

TTK4255: Robotic Vision

Homework 1: Image Processing

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1 Part 1 - Theory

Task 1.1

c) Brightness and Contrast adjustment

Task 1.2

Edge detection, makes lines/edges more visible

Task 1.3

$$g(h) = \frac{1}{\sqrt{2\pi}\sigma} e^{\frac{-h^2}{2\sigma^2}} > \epsilon \quad (1)$$

$$\implies h > \sqrt{-2\sigma^2 \ln(\epsilon\sigma\sqrt{2\pi})} \quad (2)$$

Task 1.4

$$\epsilon = 1/256, \quad \sigma = 3 \implies h = 8 \quad (3)$$

2 Part 2 - Basics

Task 2.1

The image size is 1280x720

Task 2.2

The second channel is green. Also makes sense with RGB order.

Task 2.3

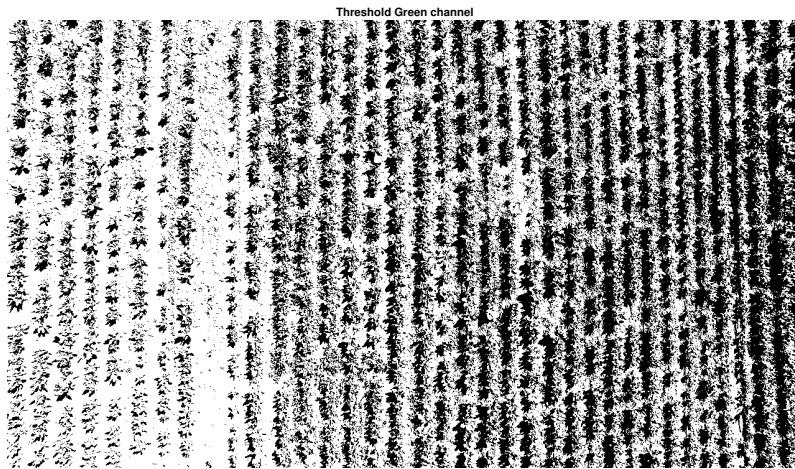


Figure 1: Threshold with just green channel

Task 2.4

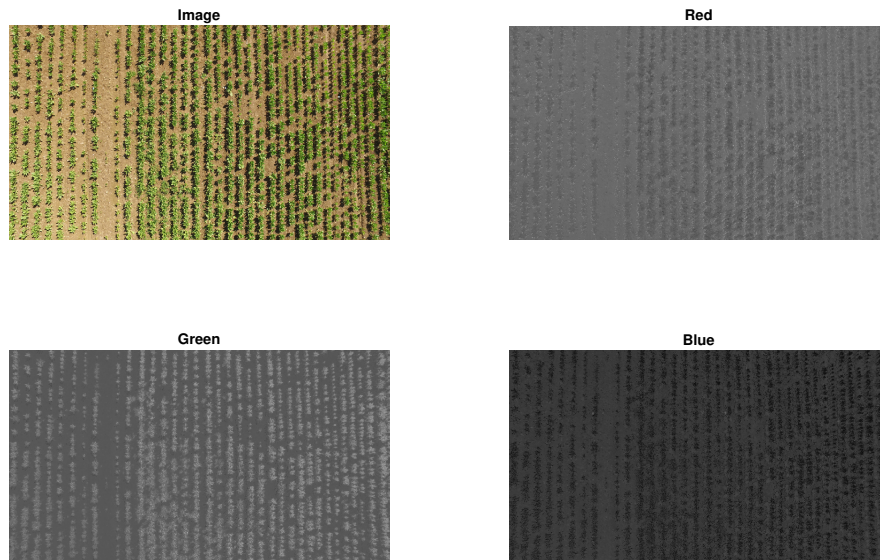


Figure 2: Normalized RGB channels

Task 2.5

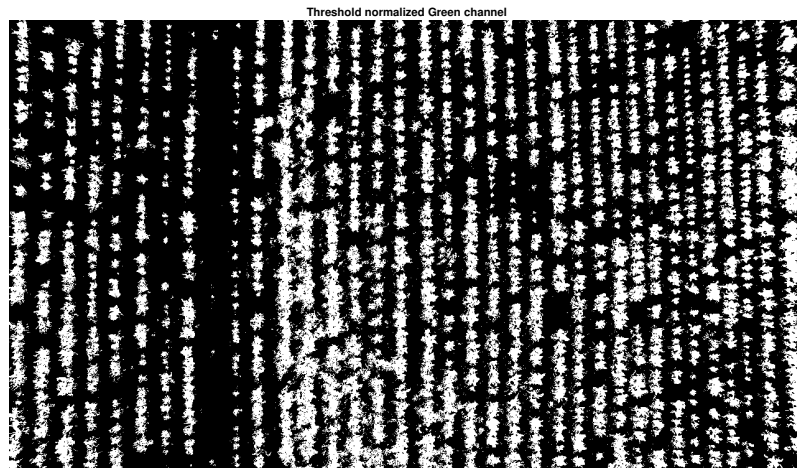
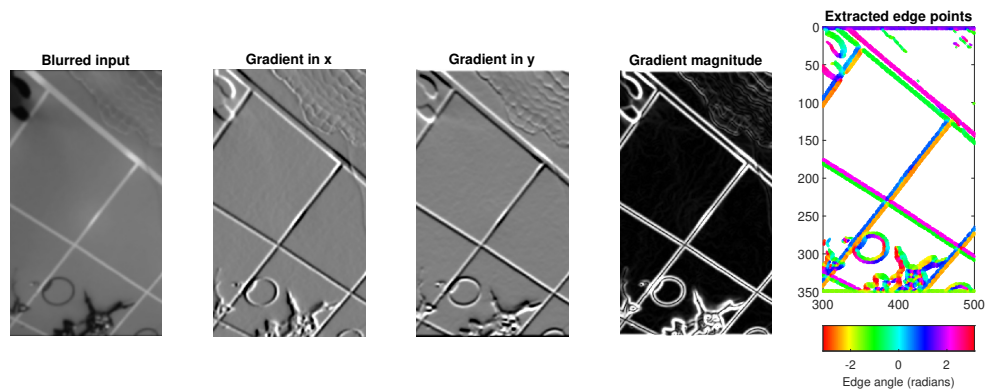


Figure 3: Threshold with normalized green channel

3 Part3 - Edge detection



Increasing σ will make softer edges like the net in the image less visible, and therefore not get detected. Here $\sigma = 1.5$ and $\epsilon = 0.02$.