
Roomba Project

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Usage: To map an area and display obstacles using a roomba

Initialization

```
dlgPrompts = {'Roomba Number'};
dlgTitle = 'Select Your Roomba';
dlgDefaults = {' '};
opts.Resize = 'on';
dlgout = inputdlg(dlgPrompts,dlgTitle,1,dlgDefaults,opts) % Create
    window that prompts user to input their roomba number

n=str2double(dlgout{1});

r=roomba(n); % Initializes user specified Roomba

dlgout =

    0x0 empty cell array

Index exceeds array bounds.

Error in MarsFINAL (line 15)
n=str2double(dlgout{1});
```

Accessing Bumpers, Creating Movement, and Gathering Data

```
while true %this while loop will run all of the sensors until the
    program is stopped or the Robot stops
b=r.getBumpers; %Output true,false
bsen_1=extractfield(b,'left') %extracts the numerical values from the
    bumper sensors and makes them usable
bsen_2=extractfield(b,'right')
bsen_3=extractfield(b,'front')
bsen_4=extractfield(b,'leftWheelDrop')
bsen_5=extractfield(b,'rightWheelDrop')
bumps=[bsen_1,bsen_2,bsen_3,bsen_4,bsen_5]
tbump=sum(bumps)
```

```
s=r.getLightBumpers; % get light bump sensors
lbumpout_1=extractfield(s,'left'); % takes the numerical values of the
  sensors and makes them more usable
lbumpout_2=extractfield(s,'leftFront');
lbumpout_3=extractfield(s,'leftCenter');
lbumpout_4=extractfield(s,'rightCenter');
lbumpout_5=extractfield(s,'rightFront');
lbumpout_6=extractfield(s,'right');
lbout=[lbumpout_1, lbumpout_2, lbumpout_3, lbumpout_4, lbumpout_5,
  lbumpout_6] % converts values into matrix

sLbump=sort(lbout); %sorts matrix to lowest value can be extracted
lowLbump=sLbump(1);

speed=.05+(lowLbump)*.005 %using lowest value, which represents close
  obstacles, to determine speed, higher speed when nothing detected

r.setDriveVelocity(speed,speed) %creates a speed for the Robot

c=r.getCliffSensors %% <800 is a cliff, >2750 safe, else water

csen_1=extractfield(c,'left') % Extracts the numerical values and
  makes them useable
csen_2=extractfield(c,'right')
csen_3=extractfield(c,'leftFront')
csen_4=extractfield(c,'rightFront')
cliffs=[csen_1,csen_2,csen_3,csen_4]
ordcliff=sort(cliffs)

if ordcliff(1) < 2750 % if the smallest cliff sensor is less than 2750
  the Robot will stop
  r.setDriveVelocity(0,0)
  if ordcliff(1)<800
    disp 'cliff'
  else
    disp 'water'
  end %depending on the range of the cliff values it will display a
  certain type of cliff
  r.turnAngle(45)
end

if tbump>0
  r.setDriveVelocity(0,0) % if the sum of all the bumper sensors is
  greater than 0 then the robot will stop

  img = r.getImage; imshow(img); %takes a photo with the onboard
  cameras and shows the image it take

  imwrite(img,'imgfromcamera.jpg') %saves image as 'imgfromcamera.jpg'
  photo = imread('imgfromcamera.jpg')
  ocrResults = ocr(photo)
  recognizedText = ocrResults.Text;
  figure;
  imshow(photo)
```

```
text(220, 0, recognizedText, 'BackgroundColor', [1 1 1]); %After
  stopping it will take a photo and use text recognition if text is
  involved

word = ocrResults.Words

if word{1} == 'HOME'
r.turnAngle(360) %if it reads HOME then it will stop and spin 360
else
  imwrite(img,'imgfromcamera2.jpg') %if it reads something other
  than HOME it will take a photo and send it as an email
setpref('Internet','SMTP_Server','smtp.gmail.com');
setpref('Internet','E_mail','tylerreynoldsroomba@gmail.com'); % mail
  account to send from
setpref('Internet','SMTP_Username','tylerreynoldsroomba'); % senders
  username
setpref('Internet','SMTP_Password','Roomba20'); % Senders password
props = java.lang.System.getProperties;
props.setProperty('mail.smtp.auth','true');
props.setProperty('mail.smtp.socketFactory.class','javax.net.ssl.SSLSocketFactory');
props.setProperty('mail.smtp.socketFactory.port','465');
sendmail('reynoldst254@gmail.com','Roomba','Roomba has returned
  home!!!','imgfromcamera2.jpg') % mail account to send to

end

r.moveDistance(-0.1) %After taking the photo is will back up and turn
  45 degrees and keep exploring
  r.turnAngle(45)

end
end %while loop at the top for the bumpers
```

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