CSE353 Assignment 1: Ground region detection

Due September 16 2021, 5:00PM, submitted via Blackboard

A robot is being designed to help farmers harvest vegetables and fruits in greenhouses. One perception task is to detect where the ground is for the mobile robot to move. One dataset with three sample images of greenhouses are collected, along with their ground truth labels as shown below where bright pixels represent ground regions in the image.

(1). Choose one image as the training image, learn the likelihood and prior distribution of ground and non-ground regions using the RGB color space.

(2). Using the rest two images as the testing images, infer every pixel's posterior probability of being within a ground region. Generate the detected ground mask and quantitatively report your results in terms of precision, recall, and F-score. The following shows one example of the detected ground mask.

Upload your codes with enough comments and a brief report to Blackboard by the due date & time, including

a) Introduction. Brief summary of what you think the assignment is about,

b) Method. Brief outline of your (algorithmic) approach,

c) Experiments. Tables and/or pictures of intermediate and final results that convince us that the program does what you think it does.

d) Discussions. Any design decisions you had to make and your experimental observations. What do you observe about the behavior of your program when you run it? Does it seem to work the way you think it should? Play around a little with different setting to see what happens. Note, your open-ended exploration is highly valued.