0.6847</b>
8	truck	<b>0.0031</b>	53	apple	<b>0.0511</b>
9	boat	<b>0.1641</b>	54	sandwich	<b>0.1033</b>
10	traffic light	<b>0.1835</b>	55	orange	<b>0.3369</b>
11	fire hydrant	0.0006	56	broccoli	<b>0.0367</b>
13	stop sign	0.0001	57	carrot	<b>0.3567</b>
14	parking meter	<b>0.1219</b>	58	hot dog	<b>0.1223</b>
15	bench	<b>0.3356</b>	59	pizza	<b>0.0043</b>
16	bird	<b>0.0055</b>	60	donut	0.0002
17	cat	0.0004	61	cake	<b>0.0026</b>
18	dog	<b>0.0153</b>	62	chair	<b>0.1150</b>
19	horse	<b>0.0115</b>	63	couch	<b>0.0044</b>
20	sheep	<b>0.0687</b>	64	potted plant	<b>0.0327</b>
21	cow	<b>0.6170</b>	65	bed	0.0000
22	elephant	<b>0.0221</b>	67	dining table	0.0000
23	bear	<b>0.0860</b>	70	toilet	0.0000
24	zebra	<b>0.0491</b>	72	tv	0.0000
25	giraffe	0.0003	73	laptop	<b>0.0199</b>
27	backpack	<b>0.0438</b>	74	mouse	0.0001
28	umbrella	<b>0.0052</b>	75	remote	<b>0.3021</b>
31	handbag	<b>0.0866</b>	76	keyboard	<b>0.0798</b>
32	tie	<b>0.0959</b>	77	cell phone	<b>0.0593</b>
33	suitcase	<b>0.0576</b>	78	microwave	<b>0.0339</b>
34	frisbee	<b>0.3983</b>	79	oven	0.0000
35	skis	<b>0.0108</b>	80	toaster	<b>0.4662</b>
36	snowboard	<b>0.0468</b>	81	sink	<b>0.4110</b>
37	sports ball	<b>0.4665</b>	82	refrigerator	<b>0.4164</b>
38	kite	<b>0.3893</b>	84	book	<b>0.1197</b>
39	baseball bat	<b>0.0469</b>	85	clock	<b>0.2173</b>
40	baseball glove	<b>0.1302</b>	86	vase	0.0004
41	skateboard	<b>0.3108</b>	87	scissors	<b>0.0989</b>
42	surfboard	<b>0.2683</b>	88	teddy bear	<b>0.0051</b>
43	tennis racket	<b>0.2553</b>	89	hair drier	<b>0.3493</b>
44	bottle	<b>0.0982</b>	90	toothbrush	<b>0.0339</b>

**Table 10.** The vertical half in which the object appears in the image. We report the significance as determined by the RCOT

Vertical Half			Vertical Half		
	Class	p-value		Class	p-value
1	person	0.0000	46	wine glass	<b>0.0623</b>
2	bicycle	<b>0.3347</b>	47	cup	<b>0.0235</b>
3	car	0.0007	48	fork	0.0003
4	motorcycle	<b>0.4635</b>	49	knife	<b>0.3462</b>
5	airplane	<b>0.1555</b>	50	spoon	<b>0.0012</b>
6	bus	0.0001	51	bowl	<b>0.1250</b>
7	train	<b>0.4530</b>	52	banana	<b>0.6847</b>
8	truck	<b>0.0031</b>	53	apple	<b>0.0511</b>
9	boat	<b>0.1641</b>	54	sandwich	<b>0.1033</b>
10	traffic light	<b>0.1835</b>	55	orange	<b>0.3369</b>
11	fire hydrant	0.0006	56	broccoli	<b>0.0367</b>
13	stop sign	0.0001	57	carrot	<b>0.3567</b>
14	parking meter	<b>0.1219</b>	58	hot dog	<b>0.1223</b>
15	bench	<b>0.3356</b>	59	pizza	<b>0.0043</b>
16	bird	<b>0.0055</b>	60	donut	0.0002
17	cat	0.0004	61	cake	<b>0.0026</b>
18	dog	<b>0.0153</b>	62	chair	<b>0.1150</b>
19	horse	<b>0.0115</b>	63	couch	<b>0.0044</b>
20	sheep	<b>0.0687</b>	64	potted plant	<b>0.0327</b>
21	cow	<b>0.6170</b>	65	bed	0.0000
22	elephant	<b>0.0221</b>	67	dining table	0.0000
23	bear	<b>0.0860</b>	70	toilet	0.0000
24	zebra	<b>0.0491</b>	72	tv	0.0000
25	giraffe	0.0003	73	laptop	<b>0.0199</b>
27	backpack	<b>0.0438</b>	74	mouse	0.0001
28	umbrella	<b>0.0052</b>	75	remote	<b>0.3021</b>
31	handbag	<b>0.0866</b>	76	keyboard	<b>0.0798</b>
32	tie	<b>0.0959</b>	77	cell phone	<b>0.0593</b>
33	suitcase	<b>0.0576</b>	78	microwave	<b>0.0339</b>
34	frisbee	<b>0.3983</b>	79	oven	0.0000
35	skis	<b>0.0108</b>	80	toaster	<b>0.4662</b>
36	snowboard	<b>0.0468</b>	81	sink	<b>0.4110</b>
37	sports ball	<b>0.4665</b>	82	refrigerator	<b>0.4164</b>
38	kite	<b>0.3893</b>	84	book	<b>0.1197</b>
39	baseball bat	<b>0.0469</b>	85	clock	<b>0.2173</b>
40	baseball glove	<b>0.1302</b>	86	vase	0.0004
41	skateboard	<b>0.3108</b>	87	scissors	<b>0.0989</b>
42	surfboard	<b>0.2683</b>	88	teddy bear	<b>0.0051</b>
43	tennis racket	<b>0.2553</b>	89	hair drier	<b>0.3493</b>
44	bottle	<b>0.0982</b>	90	toothbrush	<b>0.0339</b>

**Table 11.** The vertical position in the image. We report the significance as determined by the RCOT

Vertical Position in the Image			Vertical Position in the Image		
	Class	p-value		Class	p-value
1	person	0.0000	46	wine glass	0.0000
2	bicycle	0.0000	47	cup	0.0000
3	car	0.0000	48	fork	0.0000
4	motorcycle	0.0000	49	<b>knife</b>	<b>0.0080</b>
5	airplane	0.0000	50	spoon	0.0000
6	bus	0.0000	51	bowl	0.0000
7	train	0.0000	52	banana	0.0002
8	truck	0.0000	53	apple	0.0001
9	<b>boat</b>	<b>0.0335</b>	54	sandwich	0.0000
10	traffic light	0.0000	55	<b>orange</b>	<b>0.0251</b>
11	fire hydrant	0.0000	56	broccoli	0.0001
13	<b>stop sign</b>	<b>0.0126</b>	57	carrot	0.0005
14	<b>parking meter</b>	<b>0.0463</b>	58	hot dog	0.0000
15	bench	0.0000	59	<b>pizza</b>	<b>0.0325</b>
16	<b>bird</b>	<b>0.0018</b>	60	donut	0.0000
17	cat	0.0000	61	cake	0.0000
18	dog	0.0000	62	chair	0.0000
19	horse	0.0008	63	couch	0.0000
20	<b>sheep</b>	<b>0.1411</b>	64	potted plant	0.0000
21	cow	0.0000	65	bed	0.0000
22	elephant	0.0005	67	dining table	0.0000
23	<b>bear</b>	<b>0.0048</b>	70	toilet	0.0000
24	<b>zebra</b>	<b>0.0095</b>	72	tv	0.0000
25	giraffe	0.0000	73	laptop	0.0010
27	<b>backpack</b>	<b>0.6150</b>	74	<b>mouse</b>	<b>0.0956</b>
28	umbrella	0.0001	75	<b>remote</b>	<b>0.2540</b>
31	handbag	0.0000	76	keyboard	0.0001
32	tie	0.0000	77	<b>cell phone</b>	<b>0.0015</b>
33	<b>suitcase</b>	<b>0.1192</b>	78	microwave	0.0005
34	<b>frisbee</b>	<b>0.3939</b>	79	oven	0.0000
35	skis	0.0000	80	<b>toaster</b>	<b>0.5484</b>
36	<b>snowboard</b>	<b>0.1368</b>	81	sink	0.0000
37	<b>sports ball</b>	<b>0.0040</b>	82	refrigerator	0.0000
38	kite	0.0000	84	book	0.0002
39	baseball bat	0.0001	85	clock	0.0004
40	<b>baseball glove</b>	<b>0.3272</b>	86	vase	0.0000
41	<b>skateboard</b>	<b>0.0126</b>	87	<b>scissors</b>	<b>0.0249</b>
42	surfboard	0.0001	88	<b>teddy bear</b>	<b>0.0947</b>
43	<b>tennis racket</b>	<b>0.0039</b>	89	<b>hair drier</b>	<b>0.1430</b>
44	bottle	0.0000	90	<b>toothbrush</b>	<b>0.0284</b>

**Table 12.** The angle of the object in the image. We report the significance as determined by the RCOT

Angle in the Image			Angle in the Image		
	Class	p-value		Class	p-value
1	person	0.0000	46	wine glass	0.0000
2	bicycle	0.0000	47	cup	0.0000
3	<b>car</b>	<b>0.0093</b>	48	fork	0.0000
4	motorcycle	0.0008	49	<b>knife</b>	<b>0.0290</b>
5	airplane	0.0000	50	spoon	0.0002
6	bus	0.0000	51	bowl	0.0000
7	train	0.0000	52	<b>banana</b>	<b>0.0070</b>
8	truck	0.0001	53	<b>apple</b>	<b>0.0018</b>
9	<b>boat</b>	<b>0.3719</b>	54	<b>sandwich</b>	<b>0.0041</b>
10	traffic light	0.0000	55	<b>orange</b>	<b>0.0340</b>
11	<b>fire hydrant</b>	<b>0.0708</b>	56	<b>broccoli</b>	<b>0.0345</b>
13	<b>stop sign</b>	<b>0.5350</b>	57	<b>carrot</b>	<b>0.0105</b>
14	<b>parking meter</b>	<b>0.7646</b>	58	<b>hot dog</b>	<b>0.0317</b>
15	bench	0.0000	59	<b>pizza</b>	<b>0.3259</b>
16	<b>bird</b>	<b>0.6443</b>	60	<b>donut</b>	<b>0.0102</b>
17	cat	0.0003	61	cake	0.0001
18	<b>dog</b>	<b>0.0017</b>	62	chair	0.0000
19	<b>horse</b>	<b>0.1040</b>	63	couch	0.0000
20	<b>sheep</b>	<b>0.6257</b>	64	potted plant	0.0007
21	cow	0.0009	65	bed	0.0000
22	<b>elephant</b>	<b>0.5952</b>	67	dining table	0.0000
23	<b>bear</b>	<b>0.1138</b>	70	<b>toilet</b>	<b>0.0295</b>
24	<b>zebra</b>	<b>0.0678</b>	72	tv	0.0003
25	giraffe	0.0004	73	<b>laptop</b>	<b>0.1307</b>
27	<b>backpack</b>	<b>0.9415</b>	74	<b>mouse</b>	<b>0.0066</b>
28	<b>umbrella</b>	<b>0.0528</b>	75	<b>remote</b>	<b>0.2155</b>
31	<b>handbag</b>	<b>0.0059</b>	76	keyboard	0.0001
32	<b>tie</b>	<b>0.0646</b>	77	<b>cell phone</b>	<b>0.3723</b>
33	<b>suitcase</b>	<b>0.3774</b>	78	<b>microwave</b>	<b>0.4284</b>
34	<b>frisbee</b>	<b>0.9063</b>	79	oven	0.0000
35	skis	0.0000	80	<b>toaster</b>	<b>0.5909</b>
36	<b>snowboard</b>	<b>0.3237</b>	81	sink	0.0006
37	<b>sports ball</b>	<b>0.3310</b>	82	refrigerator	0.0000
38	<b>kite</b>	<b>0.0028</b>	84	<b>book</b>	<b>0.0442</b>
39	<b>baseball bat</b>	<b>0.0142</b>	85	<b>clock</b>	<b>0.7284</b>
40	<b>baseball glove</b>	<b>0.0491</b>	86	vase	0.0000
41	<b>skateboard</b>	<b>0.2037</b>	87	<b>scissors</b>	<b>0.2947</b>
42	<b>surfboard</b>	<b>0.0102</b>	88	<b>teddy bear</b>	<b>0.5600</b>
43	<b>tennis racket</b>	<b>0.0370</b>	89	<b>hair drier</b>	<b>0.6174</b>
44	bottle	0.0000	90	<b>toothbrush</b>	<b>0.5374</b>