Tracks Recognition

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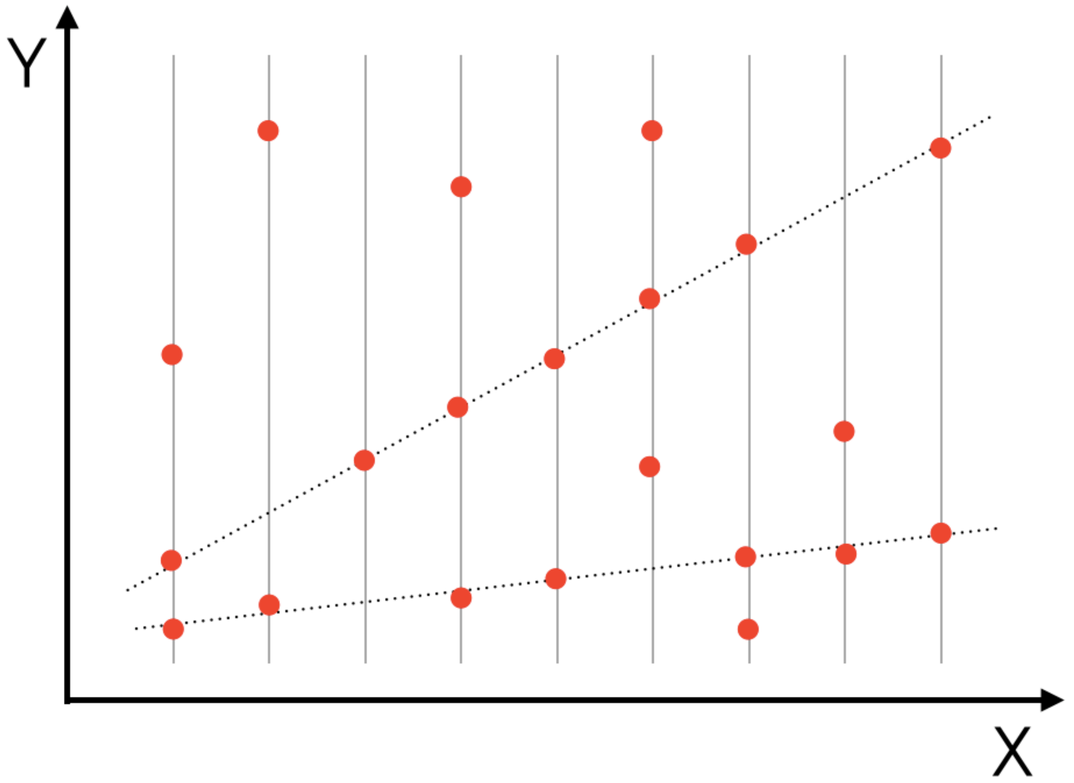
What

1. Problem formulation and key definitions
2. Global Methods of Tracks Recognition
3. Local Methods of Tracks Recognition
4. Tracks recognition in real experiments

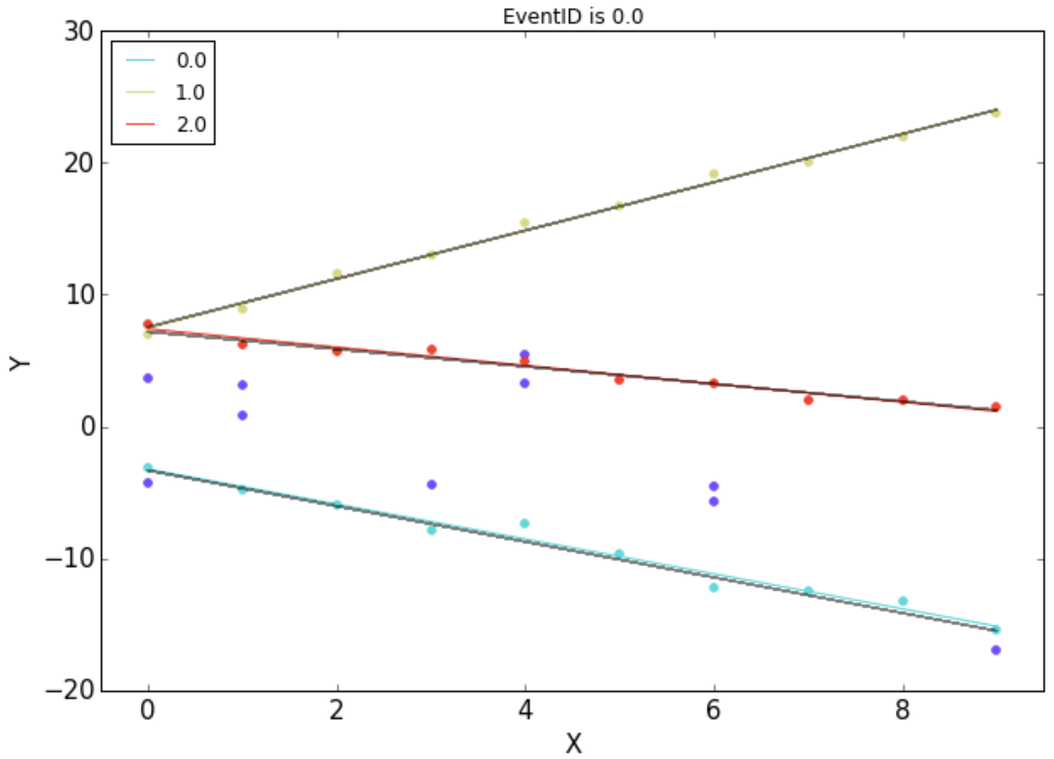
Problem Formulation

- For a given set of points find smooth curves such as straight lines, circles, etc.
- Estimate the lines parameters
- Estimate the point which belong to the lines

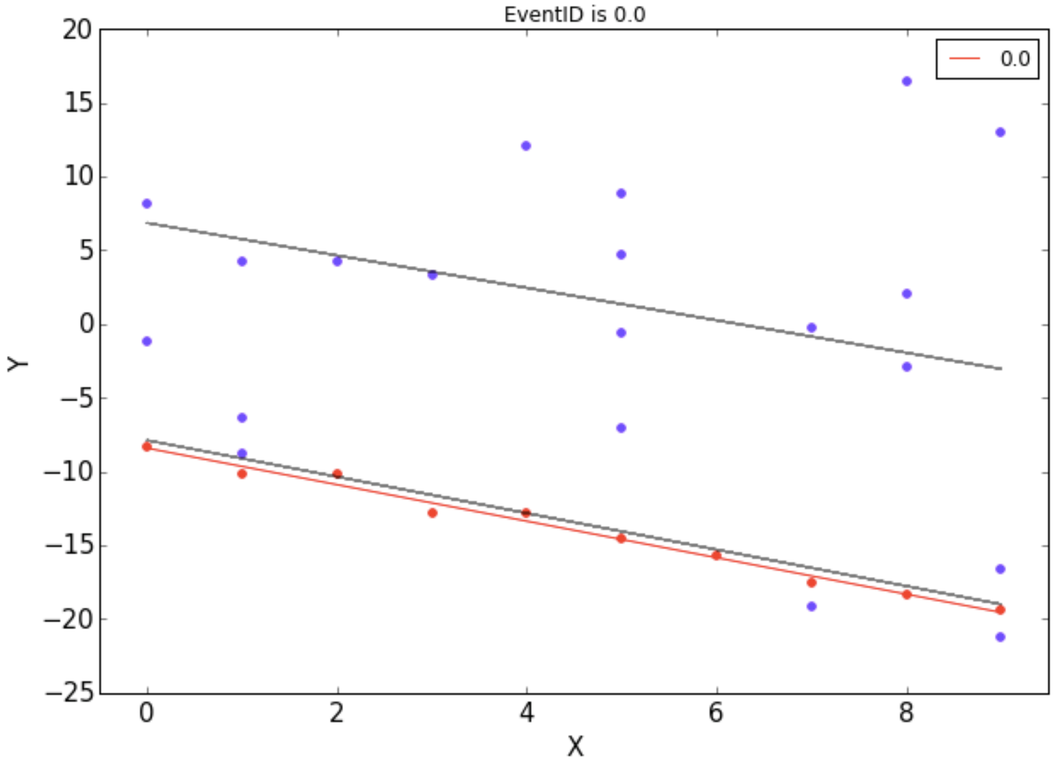


Simple Template Matching

Simple Template Matching. Demonstration.



Well tuned algorithms finds tracks with hight reconstruction efficiency and small ghost and clone rates.



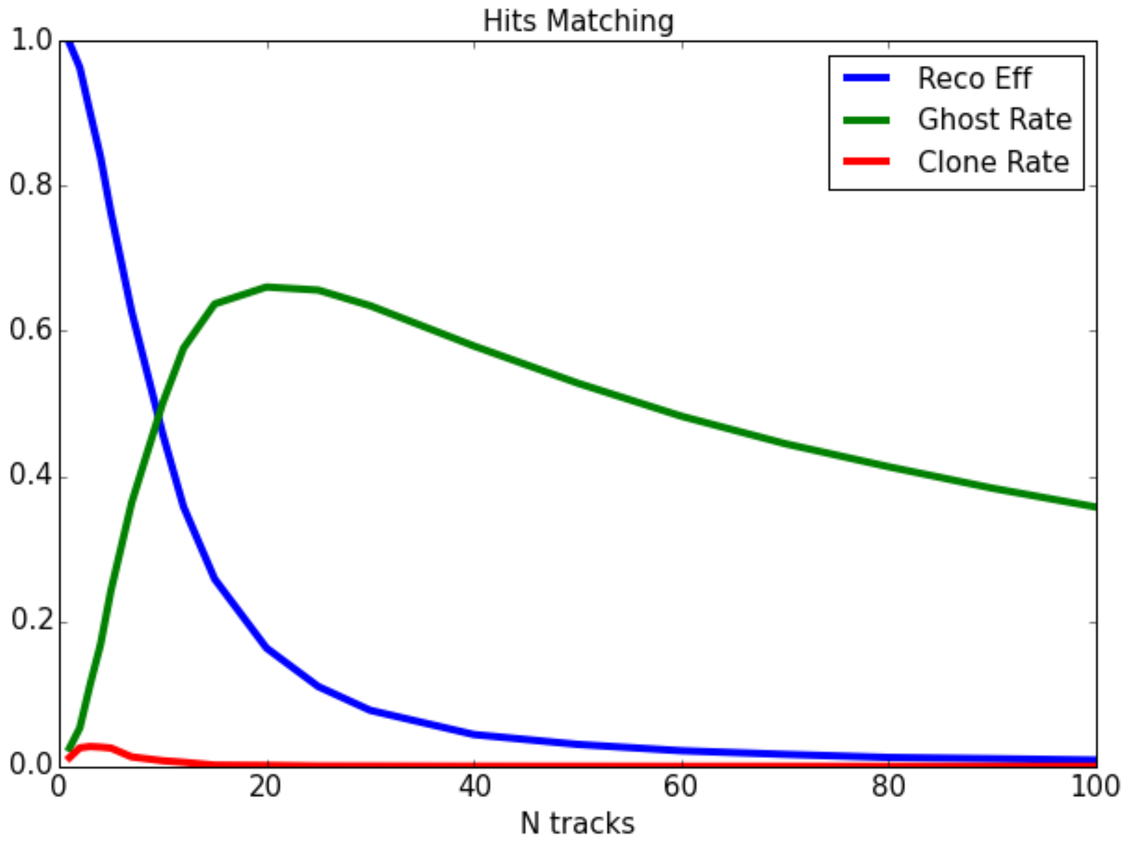
Increasing the window width or/and decreasing minimum number of hits for a track lead to growth of number of ghost.

Simple Template Matching. Demonstration.

Hits matching is used to measure the tracks recognition quality.

With increasing the number of tracks the track candidates contains more hits from different true tracks. This leads to decreasing the reconstruction efficiency (to zero) and increasing the ghost rate.

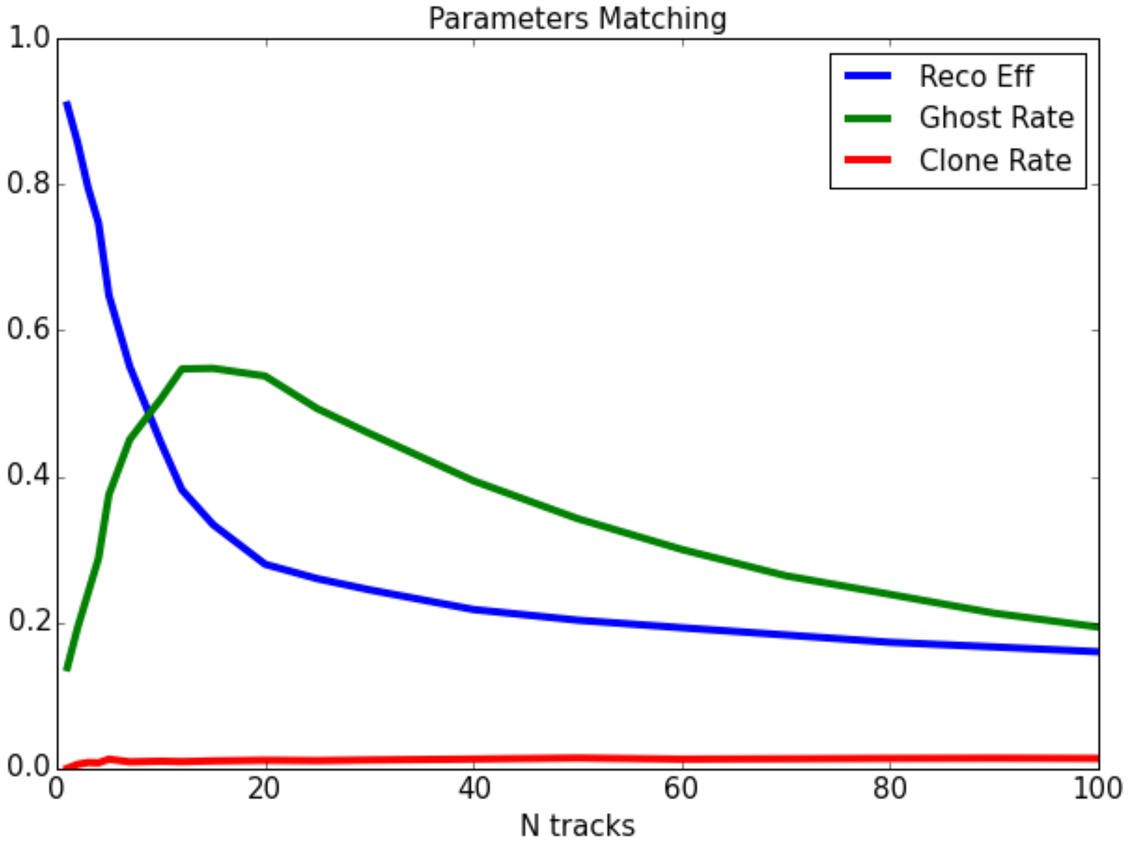
Moreover, due to the constant window width the algorithm finds less track candidates with increasing the number of the true tracks. This leads to decreasing the reconstruction efficiency and the ghost rate for the large number of true tracks.



Simple Template Matching. Demonstration.

Parameters matching is used to measure the tracks recognition quality.

In contrast with the hits matching, the reconstruction efficiency based on the parameters matching does not fall so quickly in large number of tracks. This is due to that the algorithms finds track candidates with parameters close to the true tracks ones.



The Radon Transform

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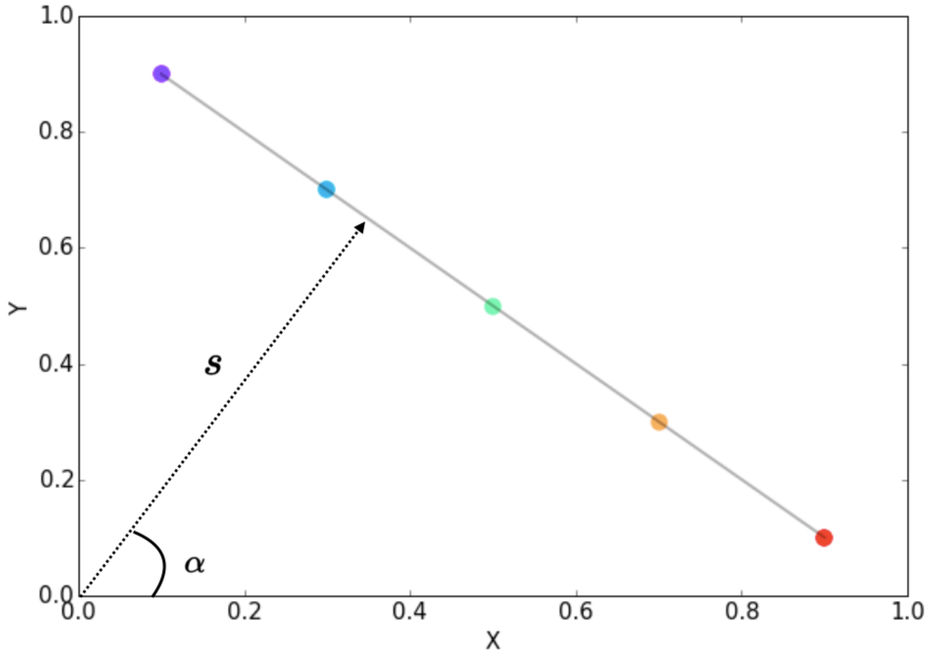

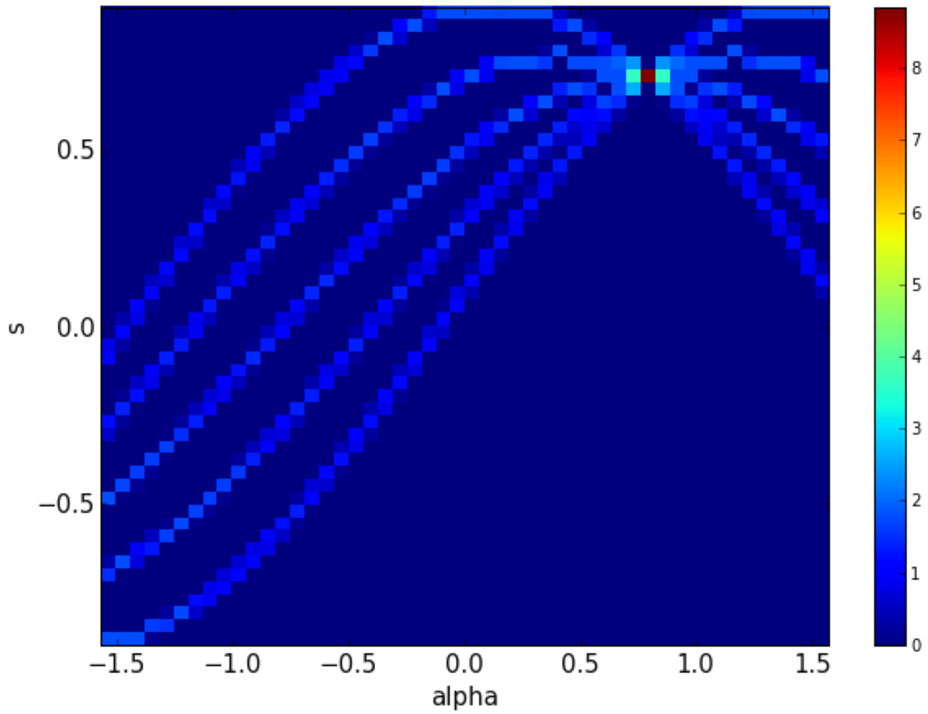

The point in (a, s) space with maximum value of the Rf(x,y) corresponds to the track's parameters.

The Denby-Peterson Method

The Denby-Peterson Method. Demonstration.