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Distributed Training of Deep Neural Networks

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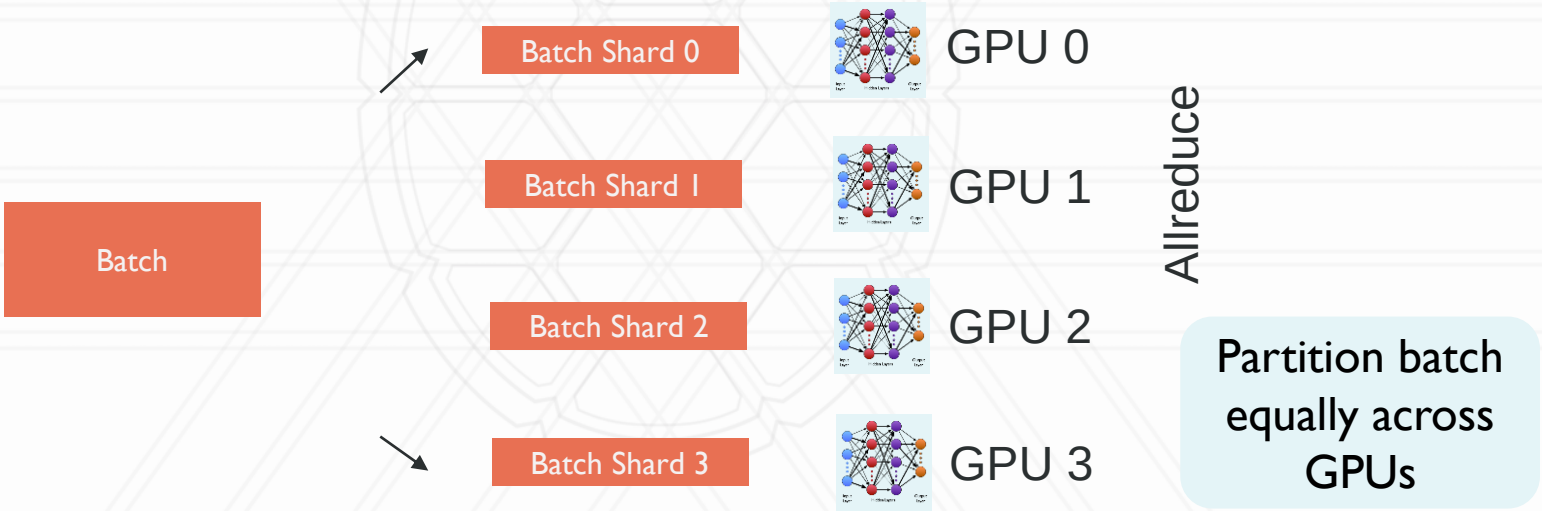
Data parallelism

- Work on different parts of the data in parallel on different GPUs
- Example: PyTorch’s DDP, DeepSpeed’s ZeRO

Work distribution in data parallelism

- Each worker has a full copy of the entire NN and processes different mini-batches
- All reduce operation to synchronize gradients



Using DDP

- Code location in the tutorial repo: session_2_data_parallelism/train_ddp.py

```
cd session_2_data_parallelism/
sbatch run_ddp.sh
```

Using DeepSpeed

- Using DDP is limited to smaller model sizes
- ZeRO implements memory optimizations to fit larger models on a GPU

- Code location in the tutorial repo:

```
sbatch run_deepspeed.sh
```

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