Pytorch

tips and tricks (pt. 1)

Use boolean masks

In pytorch there are **two ways** of **indexing** a tensor:

- Using indices
- Using masks

```
[2] import torch

    a = torch.rand(3,3)
    print(a)
```

```
    tensor([[0.3462, 0.1235, 0.6827],
            [0.1792, 0.6850, 0.2687],
            [0.3016, 0.1635, 0.5432]])
```

```
[3] print(a[0,0])
    print(a[1,1])
    print(a[0,2])
```

```
    tensor(0.3462)
    tensor(0.6850)
    tensor(0.6827)
```

```
[4] mask = a > 0.5
    print(mask)
```

```
    tensor([[False, False,  True],
            [False,  True, False],
            [False, False,  True]])
```

```
[5] print(a[mask])
```

```
    tensor([0.6827, 0.6850, 0.5432])
```

```
[6] a[mask] = 0
    print(a)
```

```
    tensor([[0.3462, 0.1235, 0.0000],
            [0.1792, 0.0000, 0.2687],
            [0.3016, 0.1635, 0.0000]])
```

Logic operations on masks

You can perform binary logic operation on masks (and, or, not, ...)

```
[14] a = torch.rand(3,3)
     print(a)

     tensor([[0.0361, 0.9871, 0.5557],
             [0.8115, 0.5852, 0.5390],
             [0.1771, 0.2919, 0.4110]])

[15] big_mask = a > 0.8
     small_mask = a < 0.2

     print(a[big_mask | small_mask])
     print(a[~big_mask])
     print(a[big_mask & small_mask])

     tensor([0.0361, 0.9871, 0.8115, 0.1771])
     tensor([0.0361, 0.5557, 0.5852, 0.5390, 0.1771, 0.2919, 0.4110])
     tensor([])
```

Be aware of the Computational Graph

Why this works?

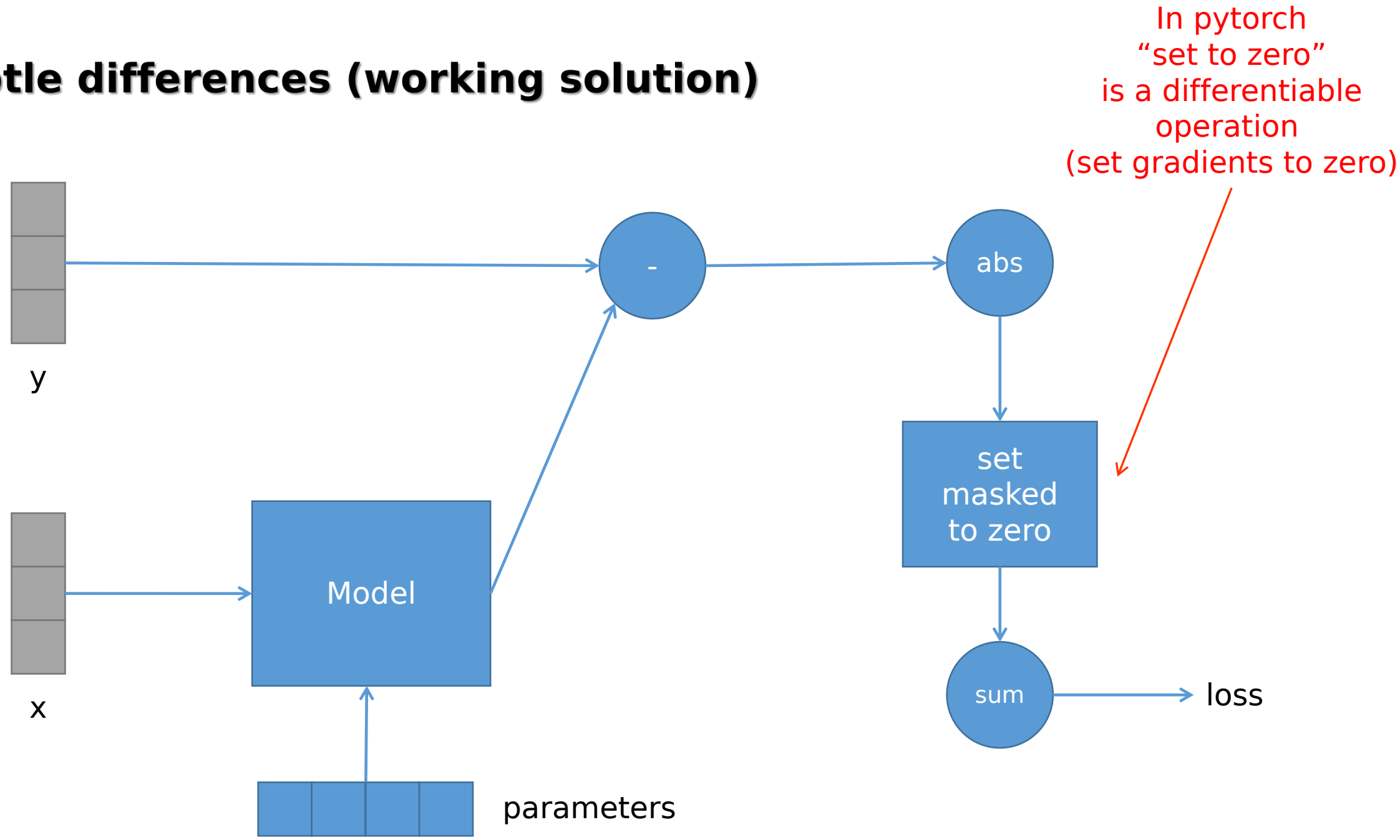
```
y_model = model(x)

predicted_above = y_model > y
actual_above = c == 1

predicted_below = y_model < y
actual_below = c == 0

errors = torch.abs(y_model - y)
errors[predicted_above == actual_above] = 0
errors[predicted_below == actual_below] = 0

loss = torch.mean(errors)
```

And this does not?

```
y_model = model(x)

errors = torch.zeros(y_model.shape[0])
for i in range(0, y_model.shape[0]):
  if y_model[i] > y[i] and c[i] == 1:
    errors[i] = y_model[i] - y[i]
  if y_model[i] < y[i] and c[1] == 0:
    errors[i] = y[i] - y_model[i]

loss = torch.mean(errors)
```

```
pass

RuntimeError: element 0 of tensors does n
```

Subtle differences (working solution)



Subtle differences (error solution)