

PART E



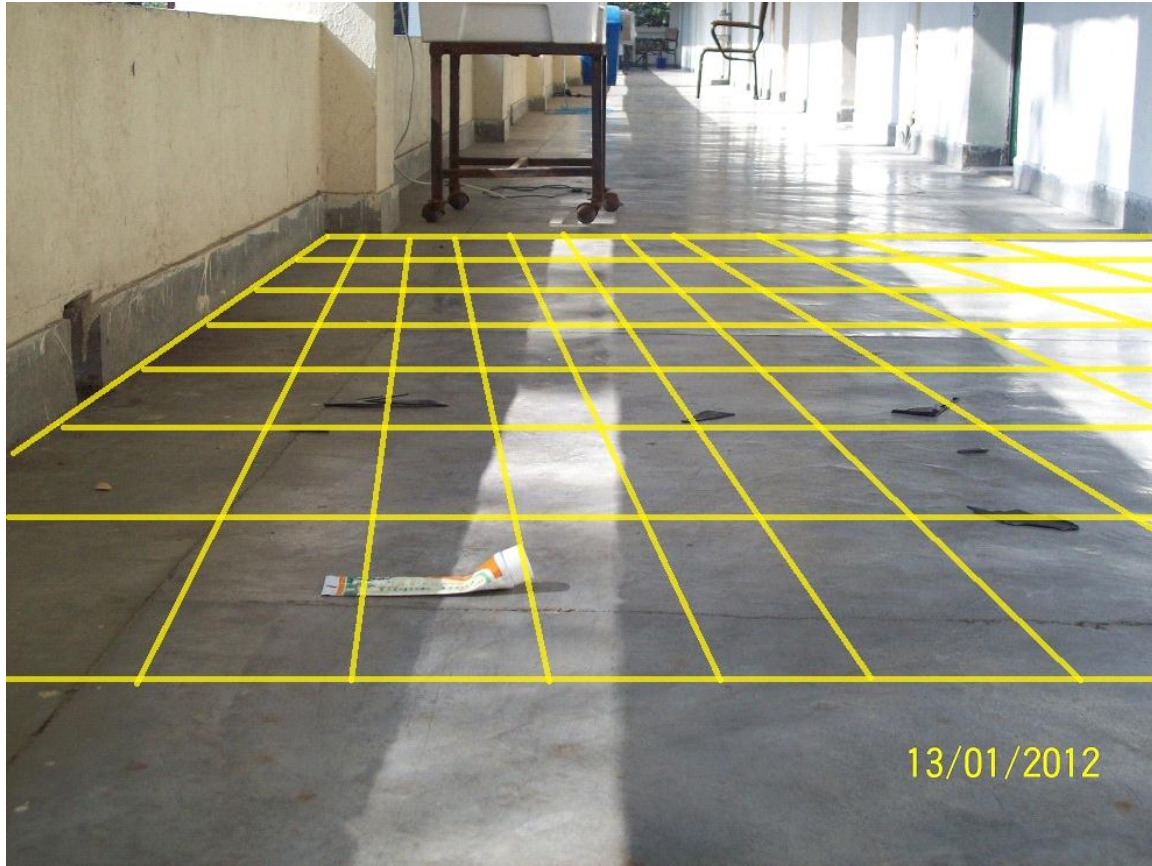
Borrow someone's digital camera, keep it at a height of about 30 cm (your robot height), and take an image of a corridor with some dirt on it. "Dirt" can be anything - papers, clothes, dirt, cups, etc. With respect to the image you have shot:

Q a) How would you determine where the floor lies in the image, and where there are walls etc. state any assumptions of prior knowledge you need to make.

Ans a) In this image floors and walls can be determined using color e.g. grey colour and yellow colour wall in this image. We can also use the fact that the floor will lie on the bottom part of the image. The boundaries can be determined using texture detection techniques Etc. Here we are assuming that the floor has a single color and a rectangular geometry.

Q b) Use a grid size of 0.5m, and indicate how the location of the dirt can be mapped to a grid?

Ans b)



The grid can be numbered as the row nearest to robot as row #1 and the leftmost column as column # 1, in this way the dirt location can be found out using image processing checking for color changes.

Q c) Would a value between 0 and 1 be good enough to map the "dirt" in each grid?

Ans c) No the value between 0 and 1 is not good enough as the notion of which is dirtier than other depends upon person to person, and what is perfectly clean is a debatable issue . May be sensor is detecting a low value of dirt but it is possible it the texture of floor and is not cleanable. Ex. A pen or tooth paste tube on the floor can't be considered as dirt but the sensor will not take that into account . Also you might feel that dog shit on floor to be dirtier than Leaves on floor irrespective of their dirt values. Also if the dirt value is very low it may be the floor is clean and sensor is noisy.

Q d) Consider how the robot might determine its own position using the image?

Ans d) the robot can sense distances using parallax method, and can create a grid in its memory. It can also keep track of distances he moves and use that information to determine its positions using the consequent images.