Cheat Sheet

PyTorch

Deep learning with PyTorch

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PyTorch is an open-source machine learning library for deep learning and tensor computation with GPU acceleration.

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Tensors

Create a tensor from a list.

```python
import torch
tensor = torch.tensor([1, 2, 3])
```

Create a random tensor.

```python
torch.rand(3, 3)
```

Perform element-wise addition.

```python
tensor + torch.ones(3)
```

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Automatic Differentiation

Enable gradients for a tensor.

```python
x = torch.tensor(2.0, requires_grad=True)
```

Compute gradients.

```python
y = x**2
y.backward()
```

Access gradient.

```python
x.grad
```

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Neural Networks

Define a simple model.

```python
import torch.nn as nn
model = nn.Linear(2, 1)
```

Apply model to input.

```python
output = model(torch.tensor([1.0, 2.0]))
```

Access model weights.

```python
model.weight.data
```

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Optimization

Define optimizer.

```python
optimizer = torch.optim.SGD(
    model.parameters(), lr=0.01
)
```

Perform optimization step.

```python
optimizer.step()
```

Zero gradients.

```python
optimizer.zero_grad()
```

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Data Handling

Create a DataLoader.

```python
from torch.utils.data import DataLoader
loader = DataLoader(
    dataset, batch_size=32
)
```

Iterate over DataLoader.

```python
for batch in loader:
    print(batch)
```

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Model Training

Train a model for one epoch.

```python
for inputs, labels in loader:
    optimizer.zero_grad()
    outputs = model(inputs)
    loss = loss_fn(outputs, labels)
    loss.backward()
    optimizer.step()
```

Define loss function.

```python
loss_fn = nn.MSELoss()
```

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Saving and Loading Models

Save the model state.

```python
torch.save(
    model.state_dict(),
    'model.pth'
)
```

Load the model state.

```python
model.load_state_dict(
    torch.load('model.pth')
)
```

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CUDA (GPU Acceleration)

Check for GPU availability.

```
torch.cuda.is_available()
```

Move tensor to GPU.

```
tensor = tensor.to('cuda')
```

Move model to GPU.

```
model = model.to('cuda')
```

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