Voronoi Diagram Intensity Extraction for SELEX Performance Enhancement

Mohammad Asadi
EE387: Computational Imaging

SELEX Process

5. Amplification
4. Binding
3. Selection
2. Purification
1. Binding
0. Initial round

Illumina MiSeq

Fragments → Add adaptors → Alpha to forward

Method

Voronoi Diagram
- Spatial analysis suitable for this domain
- Minimizing intensity spill-over
- Localized intensity calculation
- Clear boundary definition
- Adaptable to Miseq misplacement

Data Processing Pipeline

Images
- Sequence + Localization
- Sequence Evaluation in Image
  - Fluorescently labelled target
  - Fluorescent complementary displacement strand
  - Fluorescently modify aptamers + some quenching mechanism

Imaging Platform

Trellis: Transduce aptamer binding behavior to fluorescence
- Fluorescently labelled target
- Fluorescent complementary displacement strand
- Fluorescently modify aptamers + some quenching mechanism

Previous Work

1. Draw together cell background points around a given coordinate
   - rules against misalignment
2. Apply influence to neighboring clusters
   - non-linear influence on neighboring clusters
   - weak influence to neighboring clusters
   - strong influence to neighboring clusters
3. Analyze point location and read out location of coordinate
   - rules against misalignment

References