{Loop Blocking} Analyzer Report

Introduction :

This report generated by CNN-EIA. The goal of this report is analysing the loop blocking of the given Machine Learning Model. The analysis was done on these inputs :

Memory Architecture :

{
mem_levels : 3
capacity : [16.0, 16384.0, 536870912.0]
access_cost : [0.05, 3.84, 200]
static_cost : [0, 0, 0]
parallel_count : [256, 1, 1]
mac_capacity : 0
parallel_mode : [1, 0, 0]
parallel_cost : [2]
capacity_scale : [2, 2]
access_cost_scale : [2, 1.25]
explore_points : [5, 4]
precision : 16
array_dim : None
utilization_threshold : 0.0
replication : True
invalid_underutilized : True
memory_partitions : [[0, 0, 0], [0, 0, 0], [0, 0, 0], [None, None, None]]
}

Layer Architecture :

{
fmap_width : 1
fmap_height : 1
input_fmap_channel : 500
output_fmap_channel : 250
window_width : 1
window_height : 1
batch_size : 16
stride_width : 1
stride_height : 1
layer_info : [1, 1, 500, 250, 1, 1, 16, 1, 1]
layer_name : mlp_fc3_batch16
}

Schedule Architecture :

{
schedule_hint : {0: [[0, 3, 1], None, None], 1: [[2, 1, 3], None, None], 3: [[3, 1, 13], None, None], 4: [[4, None, 4], None, None]}
partition_loops : None
}

Glossary :

- Cache Levels : (L0, L1, L2)
  The smallest index the nearest to CPU.

- Loop Names : (FX, FY, OX, OY, OC, IC, ON)

Analysis Output :

Map Configuration

Loop Blocking (factors):

MEM	L0	L1	L2
FX	3	1	1
FY	1	1	1
OX	1	1	1
OY	1	1	1
OC	3	5	5
IC	1	1	500
ON	1	16	1

The factors of each loop for each cache.

Loop Partitioning (units):

MEM	L0	L1	L2
FX	1	1	1
FY	3	1	1
OX	1	1	1
OY	13	1	1
OC	4	1	1
IC	1	1	1
ON	1	1	1

Take the processing elements from parallel memories.

Loop Ordering :

MEM	L0	L1	L2
FX	0	6	6
FY	1	6	6
OX	6	6	6
OY	2	6	6
OC	3	1	1
IC	6	6	0
ON	6	0	6

The order on each cache.

Schedule

The Best format for schedule found is :

MEM - L2:

```
for ( OC, 5b, 1p )
  for ( IC, 500b, 1p )
```

MEM - L1:

```
for ( OC, 5b, 1p )
  for ( ON, 16b, 1p )
```

MEM - L0:

```
for ( OC, 3b, 4p )
  for ( OY, 1b, 13p )
    for ( FY, 1b, 3p )
      for ( FX, 3b, 1p )
```

spatially unrolled loops: (FX)(FY)(OY)(OC)

Cost

MEM	ENERGY (PJ)
L0	399800.0
L0-PARA	20050000.0

L1	16592640.0
L2	33800000.0
TOTAL	70842440.0