Pre-Class Assignment 6

Reading Material 1:

Andreas Velten, Thomas Willwacher, Otkrist Gupta, Ashok Veeraraghavan, Moungi G Bawendi, and Ramesh Raskar. Recovering three-dimensional shape around a corner using ultrafast time-offlight imaging. Nature Communications 1747, 2012.

1. What is the main difference in detector (or sensor) in Non-line-of-sight imaging and traditional imaging (e.g. taking a RGB photo for something using your phone)?

2. What is the main problem of back projection generated heatmap? What is the solution proposed in this paper?

Reading Material 2:

Matthew O'Toole, David B. Lindell, and Gordon Wetzstein. Confocal non-line-of-sight imaging based on the light-cone transform. Nature, 555(7696):338–341, 2018.

3. Why does non-line-of-sight imaging remain a hard problem? How does Confocal Non-line-of-sight (C-NLOS) imaging system overcome such challenges?

4. What is the advantage of convolutional model (e.g. $\boldsymbol{y} = \boldsymbol{h} * \boldsymbol{x}$) compared with general linear model ($\boldsymbol{y} = A\boldsymbol{x}$)? What methods does the authors use to solve the convolutional model?

Link:

1. Recovering three-dimensional shape around a corner using ultrafast time-of-flight imaging | Nature Communications
2. Confocal non-line-of-sight imaging based on the light-cone transform | Nature