Ahmedabad University

15/03/2025

CSE641: Computer Vision : Modern Methods and Applications

Group: RCNN
Project no.:13

Weekly Report 3

Name	**Enrollment number**
Sloka Thakkar	AU2240103
Daksh Shah	AU2240207
Shalvi Modi	AU2240215

Task completed:

- Implemented and ran YOLOv11 on the dataset to detect crocodile dorsal scute patterns.

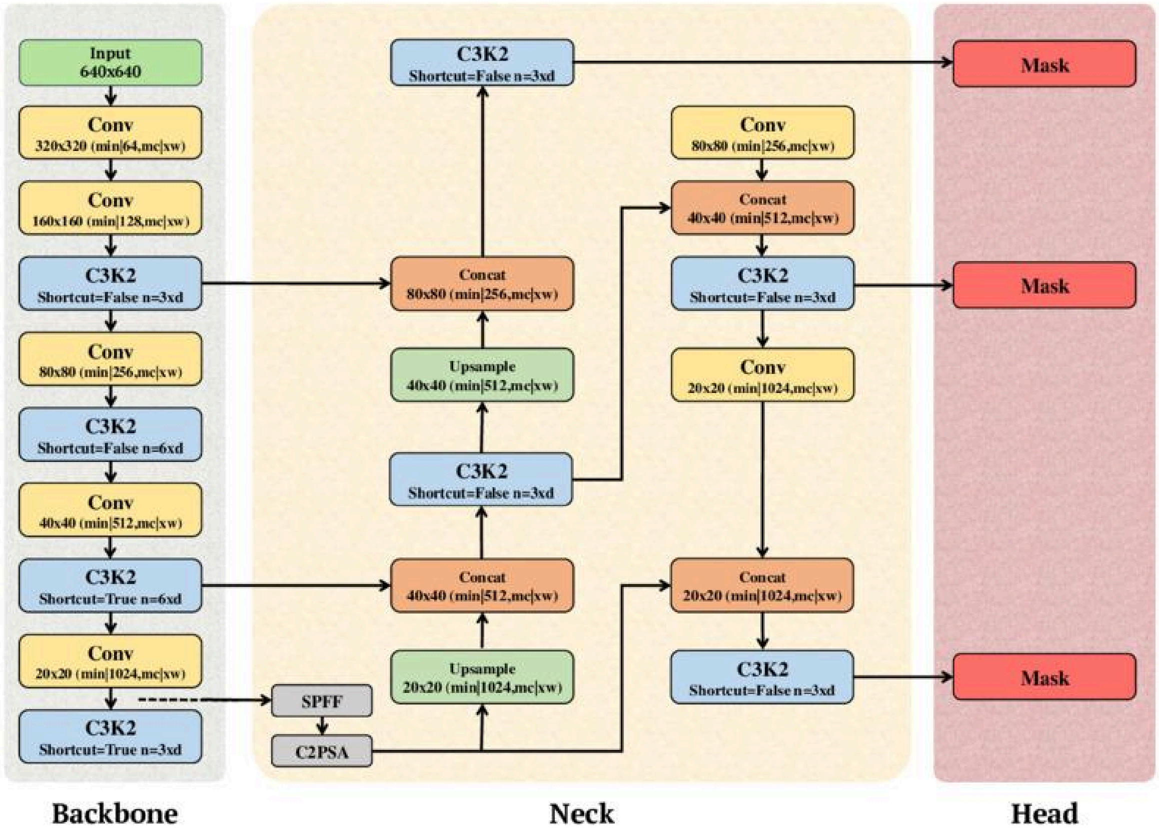
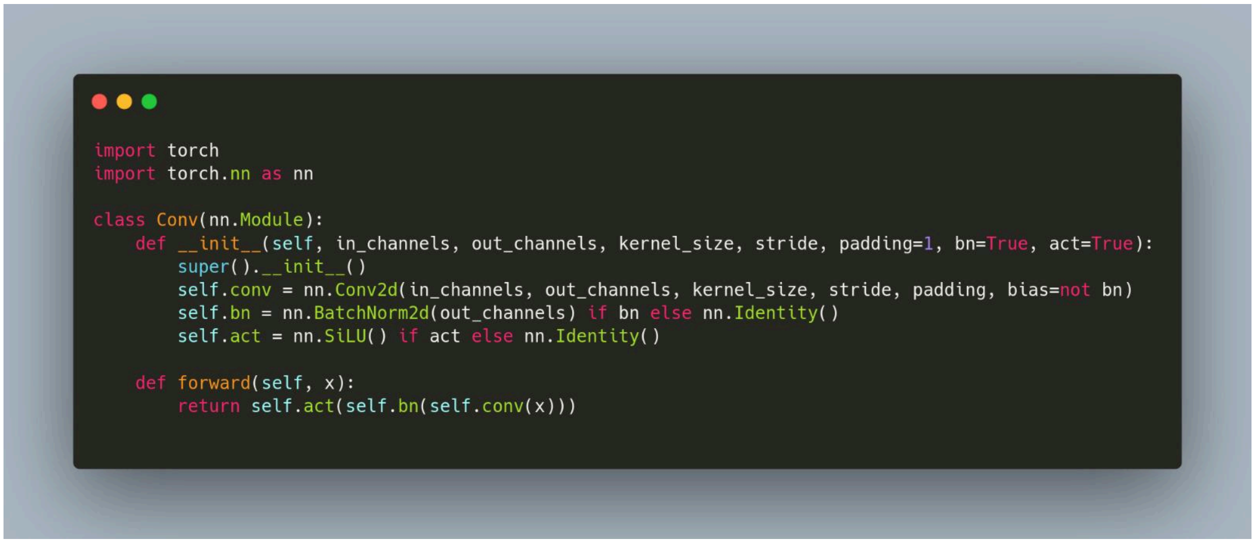


Fig 1 YOLOv11 Architecture

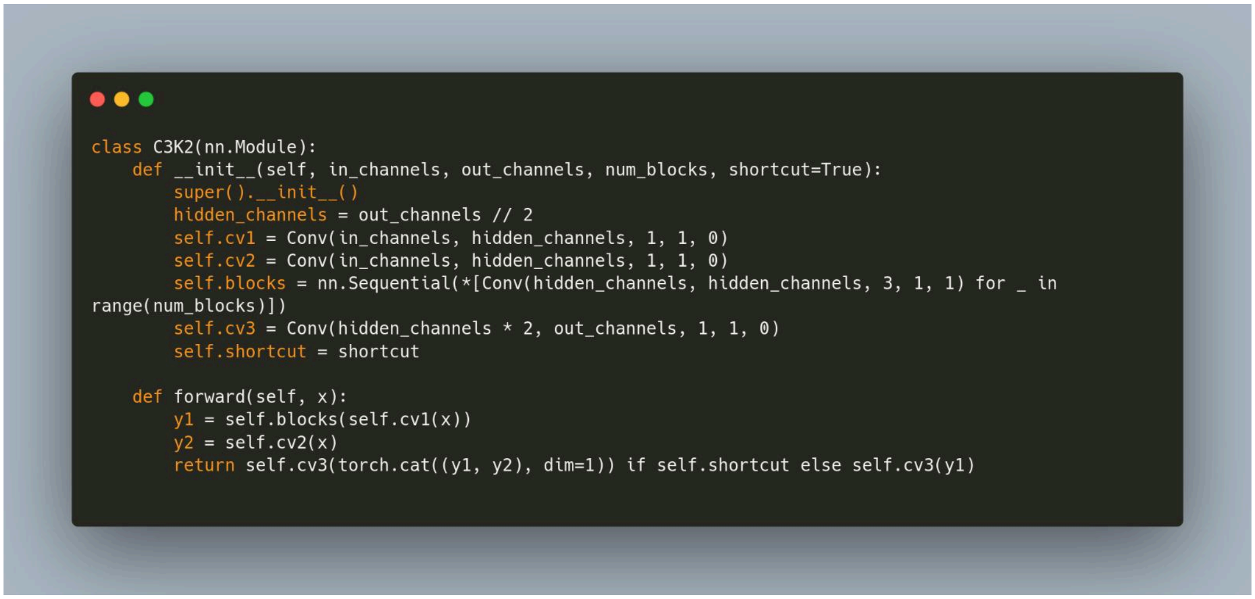


```python
import torch
import torch.nn as nn

class Conv(nn.Module):
    def __init__(self, in_channels, out_channels, kernel_size, stride, padding=1, bn=True, act=True):
        super().__init__()
        self.conv = nn.Conv2d(in_channels, out_channels, kernel_size, stride, padding, bias=not bn)
        self.bn = nn.BatchNorm2d(out_channels) if bn else nn.Identity()
        self.act = nn.SiLU() if act else nn.Identity()

    def forward(self, x):
        return self.act(self.bn(self.conv(x)))
```

Fig 2 Convolutional Layer



```
class C3K2(nn.Module):
    def __init__(self, in_channels, out_channels, num_blocks, shortcut=True):
        super().__init__()
        hidden_channels = out_channels // 2
        self.cv1 = Conv(in_channels, hidden_channels, 1, 1, 0)
        self.cv2 = Conv(in_channels, hidden_channels, 1, 1, 0)
        self.blocks = nn.Sequential(*[Conv(hidden_channels, hidden_channels, 3, 1, 1) for _ in
range(num_blocks)])
        self.cv3 = Conv(hidden_channels * 2, out_channels, 1, 1, 0)
        self.shortcut = shortcut

    def forward(self, x):
        y1 = self.blocks(self.cv1(x))
        y2 = self.cv2(x)
        return self.cv3(torch.cat((y1, y2), dim=1)) if self.shortcut else self.cv3(y1)
```

Fig 3 C3K2 LAyer

Goals for Next week:

- Train YOLO on the training dataset for further improvement.

- Finding the similarity indexes between the 143 classes dataset provided.

- Preparing the csv file from yml data provided for systematic analysis.

- Verify YOLOv11's detection accuracy by running the model on test images.

- Adjust hyperparameters and train YOLOv11 to optimize performance.