```
(.venv) ubuntu@146-235-212-176:~/proj/mod3-Navxihziq$ python project/run_fast_tensor.py --BACKEND gpu --HIDDEN 100 --DATASET split --RATE 0.05
/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py:536: NumbaPerformanceWarning: Grid size 1 will likely result in GPU under-utilization due to low o
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  warn(NumbaPerformanceWarning(msg))
/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py:536: NumbaPerformanceWarning: Grid size 100 will likely result in GPU under-utilization due to low
occupancy.
  warn(NumbaPerformanceWarning(msg))
/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py:536: NumbaPerformanceWarning: Grid size 16 will likely result in GPU under-utilization due to low
occupancy.
  warn(NumbaPerformanceWarning(msg))
/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py:536: NumbaPerformanceWarning: Grid size 7 will likely result in GPU under-utilization due to low o
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/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py:536: NumbaPerformanceWarning: Grid size 8 will likely result in GPU under-utilization due to low o
ccupancy.
  warn(NumbaPerformanceWarning(msg))
/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py:536: NumbaPerformanceWarning: Grid size 2 will likely result in GPU under-utilization due to low o
ccupancy.
  warn(NumbaPerformanceWarning(msg))
/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py:888: NumbaPerformanceWarning: Host array used in CUDA kernel will incur copy overhead to/
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ccupancy.
  warn(NumbaPerformanceWarning(msg))
Epoch  0  loss  7.380800933932704 correct 38 time 3.31s time per epoch 3.31s
Epoch  10  loss  5.085222153062372 correct 39 time 16.88s time per epoch 1.53s
Epoch  20  loss  3.835299699035385 correct 40 time 30.46s time per epoch 1.45s
Epoch  30  loss  3.190248188743328 correct 44 time 43.98s time per epoch 1.42s
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Epoch  40  loss  3.8206068822429513 correct 47 time 57.60s time per epoch 1.40s
Epoch  50  loss  3.374021549755926 correct 48 time 71.43s time per epoch 1.40s
Epoch  60  loss  2.3818731339270083 correct 49 time 85.20s time per epoch 1.40s
Epoch  70  loss  1.6159477534116222 correct 46 time 98.98s time per epoch 1.39s
Epoch  80  loss  2.62678262333655 correct 49 time 112.70s time per epoch 1.39s
Epoch  90  loss  2.3393019368962915 correct 49 time 126.44s time per epoch 1.39s
Epoch  100  loss  1.7873210729655682 correct 50 time 140.18s time per epoch 1.39s
Epoch  110  loss  1.074079664942238 correct 50 time 153.97s time per epoch 1.39s
Epoch  120  loss  1.759821848904663 correct 50 time 167.73s time per epoch 1.39s
Epoch  130  loss  0.6410341844847615 correct 50 time 181.50s time per epoch 1.39s
Epoch  140  loss  0.42725729411551483 correct 50 time 195.25s time per epoch 1.38s
Epoch  150  loss  0.3883554718120374 correct 50 time 209.04s time per epoch 1.38s
Epoch  160  loss  0.6721461643509723 correct 50 time 223.20s time per epoch 1.39s
Epoch  170  loss  0.5742892264020044 correct 50 time 238.27s time per epoch 1.39s
Epoch  180  loss  0.8319282409943765 correct 50 time 253.28s time per epoch 1.40s
Epoch  190  loss  0.49926423953554727 correct 50 time 268.29s time per epoch 1.40s
Epoch  200  loss  0.6805619185615739 correct 50 time 283.77s time per epoch 1.41s
Epoch  210  loss  1.0074121208991353 correct 50 time 299.20s time per epoch 1.42s
Epoch  220  loss  0.3680246122168671 correct 50 time 314.54s time per epoch 1.42s
Epoch  230  loss  0.47463329277364064 correct 50 time 329.56s time per epoch 1.43s
Epoch  240  loss  0.6123216199014468 correct 50 time 344.68s time per epoch 1.43s
Epoch  250  loss  0.5780413248770209 correct 50 time 359.92s time per epoch 1.43s
Epoch  260  loss  0.8160247193127806 correct 50 time 374.99s time per epoch 1.44s
Epoch  270  loss  0.754561749733112 correct 50 time 390.08s time per epoch 1.44s
Epoch  280  loss  0.15056632163918357 correct 50 time 405.18s time per epoch 1.44s
Epoch  290  loss  0.21470546061614496 correct 50 time 420.45s time per epoch 1.44s
Epoch  300  loss  0.4210963156368792 correct 50 time 435.58s time per epoch 1.45s
Epoch  310  loss  0.19411553162400305 correct 50 time 450.52s time per epoch 1.45s
Epoch  320  loss  0.4964319201860512 correct 50 time 465.57s time per epoch 1.45s
Epoch  330  loss  0.4999424263761936 correct 50 time 480.61s time per epoch 1.45s
Epoch  340  loss  0.3308044029318727 correct 50 time 495.79s time per epoch 1.45s
Epoch  350  loss  0.27953803901065816 correct 50 time 511.03s time per epoch 1.46s
Epoch  360  loss  0.6042746298198678 correct 50 time 526.04s time per epoch 1.46s
Epoch  370  loss  0.5785738079168321 correct 50 time 541.20s time per epoch 1.46s
Epoch  380  loss  0.383365801580663 correct 50 time 556.49s time per epoch 1.46s
Epoch  390  loss  0.3241101114025531 correct 50 time 571.58s time per epoch 1.46s
Epoch  400  loss  0.49098038753028084 correct 50 time 586.69s time per epoch 1.46s
^CTraceback (most recent call last):
  File "/home/ubuntu/proj/mod3-Navxihziq/project/run_fast_tensor.py", line 145, in <module>
    ).train(data, RATE)
  File "/home/ubuntu/proj/mod3-Navxihziq/project/run_fast_tensor.py", line 97, in train
    out = self.model.forward(X).view(y.shape[0])
  File "/home/ubuntu/proj/mod3-Navxihziq/project/run_fast_tensor.py", line 47, in forward
    h = self.layer1.forward(x).relu()
  File "/home/ubuntu/proj/mod3-Navxihziq/project/run_fast_tensor.py", line 63, in forward
    return x @ self.weights.value + self.bias.value.view(1, *self.bias.value.shape)
  File "/home/ubuntu/proj/mod3-Navxihziq/minitorch/tensor.py", line 290, in __matmul__
    return MatMul.apply(self, b)
  File "/home/ubuntu/proj/mod3-Navxihziq/minitorch/tensor_functions.py", line 54, in apply
    c = cls._forward(ctx, *raw_vals)
  File "/home/ubuntu/proj/mod3-Navxihziq/minitorch/tensor_functions.py", line 38, in _forward
    return cls.forward(ctx, *inps)  # type: ignore
  File "/home/ubuntu/proj/mod3-Navxihziq/minitorch/tensor_functions.py", line 272, in forward
    return t1.f.matrix_multiply(t1, t2)
  File "/home/ubuntu/proj/mod3-Navxihziq/minitorch/cuda_ops.py", line 140, in matrix_multiply
    tensor_matrix_multiply[blockspergrid, threadsperblock](
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py", line 539, in __call__
    return self.dispatcher.call(args, self.griddim, self.blockdim,
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py", line 683, in call
    kernel.launch(args, griddim, blockdim, stream, sharedmem)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py", line 317, in launch
    self._prepare_args(t, v, stream, retr, kernelargs)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/dispatcher.py", line 387, in _prepare_args
    devary = wrap_arg(val).to_device(retr, stream)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/args.py", line 58, in to_device
    devary, conv = auto_device(
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py", line 889, in auto_device
    devobj.copy_to_device(obj, stream=stream)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devices.py", line 232, in _require_cuda_context
    return fn(*args, **kws)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py", line 223, in copy_to_device
    sentry_contiguous(self)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py", line 849, in sentry_contiguous
    core = array_core(ary)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py", line 823, in array_core
    return ary[tuple(core_index)]
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devices.py", line 232, in _require_cuda_context
    return fn(*args, **kws)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py", line 630, in __getitem__
    return self._do_getitem(item)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py", line 660, in _do_getitem
    return cls(shape=arr.shape, strides=arr.strides,
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/cuda/cudadrv/devicearray.py", line 93, in __init__
    self._dummy = dummyarray.Array.from_desc(0, shape, strides,
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/misc/dummyarray.py", line 158, in from_desc
    return cls(dims, itemsize)
  File "/home/ubuntu/proj/mod3-Navxihziq/.venv/lib/python3.10/site-packages/numba/misc/dummyarray.py", line 164, in __init__
    self.strides = tuple(dim.stride for dim in self.dims)
KeyboardInterrupt

(.venv) ubuntu@146-235-212-176:~/proj/mod3-Navxihziq$
```