

# Assignment 1: CS 663, Fall 2023

Darshan Makwana, Vignesh Nayak, Harsh Kavediya

August 25, 2023

Q3. Let  $P_{I+J}$  denote the probability mass function for image  $I+J$ . By definition  $P_{I+J}(i)$  denotes the probability that any randomly chosen pixel in the image will have an intensity of  $i$

$$\begin{aligned} P_{I+J}(i) &= P_{I+J}(I+J=i) \\ &= P_{I+J}(I=i-J) \\ &= P_I(I=i-J|J)P_J(0 \leq j \leq i) \\ &= \sum_{j=0}^i P_I(i-j)P_J(j) \end{aligned} \tag{1}$$

This resembles the convolution operation we used in class for local spatial filters