~~HEVA~~

Page No.
Date

Modul 1

Through One-Hot Encoding
GT - Ground Truth

	P(A)	P(B)	P(C)	GT(A)	GT(B)	GT(C)	Act. Gr	
1	0.55	0.35	0.1	1	0	0	A	A
2	0.3	0.5	0.2	0	1	0	B	B
3	0.6	0.35	0.05	1	0	0	A	A
4	0.1	0.3	0.4	0	0	1	C	C

Modul 2

	P(A)	P(B)	P(C)	GT(A)	GT(B)	GT(C)	Act. Gr	
1	0.8	0.1	0.1	1	0	0	A	A
2	0.5	0.4	0.1	0	1	0	B	A
3	0.75	0.2	0.05	1	0	0	A	A
4	0.05	0.2	0.75	0	0	1	C	C

Cross entropy = $-\sum (GT(A) \cdot \log(P(A)) + GT(B) \log(P(B)) + \cdots)$

Have to do this in TEE

Modul 1 cross-entropy

1 $-[0.55 \log(0.55)] = 0.259$

2 0.30

3 0.22

4 0.39

1.18

Ground Truth ← GT(Dog) = 12

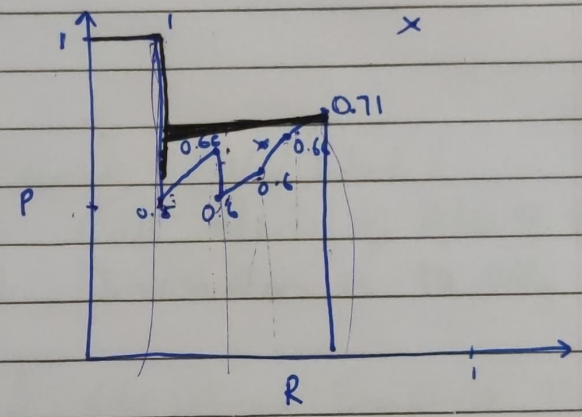
mAP : mean Average Precision

$\frac{TP}{TP+FP}$ ↑ Precision $\frac{TP}{GT}$ ↑ Recall

Sr	Conf	Matches	Cum. TP	Cum FP	P	R
	0.92	TP	1	0	1/1 = 1	1/12
	0.91	FP	1	1	1/2	1/12
	0.88	TP	2	1	2/3	2/12 = 1/6
	0.86	FP	2	2	2/4	2/12
	0.77	TP	3	2	3/5	3/12 = 1/4
	0.63	TP	4	2	4/6	4/12
	0.58	TP	5	2	5/7	5/12

11 Point Interpolation

P	R
1	0.08
0.5	0.08
0.66	0.16
0.5	0.16
0.6	0.25
0.66	0.33
0.71	0.41



$1 \times 1 + 4 \times 0.71 + 6 \times 0.0 = 3.84$

(Sum of all points)

$AP = \frac{1}{11}(3.84) \approx 0.349$

Manual calculation of CNN

Output width = $\frac{W - F_w + 2P}{S_w} + 1$

Output height = $\frac{H - F_h + 2P}{S_h} + 1$

W - Width (from input dim)
F_w - Filter size
P - Padding (not given = 0 same = 1)
S_w - Stride

Q.4

	Kernel size	Input size	No. of Kernels	Calculations	Output size	Parameters
2. Conv.	11×11	224×224×3	64	Weights: 11×11×3 = 363 363×64 = 23232 Bias: 1×64 = 64 Total = 23232+64 = 23296	$O_W = \frac{224-11+0}{2} + 1$ = 106+1 = 107 107×107×64	23296
3. MaxPool	3×3	107×107×64	-	-	$\left(\frac{107-3+0}{2}\right)+1$ = 53×53×64	-
4. Conv	5×5	53×53×64	128	W: 5×5×64 = 1600 1600×128 = 204800 B: 1×128 = 128 T: 204928	(53-5+2×2)/1+1 = 53×53×128	204928
5. MaxPool	3×3	53×53×128	-	-	26×26×128	-
6. Conv	3×3	26×26×128	256	W: 3×3×128 = 1152 1152×256 = 294912 B: 1×256 = 256 P: 295168	26×26×256	295168

Kernel size	Input size	No. of Kernels	Calculations	Output size	Parameters	
3×3	26×26×256	256	W: 3×3×256 = 2304 2304×256 = 589824 B: 1×256 = 256 T: 590080	26×26×256	590080	7. Conv.
3×3	26×26×256	512	W: 3×3×256 = 2304 2304×512 = 1179648 B: 1×512 = 512 T: 1180160	26×26×512	1180160	8. Conv
3×3	26×26×512	-	-	12×12×512	-	9. Maxpool
2048	12×12×512 = 73728 W: 2048×73728 = 150994944 B: 1×2048 = 2048 T: 150996992				150996992	10. ~~Fully Connected~~ Flatten Fully con. 2048
1024	W: 1024×2048 = 2097152 B: 1×1024 = 1024 T: 2098176				2098176	11. Fully con. 1024
10	W: 10×1024 = 10240 B: 1×10 = 10 T = 10250				10250	12. Output 10

Total Parameters = 155 349 050

Q2

Kernel size	Input size	No. of Kernels	Calculations	Output size	Parameters
3×3	150×150×3	25	W: 3×3×3 = 27 27×25 = 675 B: 25 T: 700	$\frac{150-3}{2}+1$ = 74 74×74×25	700
2×2	74×74×25	-	-	37×37×25	-
3×3	37×37×25	35	W: 3×3×25 = 225 225×35 = 7875 B: 35 T: 7910	18×18×35	7910
2×2	18×18×35	-	-	9×9×35	-
3×3	9×9×35	50	W: 3×3×35 = 315 315×50 = 15750 B: 50 T: 15800	7×7×50	15800
2×2	7×7×50	-	-	3×3×50	-
			3×3×50 = 450		
			W: 1024×450 = 460800 B: 1024 T: 461824	1024	461824
			W: 100×1024 = 102400 B: 100 T: 102500	100	102500
					586734

Q3

Kernel size	Input size	No. of Kernels	Calculations	Output size	Parameters
7×7	224×224×3	32	W: 7×7×3 = 147 147×32 = 4704 B: 32 T: 4736	224-7+1 / 4 = 55×55×32	4736
3×3	55×55×32	-	-	27×27×32	-
3×3	27×27×32	64	W: 3×3×32 = 288 288×64 = 18432 B: 64 T: 18496	25×25×64	18496
3×3	24×24×64	-	-	11×11×64	-
3×3	11×11×64	128	W: 3×3×64 = 576 576×128 = 73728 B: 128 T: 73856	9×9×128	73856
3×3	9×9×128	-	-	4×4×128	-
			4×4×128 = 2048		
			W: 2048×512 = 1048576 589824 B: 512 T: 540336 1049088	512	540336 1049088
			W: 100×512 = 51200 B: 100 T: 51300	100	51300
					1197476 738724