

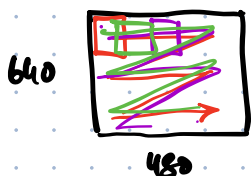
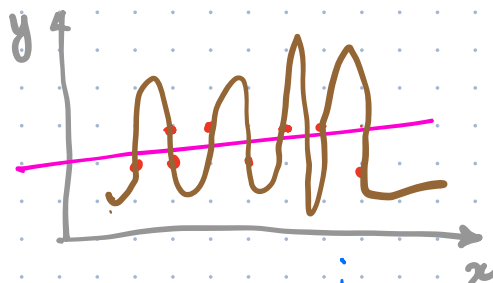
CONVOLUTION NETWORKS

640x480

MLP → large number of parameters.



over-fitting. model complexity too high.



638 x 478

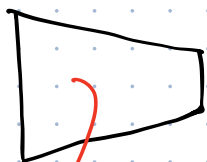


FLATTEN

(638)(478)(3)

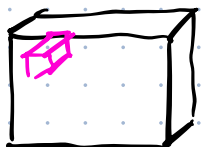
output of a convolutional layer with 3, 3x3 filters

parameters = $(3 \times 3)(3)$



Feature extractor Encoder

deep feature



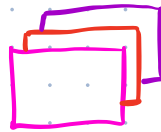
640x480x3

7x7



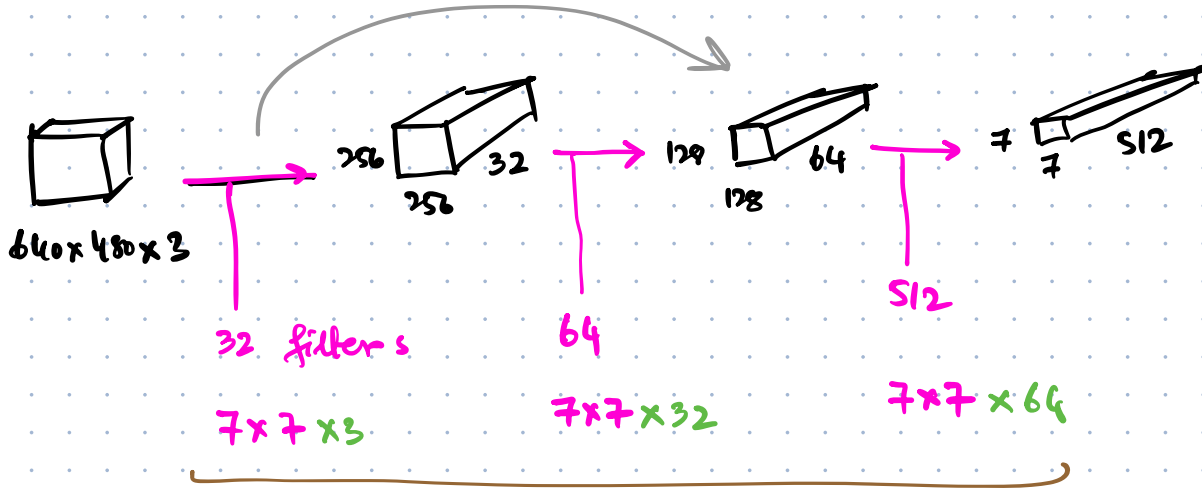
parameters.

$(7 \times 7 \times 3) \times 3$



HxWxC

number of filters



$$\mathcal{L}(\theta) \xrightarrow{\text{parameter}} \nabla \mathcal{L}(\theta) = \begin{bmatrix} \partial \mathcal{L}(\theta) / \partial \theta_1 \\ \vdots \\ \partial \mathcal{L}(\theta) / \partial \theta_n \end{bmatrix}$$

MLP LOSS

$$\mathcal{L} = \frac{1}{N} \sum_{i=1}^N (\hat{y}_i - y_i)$$

$$= \frac{1}{N} \sum_{i=1}^N (f(x; \theta) - y_i)$$

$y = mx + b$
↑ ↑

x_1 x_2 x_3 x_4 x_5 x_6

h_3

h_2

h_1



$$x_2 h_3 + x_3 h_2 + x_4 h_1$$



parameters.