ssd

April 9, 2019

1 Single Shot Multibox Detection (SSD)

```
In [1]: %matplotlib inline
        import d2l
        from mxnet import autograd, contrib, gluon, image, init, nd
        from mxnet.gluon import loss as gloss, nn
        import time
```

1.1 Model

1.1.1 Category Prediction Layer

```
In [2]: def cls_predictor(num_anchors, num_classes):
            return nn.Conv2D(num_anchors * (num_classes + 1), kernel_size=3,
                             padding=1)
```

1.1.2 Sanity Test

```
In [3]: def forward(x, block):
            block.initialize()
            return block(x)

        Y1 = forward(nd.zeros((2, 8, 20, 20)), cls_predictor(5, 10))
        Y2 = forward(nd.zeros((2, 16, 10, 10)), cls_predictor(3, 10))
        (Y1.shape, Y2.shape)
```

```
Out[3]: ((2, 55, 20, 20), (2, 33, 10, 10))
```

1.1.3 Concatenating Predictions for Multiple Scales

```
In [4]: def flatten_pred(pred):
            return pred.transpose((0, 2, 3, 1)).flatten()

        def concat_preds(preds):
            return nd.concat(*[flatten_pred(p) for p in preds], dim=1)

        concat_preds([Y1, Y2]).shape
```

```
Out[4]: (2, 25300)
```