```
function [xs, ys, zs, rs] = dumpLocation()
```

```
[I1 ,I2] = getImage();
while mean(mean(I1(:,:,1)))<60
    [I1,~] = getImage();
end
while mean(mean(I2(:,:,1)))<60
    [~,I2] = getImage();
end
imshow([I1 I2])
```

```
%point cloud construction
%rectification
load('myParams.mat');
[xyzPoints,J1,J2] = cloudReconstruct(I1, I2,stereoParams);
%create 3D reconstruction
ptCloud = pointCloud(xyzPoints);
```

%Circle finding BWJ1 = rgb2gray(J1); cim = J1(:,:,1); %[centers,radii,metric] = imfindcircles(cim,[200 500],'ObjectPolarity','dark','Sensitivity',0.975,'EdgeThreshold',0.06); [centers,radii,metric] = imfindcircles(cim,[200 500],'ObjectPolarity','dark','Sensitivity',0.99,'EdgeThreshold',0.05); %figure imshow(cim) hBright = viscircles(centers, radii,'Color','b');

```
%Centroid Calculations
%binarize
BI = (1.5*J1(:,:,1)-J1(:,:,2))>80;
%remove small objects (noise)
BI1 = bwareaopen(BI, 20000);
%find centroid
stats = regionprops(BI1,'centroid');
centroids = cat(1, stats.Centroid);
[m,~] = size(centroids);
if m > 1
    centroids = mean(centroids);
end
centers = centroids;
%diameters = mean([stats.MajorAxisLength stats.MinorAxisLength],2);
%radii = diameters/2;
radii = 0;
figure;
imshow(J1)
hold on
if ~isempty(centroids)
    plot(centroids(:,1),centroids(:,2), 'b*')
end
hold off
```

```
%check locations
```

```
xout = [];
yout = [];
zout = [];
X1 = xyzPoints(:,:,1);
Y1 = xyzPoints(:,:,2);
Z1 = xyzPoints(:,:,3);
[mc,nc] = size(centers);
%[m n] = size(X);
range1 = 25;%set an averaging range to ensure real numbers and accuracy
for i = 1:mc
    xloc = round(centers(i,1));
    yloc = round(centers(i,2));
    zloc = Z1(xloc-range1:xloc+range1,yloc-range1:yloc+range1);
    zloc(isnan(zloc)) = [];
    zloc(zloc > 1000) = [];
    zloc(zloc < 100) = [];
    zcenters = mean(mean(zloc));
    xcenters = X1(yloc-range1:yloc+range1,xloc-range1:xloc+range1);
    xcenters(isnan(xcenters)) = [];
    ycenters = Y1(yloc-range1:yloc+range1,xloc-range1:xloc+range1);
    ycenters(isnan(ycenters)) = [];
    zout = [zout zcenters];
    xout = [xout mean(mean(xcenters))-0.5*max(max(xyzPoints(:,:,1)))];
    yout = [yout mean(mean(ycenters))-0.5*max(max(xyzPoints(:,:,2)))];
end %end for
zout1 = zout./25.4;
xout1 = yout./25.4./3+3;%swap x and y
yout1 = -xout./25.4./3;
outputs = [xout1' yout1' zout1']
xs = xout1';
ys = yout1';
zs = zout1';
rs = radii'./25.4;
```

```
end

function [img1, img2] = getImage()
webcams = webcamlist
%CAM1
cam1 = webcam(1);%set to L1
pause(0.5)
cam1.Resolution = '1280x960';
img1 = snapshot(cam1);
pause(0.5);%in seconds
clear('cam1')
%CAM 2
pause(0.5);%in seconds
cam2 = webcam(2);%set to R3
pause(0.5)
cam2.Resolution = '1280x960';
img2 = snapshot(cam2);
pause(0.5);%in seconds
clear('cam2')

%imshow([img1 img2])
```

```
end

function [xyzPoints,J1,J2] = cloudReconstruct(I1, I2, stereoParams)
[J1, J2] = rectifyStereoImages(I1,I2,stereoParams,'OutputView','full');
%imshow(stereoAnaglyph(J1,J2));
%figure
%imshow(cat(3,J1(:,:,1),J2(:,:,2:3)),'InitialMagnification',50);
%disparity map
disparityRange = [16*8,16*18];
disparityMap = disparity(rgb2gray(J1), rgb2gray(J2),'BlockSize',11,'DisparityRange',disparity
Range);
%figure
%imshow(disparityMap,disparityRange);
%title('Disparity Map');
%colormap(gca,jet)
%colorbar
%imshow(disparityMap,[0,64],'InitialMagnification',50);
%reconstruct point cloud
xyzPoints = reconstructScene(disparityMap,stereoParams);
%pick out image section  within a certain range
%Z = xyzPoints(:,:,3);
end
```

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