documentation

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0.1 Convolutional Network

explain convolutional network there's a lot to talk about here...

[1]:
```
import torch
import torch.nn as nn
import torch.functional as F
import torch.optim as optim
```

want to import the dependencies in order to write our model...

0.2 Basic Explaination of Convolutional Network

From a maths perspective a network can be thought of as a model that wants to minimize some arbitrary loss function in this case we will denote this as ℓ so therefore we want to think about how we want to minimize this function. Most of the time we will use the gradient decent algorithm in order to do this.

$$\nabla \ell(x_1, x_2, ..., x_n) = \langle \frac{\partial \ell}{\partial x_1}, \frac{\partial \ell}{\partial x_2} \rangle$$

so our network wants to minimize this function ... etc.

$$min_{\ell} f(\nu, \ell, w, p) = \Sigma \nabla \ell * \nu$$

[2]:
```
class CNN(nn.Module):
    def __init__(self):
        super(CNN, self).__init__()
        # conv layers
        self.conv1 = nn.Conv2d(1, 32, kernel_size=(3, 3), padding=1, stride=2)
        self.conv2 = nn.Conv2d(32, 64, kernel_size=(3, 3), padding=1, stride=2)
        self.conv3 = nn.Conv2d(64, 32, kernel_size=(3, 3), padding=1, stride=2)

        # batch norm layers match outputs of matching conv layer
        self.bn1 = nn.BatchNorm2d(32)
        self.bn2 = nn.BatchNorm2d(64)

        # activation function
        self.relu = nn.ReLU()
```

```
        # fully connected layer at the end to output our classes
        self.fc1 = nn.Linear(32, 10)

    def forward(self, x):
        """sequentially pass input can be improved upon but we like to see␣
↪what's going on"""

        # layer 1
        out = self.conv1(x)
        out = self.bn1(out)
        out = self.relu(out)

        # layer 2
        out = self.conv2(out)
        out = self.bn2(out)
        out = self.relu(out)

        # layer 3
        out = self.conv3(out)
        out = self.fc1(out)
        out = self.relu(out)

        return out
```

0.3 Explaination...