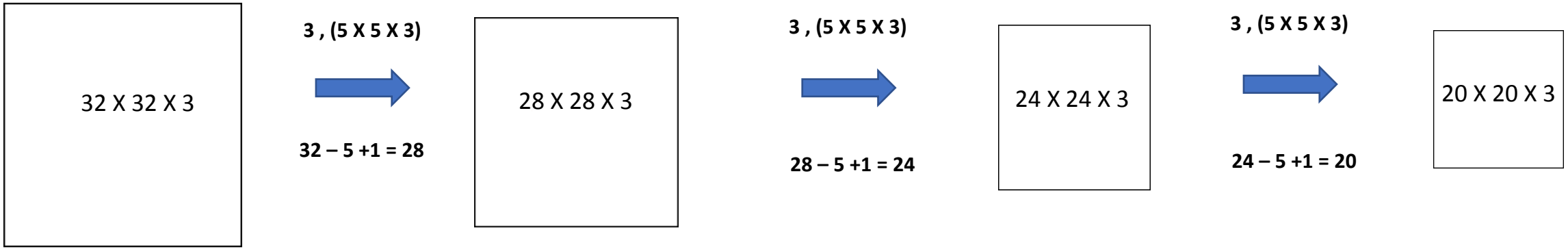
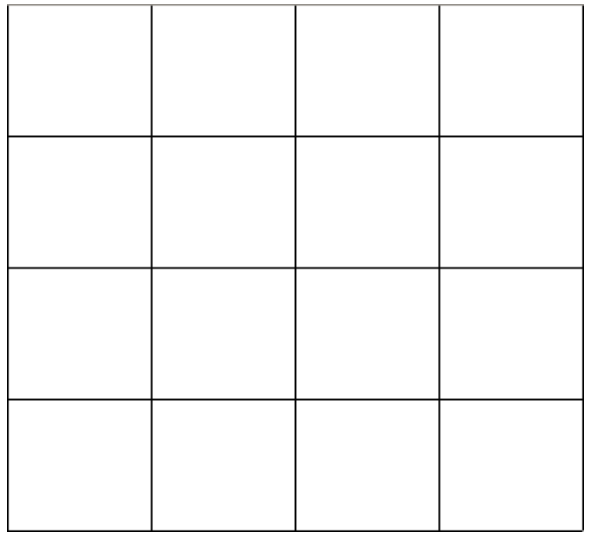
Padding

Problem - 1


32 X 32 X 3
3 , (5 X 5 X 3)
32 – 5 +1 = 28
28 X 28 X 3
3 , (5 X 5 X 3)
28 – 5 +1 = 24
24 X 24 X 3
3 , (5 X 5 X 3)
24 – 5 +1 = 20
20 X 20 X 3

Problem - 2

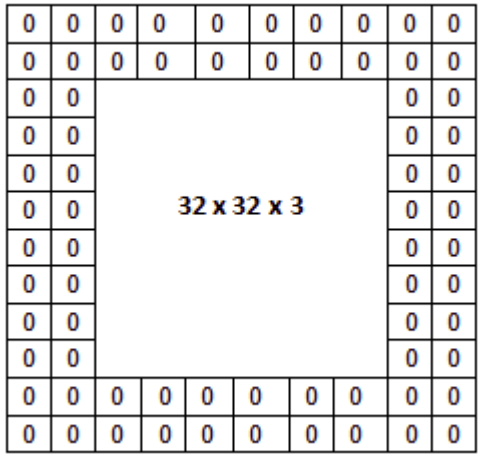


Problems

1. Drastic Reduction in Feature Map Dimensions, Unable to build Deeper Networks

2. Loss of Information at the Edges of Images

Solution - Padding



3 , (5 X 5 X 3)

36 – 5 +1 = 32

32 X 32 X 3

Padding Strategies

Valid

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Same

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Padding Strategies - Same

```
out_height = ceil(float(in_height) / float(strides[1]))
out_width  = ceil(float(in_width) / float(strides[2]))
```

Padding Strategies - Same

```
if (in_height % strides[1] == 0):
  pad_along_height = max(filter_height - strides[1], 0)
else:
  pad_along_height = max(filter_height - (in_height % strides[1]), 0)
if (in_width % strides[2] == 0):
  pad_along_width = max(filter_width - strides[2], 0)
else:
  pad_along_width = max(filter_width - (in_width % strides[2]), 0)
```

Padding Strategies - Same

```
pad_top = pad_along_height // 2
pad_bottom = pad_along_height - pad_top
pad_left = pad_along_width // 2
pad_right = pad_along_width - pad_left
```

Padding Strategies - Valid

```
out_height = ceil(float(in_height - filter_height + 1) / float(strides[1]))
out_width  = ceil(float(in_width - filter_width + 1) / float(strides[2]))
```

Thank You