{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 :	4
capacity :	[4.0, 16.0, 65536.0, 536870912.0]
access_cost :	[0.0125, 0.05, 6, 200]
static_cost :	[0, 0, 0, 0]
parallel_count :	[1, 256, 1, 1]
mac_capacity :	0
parallel_mode :	[0, 1, 0, 0]
parallel_cost :	[2]
capacity_scale :	[2, 2]
access_cost_scale :	[2, 2]
explore_points :	[5, 5]
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: [None, [0, 3, 1], None, None], 1: [None, [2, 1, 3], None, None], 3: [None, [3, 1, 13], None, None], 4: [None, [4, None, 4], None, None]}
partition_loops : None
}

Glossary :

- Cache Levels : (L0, L1, L2, L3)
  The smallest index the nearest to CPU.

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

Analysis Output :

Map Configuration

Loop Blocking (factors):

MEM	L0	L1	L2	L3
FX	1	3	1	1
FY	1	1	1	1
OX	1	1	1	1
OY	1	1	1	1
OC	1	2	1	50
IC	1	1	250	2
ON	1	2	1	8

The factors of each loop for each cache.

Loop Partitioning (units):

MEM	L0	L1	L2	L3
FX	1	1	1	1
FY	1	3	1	1
OX	1	1	1	1
OY	1	13	1	1
OC	1	4	1	1
IC	1	1	1	1
ON	1	1	1	1

Take the processing elements from parallel memories.

Loop Ordering :

MEM	L0	L1	L2	L3
FX	6	0	6	6
FY	6	1	6	6
OX	6	6	6	6
OY	6	3	6	6
OC	6	2	6	0
IC	6	6	0	1
ON	6	4	6	2

The order on each cache.

Schedule

The Best format for schedule found is :

MEM - L3:

```
for ( ON, 8b, 1p )
    for ( IC, 2b, 1p )
        for ( OC, 50b, 1p )
```

MEM - L2:

```
for ( IC, 250b, 1p )
```

MEM - L1:

```
for ( ON, 2b, 1p )
    for ( OY, 1b, 13p )
        for ( OC, 2b, 4p )
            for ( FY, 1b, 3p )
                for ( FX, 3b, 1p )
spatially unrolled loops: (FX)(FY)(OY)(OC)
```

MEM - L0:

Cost

MEM	ENERGY (PJ)
L0	99950.0
L1	2139800.0
L1-PARA	35648000.0
L2	8472000.0
L3	NOT_CHECKED
TOTAL	46359750.0