GANAX

A Unified MIMD-SIMD Acceleration for Generative Adversarial Networks

Amir Yazdanbakhsh
Kambiz Samadi
Nam Sung Kim
Hadi Esmaeilzadeh

Alternative Computing Technologies (ACT) Lab

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Generative Adversarial Network Applications

- Drug Discovery
- Robotics
- Autonomous Driving
- Image Synthesis
- Music Synthesis

Imagination
Generative Adversarial Networks

Generative

Discriminative
Generative Adversarial Networks

Generative

Eyeriss, SCNN, DaDianNao, DNNWEAVER

Discriminative
Generative Adversarial Networks

Transposed Convolution

Conventional Convolution

Generative

Discriminative

Eyeriss, SCNN, DaDianNao, DnNWeaver
Using a conventional convolution dataflow leads to a large number of inconsequential operations.
Using a typical convolution hardware, there will be inconsequential operations.

Resource Underutilizations

Diminished Data Reuse
Using a typical convolution hardware, there will be inconsequential operations.
The combination of **output row** and **filter row** reorganization effectively improves the resource utilization.
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GANAX: A Unified MIMD-SIMD Acceleration

GANAX architecture unifies MIMD and SIMD model by taking a two-level operation buffer approach.
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GANAX architecture extends the concept of access-execute architectures to the finest granularity of each individual operation.
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Performance
3.6x over a convolution accelerator

Energy Efficiency
3.1x
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