RANSAC [Random Sample Consensus]

(Fischler & Bolles 1981)

⇒ Trial and Error approach.

⇒ Approach to deal with high fractions of outliers in the data.

⇒ Key Idea: Find the best partition of points in inlier set and outlier and estimate the model from the inlier set.

⇒ Standard approach for fitting in the presence of outliers.

★ RANSAC Algorithm

1. **Sample:** the number of data points required to fit the model.

2. **Compute:** model parameters using the sampled data points.

3. **Score:** by the fraction of inliers within a present threshold of the model.

⇒ **Repeat:** 1-3 until the best model is found with high confidence.

* How to choose the Parameters?

⇒ Number of sampled points S
- ↳ Minimum number needed to fit the model.

⇒ Outlier ratio e

⇒ Number of trial T
- ↳ Choose T so that, with probability p, at least one random sample set is free from outliers.

$$T = \frac{\log(1-p)}{\log(1-(1-e)^S)}$$

⇒ Distance threshold δ
- ↳ Choose δ so that a good point with noise is likely within threshold.