

Computer Science in Practice

Exercise No. 5

Due: Friday, July 6, Ross closing time

This exercise should be submitted in pairs. See submission instructions at the end of the exercise description.

In this exercise you will solve the Poisson equation for deriving intrinsic images from a sequence of images.

Given an image sequence, decompose the images into the reflectance component and the illumination component. All you have to do is implement the function `solvePoisson` for solving the Poisson equation:

$$\frac{\partial^2 I}{\partial x^2} + \frac{\partial^2 I}{\partial y^2} = \frac{\partial \hat{r}_x}{\partial x} + \frac{\partial \hat{r}_y}{\partial y} \quad (1)$$

```
function [imR] = solvePoisson(dx,dy);

% NAMES:
% LOGIN NAMES:
% IDS:
% [imR] = solvePoisson(dx,dy);
% reconstruct the image imR from its partial derivatives dx, dy
% up to the boundary condition.
```

The rest of the code is already written. The script `demo.m` generates an image of a circle in square shadow. The generated image is already the log image (reflectance and illumination are additive in this image). Then it calls the function `getAlbedo` to get the reflectance component using the algorithm from the paper by Yair Weiss. The function `getAlbedo` calls the function `solvePoisson` for integrating the estimated partial derivatives of the reflectance.

You are given all the code except the function `solvePoisson.m` that you have to fill in (The derivatives of the estimated partial derivatives are already

computed in the first 2 lines of this file). No special care for the boundary is needed (The boundary of the image is assumed to be 0).

If you want to see what your output should look like when debugging your code you can call the function `reconsEdge3` instead of `solvePoisson` (uncomment the lines that call this function). This function integrates the partial derivatives using `fft` as described in the paper.

Submit your code electronically in a single file called `solvePoisson.m` (include the names, id numbers and login names of both persons submitting the exercise in a comment in the beginning of the file).

Reminder: You must submit at least 4 out of the 5 exercises in the course. If you submit all the 5 exercises your exercise grade will be the average of the top 4.