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r.setDriveVelocity(.15); % tells the robot to initially move at about .15 m/s
mostop = 0; % Used for an if statement further down the code to completely
break out of while loop (mostop = manual override stop)
anet = alexnet; % Assigns alexnet deep learning to a variable
while true % Infinite while loop
    img = r.getImage;
    img = imresize(img, [227,227]);
    label = classify(anet, img);
    if label == "paper towel" || label == "refrigerator"
        label = "water";
    end
    image(img);
    title(char(label));
    drawnow;
    %     img = r.getImage; % Takes a picture from the mounted camera
    %     image(img); % Shows the image that was taken
    %     red_mean = mean(mean(img(:,:,1))) % Takes the average value of an
image for the red color
    cliff = r.getCliffSensors; % Retrieves data about the cliff sensors
    bump = r.getBumpers; % Retrieves data about the bump sensor values
    lightbump = r.getLightBumpers; % Retrieves data about the light bump
sensor values

    if cliff.rightFront < 2000
        r.turnAngle(-2); % Turns the robot approximately 2 degrees CW once
the value for the right front cliff sensors fall below 2000
        r.setDriveVelocity(.15); % Moves the robot at about .15 m/s
        continue
    elseif cliff.leftFront < 2000
        r.turnAngle(2); % Turns the robot approximately 2 degrees CCW once
the value for the left front cliff sensors fall below 2000
        r.setDriveVelocity(.15); % Moves the robot at about .15 m/s
        continue
    elseif 2000 > cliff.leftFront && 2000 > cliff.rightFront
        r.setDriveVelocity(.15); % Tells the robot to keep going forward at
approximately .15 m/s if both values from the right front and left front
sensors fall below 2000
        r.turnAngle(0); % Tells the robot to not turn if the above mentioned
conditions are true
        continue
    elseif label == "water" || label == "plant" % When the robot sees water
or a plant it makes notification sound, displays what it sees, and does a
little dance
        r.stop; % Stops the robot when there is water or plant life
        r.beep('A2,A#2,B2,C^6'); % Play a celebratory jingle
        img = r.getImage; % Takes a picture from the mounted camera
        imshow(img); % Shows the image taken
        pause(1); % Pauses for 1 second, long enough to take the picture
        for i = 1:3 % Robot does a short dance
            r.setDriveVelocityRadius(10,.001);
            r.setDriveVelocityRadius(10,-.001);
        end
        r.turnAngle(160); % Turns the robot around
        r.setDriveVelocity(.15); % Sets the robot's velocity to about .15 m/s
        continue
    elseif label == "fire"
        r.stop; % Stops the robot if there is fire

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r.beep('F,E,F,E');
img = r.getImage; % Takes a picture from the mounted camera
imshow(img); % Shows the image taken
mf = msgbox('Danger! Fire directly ahead!');
waitfor(mf);
r.moveDistance(-.1,1); % Moves the robot back quickly about .1 meters
at about 1 m/s
r.turnAngle(160); % Turns the robot around
r.setDriveVelocity(.15); % Sets the robot's velocity to about .15 m/s
continue
elseif bump.front == 1 || bump.left == 1 || bump.right == 1
r.setDriveVelocity(0); % Stops the robot from moving
r.moveDistance(-.15); % Tells the robot to move backwards about .15
meters
r.turnAngle(-70); % Turns the robot such that it can go through an
open path
r.moveDistance(.1); % Moves the robot forward about .1 meters
r.beep('E3,C5')
err_bump = errorDlg('Obstacle blocking pathway! Iris unable to
proceed!');
waitfor(err_bump)
% Sequence for Manual Override
yn = menu('Would you like to activate Manual Override?', 'Yes', 'No');
waitfor(yn);
if yn == 2
h = msgbox('Okay! Stopping Iris.');
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break
elseif yn == 1
h = msgbox('Activating Manual Override!');
waitfor(h);
h_wait = waitbar(0, 'Please wait...');
steps = 50;
for i = 1:steps
pause(.1)
waitbar(i/steps); % Updates the waitbar
end
delete(h_wait)
h1 = msgbox('Manual Override Initiated!');
waitfor(h1);
while true
pause(.1) % Pause for .1 seconds before each value is taken
Controller = phone.Orientation; % Assigns the matrix for the
values of the orientation of the phone to a variable (hold the phone with the
top part of the phone in the right hand)
Azimuthal = Controller(1); % Assigns the first value of the
matrix to a variable
Pitch = Controller(2); % Assigns the second value of the
matrix to a variable (tilt forwards and backwards when phone is held
sideways)
Roll = Controller(3); % Assigns the third value of the matrix
to a variable (tilt left and right when phone is held sideways)
Cliff = r.getCliffSensors; % Retrieves the values of the
cliff sensors

% Causes an output based on the orientation of the phone
if Cliff.rightFront < 2000 || Cliff.leftFront < 2000
r.stop % Stops the robot

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        r.beep('B,B,B');
        r.moveDistance(-.15) % Moves the robot backwards about
.15 meters
        w = warndlg('Cliff directly in front! Moving Iris
backwards.');
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        waitfor(w);
        elseif Roll > 130 || Roll < -130 % If the phone is flipped
face-down, it stops the robot and exits the loop
            r.stop
            mostop = 1; % Use to stop entire code further down
            break
        elseif Roll > 25
            r.setDriveVelocity(-.15) % Moves the robot backwards at a
speed of approximately .15 m/s if the phone is tilted backwards at least 25
degrees
            elseif Roll < -25
                r.setDriveVelocity(.15) % Moves the robot forwards at a
speed of approximately .15 m/s if the phone is tilted forwards at least 25
degrees
                elseif Pitch > 25
                    r.turnAngle(-1) % Turns the robot approximately 1 degree
CCW if the phone is tilted left at least 25 degrees
                    elseif Pitch < -25
                        r.turnAngle(1) % Turns the robot approximately 1 degree
CW if the phone is tilted at least 25 degrees
                        elseif Roll < 25 && Roll > -25 && Pitch < 25 && Pitch > -25
                            r.setDriveVelocity(0) % Stops the movement of the robot
if the phone is help face-up
                            end % end of if statement controlling movement of robot
                        end % end of while loop that gets the orientation matrix
                    end % end of if statement containing "Manual Override"
                elseif lightbump.leftFront > 500 || lightbump.leftCenter > 500 ||
lightbump.rightCenter > 500 || lightbump.rightFront > 500
                    r.setDriveVelocity(.025); % Slows the robot down to about .025 m/s if
it gets too close to a wall
                    r.beep('E,C,E,C,E,C');
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                elseif lightbump.leftFront > 300 || lightbump.leftCenter > 300 ||
lightbump.rightCenter > 300 || lightbump.rightFront > 300
                    r.setDriveVelocity(.05); % Slows the robot down to about .05 m/s if
it gets close to a wall
                    r.beep('E,C,E,C,E,C');
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                end % end of if statement that follows the path
            if mostop == 1
                break
            end % end of if statement breaking out of entire while loop
        end % end of entire while loop

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