Last Week

- Depth from defocus
- Lots of reading
  - “Depth from Diffusion” by Zhou, Cossairt, & Nayar
  - “Shape from Defocus via Diffusion” by Favaro, Soatto, Burger, & Osher
  - “3D Shape Estimation and Image Restoration” by Favaro & Soatto
  - More powerpoints and papers on DfDefocus and related programming
- Began test programming
- Began reading existing code
This Week

• More reading
  – Papers and code

• Finished test programming
  – Basic, intuitive implementation of depth from defocus
  – More on that next

• Brain storming
  – What are the limitations?
  – How to work around them?
My Test

• Two images
  – One with deep depth of field
  – One with shallow depth of field
• Use a set of convolutions to estimate depth locally
• Essentially, reduces the problem to a grid of approximate coplanar patches (parallel to sensor)
• Decent results, but slow (at least in MATLAB)
• No image segmentation used, so depth only measured at edges
Deep DOF
Shallow DOF
Depthmap
Reconstruction
Error
The Problem

- The way I got my results was by looking at a neighborhood around each pixel
- Inspecting such a small scale reduces oblique surfaces to a series of coplanar approximations
- Brute force approach
  - Throw everything at it and see what sticks
Our Goal

• We want to find a way to deal with oblique edges without reducing the problem

• Find a way to determine the appropriate filters needed dynamically
  – Ex: oblique surfaces would need asymmetrical filters because the amount of blur varies across them

• Global optimization with fewer assumptions