IIIT Vadodara
Autumn 2018-19
TE3 Computer Vision
Lab-6: Depth Finding - Calculus of Variation (COV)

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Problem 1. Find the depth maps of the images generated for the Shape from Shading (SFS) lab problem. Use the p and q matrices which are estimated in the SFS problem and apply the COV approach (Euler equation for the depth) as discussed in the class to estimate the depths at each point the Sphere scene. Carry out the process for different source positions and plot the corresponding depth maps.

Solution Code :-

```
tStart=tic;

p = load("p.mat");
q = load("q.mat");
typeinfo(p)
i1 = size(q,1)
j1= size(p,2)
z = rand(i1, j1);

for count = 1 : 100
  i1 = size(p,1);
  j1= size(p,2);

  for i = 3 : (i1 - 3)
    for j = 3 : (j1 - 3)
      zn(i, j) = (z(i, j) + p(i,j) - p(i - 1, j) + q(i,j) - q(i, j - 1))/4;
    endfor
  endfor
  z = zn
endfor

save depth_matrix.mat z
```

```
tElapsed=toc(tStart)
```

tElapsed = 128.786

Figure 1: Depth matrix plotted as a image