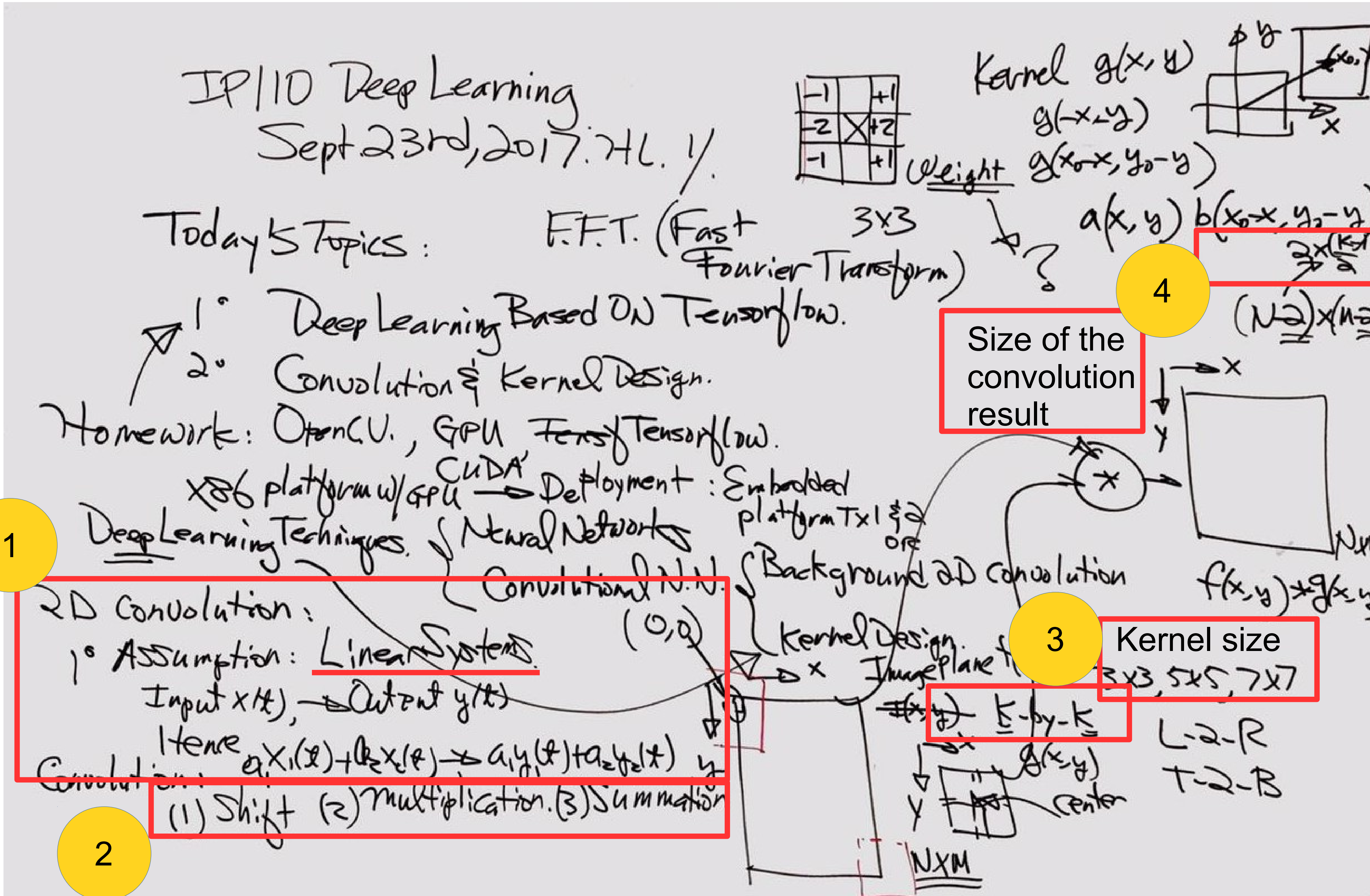
Lecture Notes on 2D Convolution (1)



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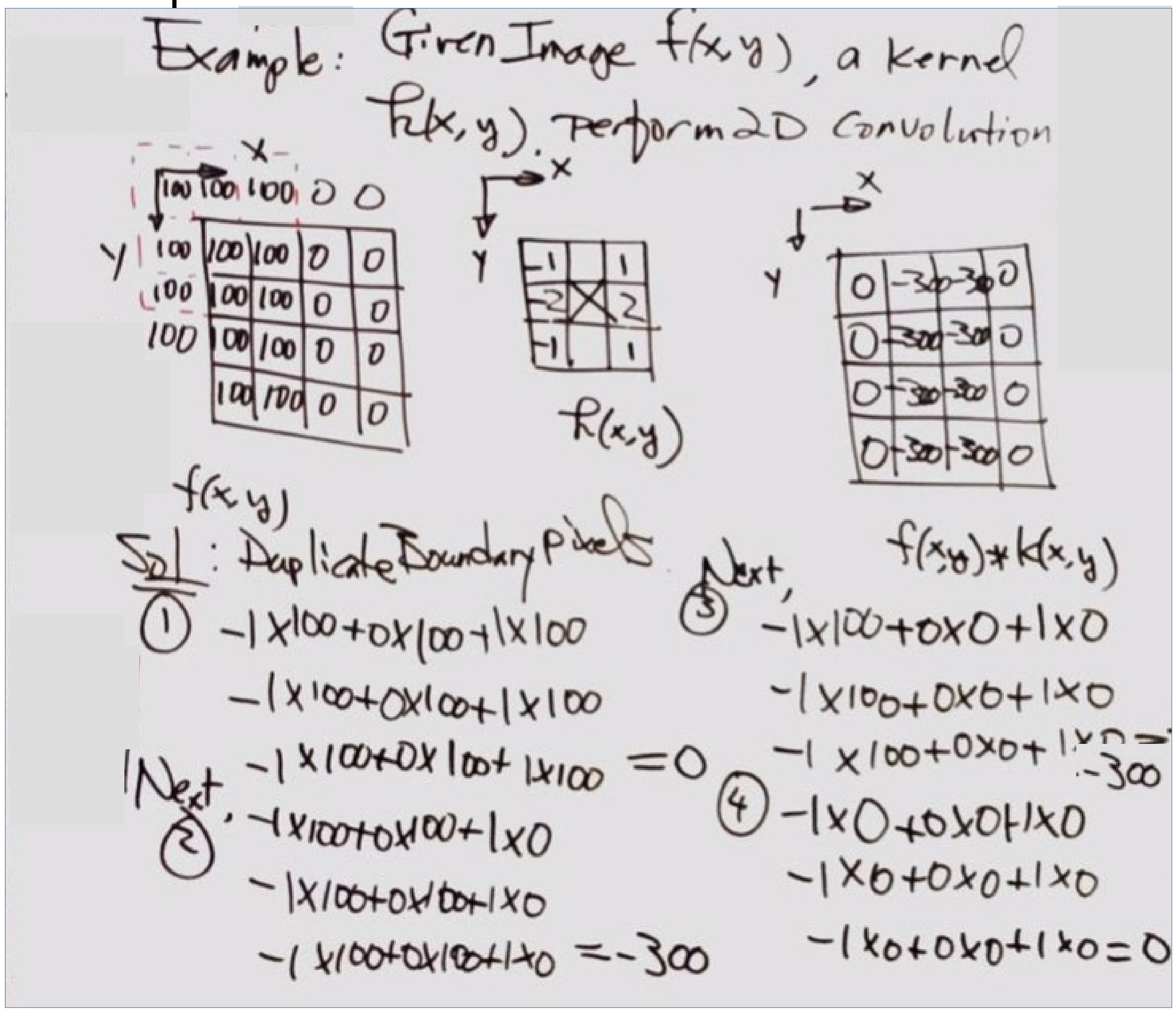
Lecture Notes on 2D Convolution (2)

Example: Calculation of 2D convolution



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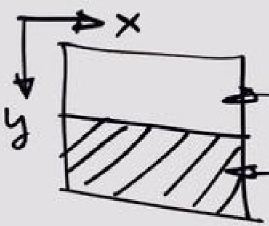
Derivation of Kernel

Derivation of Kernels

$$\nabla^2 G(x, y) \quad \begin{cases} \nabla^2 \begin{cases} \nabla \cdot \left(\frac{\partial}{\partial x}, \frac{\partial}{\partial y}\right), \\ \nabla^2, \left(\frac{\partial^2}{\partial x^2}, \frac{\partial^2}{\partial y^2}\right) \end{cases} \\ G(x, y) \end{cases}$$

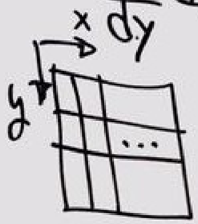
DoG, G. Blur



$I(x, y)$

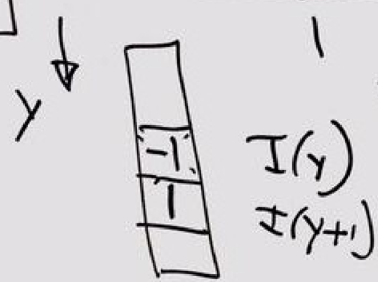
$$\frac{\partial}{\partial y} I(x, y) \longrightarrow \frac{d}{dy} I(y)$$

$$\frac{d}{dy} I(y) = \lim_{\Delta x \to 0} \frac{\Delta I(y)}{\Delta y} = \lim \frac{I(y + \Delta y) - I(y)}{\Delta y}$$



$$\simeq \frac{I(y+1) - I(y)}{1} = I(y+1) - I(y)$$

$$= 1 * I(y+1) + (-1) * I(y)$$



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