Sunday, January 21, 2024 3:54 PM

# HW1

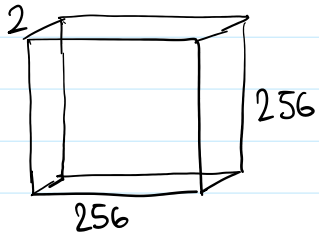
A. Input layer = 120

2x Hidden layer = 256 Stored at 8-bits

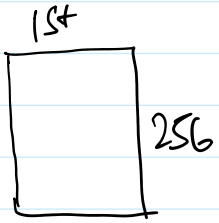
Output layer = 10

120 → 256
256 → 256
256 → 10

Total parameters = 99338




hidden



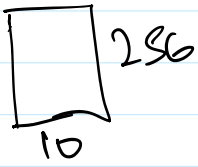

1st layer = 120 · 256 = 30720

1st hidden layer = 256 · 256 = 65,536

2nd hidden layer = 256 · 10 = 2560

Biases = 256 + 256 + 10 = 522

= 99338




out

B. Total MAC's would be : 1st layer + 1st hidden layer + 2nd hidden layer

= 30720 + 65536 + 2560

= 98816

C. Temporary SRAM req :

Input : 120 + 256 = 376
1st hidden : 256 + 256 = 512
2nd hidden : 256 + 10 = 266

1st hidden layer has the largest amount of bytes so the temp SRAM req = 512

2

A. Input layer : 1280

2x Hidden layers : 512 Stored at 32-bits

Output layer : 32

1st layer : 1280 x 512 = 655360

1st Hidden layer : 512 x 512 = 262144

2nd Hidden layer : 512 x 32 = 16384

Total param without Bias = 655360 + 262144 + 16384 = 933888

Bias = 512 + 512 + 32 = 1056

Total Parameters = 933888 + 1056

= 934944

32 bit = 4 bytes

Total Storage = 934944 · 4

$= \boxed{3,739,776 \text{ bytes}}$

B. Total param without bias = 933,888

80MHz computing 1 MAC every 4 cycles

$$\text{Time} = \frac{4}{80} \cdot 933888$$

$$= \boxed{46,694.4 \text{ ms}}$$

C. Temp SRAM req:

Input : 1280 + 512 = 1792
1st hidden layer: 512 + 512 = 1024
2nd hidden layer: 512 + 32 = 544

Since the input layer is the largest,
at 4 bytes the temp SRAM storge = 1792 · 4

$= \boxed{7168 \text{ bytes}}$