# Simultaneous Localization and Calibration (SLAC)

## ||Overview||

### Input:

##### A sequence of depth image

##### A corresponding set

### Given and, SLAC produces camera posed and a calibration function

### Data description

##### is a 4x4 transformation matrix

##### The calibration function is a mapping for all images

## ||Objective||

### Minimize an objective of the following form

### Alignment term

##### ,

##### is the normal of in the world frame

### Regularization term

##### To parameterize the function C, we take advantage of the spatial smoothness of range distortion

12-PAMI- Joint depth and color camera calibration with distortion correction

13-RSS- Unsupervised intrinsic calibration of depth sensors via SLAM

13-ICCV- Elastic fragments for dense scene reconstruction

##### Sample over a regular lattice

Regular lattice

are trilinear interpolation coefficients

##### Use a shape-preserving regularizer by elasticity theory

* + - * + is the set of neighbors of in
        + is a local linearization of at

## ||Optimization||

### Minimize using Gauss-Newton method

### Let x be the vector of variables that includes all the parameters of and

##### The calibration function is parameterized by the calibrated position of each lattice point

##### Transformation is linearize by a 6-vector

### Initialization

##### An initial rigid alignment of the input images

##### Stationary function