

Workload

Architecture

Constraint

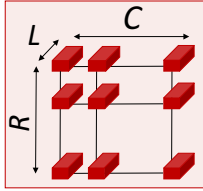
Offline Phase

Inputs

DNN
Parameters

Layer	Parameters			
	N_{in}	N_{out}	N_{ij}	N_{kl}
CONV_1	3	64	224x224	3x3
CONV_2	64	128	112x112	3x3
CONV_3_1	128	256	56x56	3x3

Configurable
Parameters



$$\text{ExCy} = f(R, L, C)$$

$$\text{ReConCy} = g(R, L, C)$$

Performance
Model

Resource
Limits

$$\text{Power} < P_{MAX}$$

$$\text{Cap} < \text{Cap}_{MAX}$$

$$\dots$$

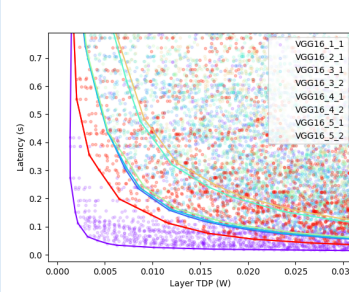
Optimization
Metric

Opt. Latency

DyHard-Xplore: Construct Configuration Map

A) Explore Configs.

- For each **Layer** & **Config**.
 - Calculate metrics using accelerator model
- Identify **best static** config.



B) Optimize Schedule

- Start with the best static config. for all layers
- At each layer, choose if necessary to reconfigure
 - Evaluate **benefit** vs. **reconfiguration cost**

Configuration Map

Layer1: (r1, c1, l1, C_{IM1} , C_{WM1} , C_{OM1})

Layer2: (r1, c1, l1, C_{IM1} , C_{WM1} , C_{OM1})

Reconfigure

Layer3: (r2, c2, l2, C_{IM2} , C_{WM2} , C_{OM2})

Execution Phase

Apply Configuration Map

Runtime
Config. Unit

Reconfig.
Signals

**DyHard-DNN
Accelerator**

Config1: (R:4, C:3, L:4, ...)

Config2: (R:2, C:3, L:8, C_{im} :8, C_{wm} :8, ...)

RECONFIGURE

Layer1

Layer2

Layer3

Time
...