Contribution ID: **6** Type: **not specified**

Young Scientist Forum : Bivariate normal distribution for finding inliers in Hough space for a Time Projection Chamber

Wednesday, 8 March 2017 16:00 (15 minutes)

A Time Projection Chamber (TPC) is foreseen as the main tracking detector for the International Large Detector (ILD) one of the two detectors for the next candidate collider named International Linear Collider (ILC).

GridPix, which is a combination of micro-pattern gaseous detector with a pixelised readout system, is one of the candidate readout systems for the TPC [1]. One of the challenges in the track reconstruction is the large numbers of individual hits along the track (around 100 per cm). Due to the small pixel size of 55 x 55 μm^2, the hits are not consecutive. This leads to the challenge of assigning the individual hits to the correct track. Hits within a given distance from a reconstructed track are called inliers. Consequently, finding inliers within the many hits and noise is difficult for pattern recognition and this difficulty is increased by diffusion effects in the TPC.

One of the current algorithms which is utilized for track finding is the Hough transform. Using *bivariate normal distribution* based on the covariance matrix calculated from the diffusion defects improves collecting inliers in the Hough space directly [2].

References

[1] Michael Lupberger.
The Pixel-TPC:
*A feasibility study.*PhD thesis in Physik
Bonn University, Germany, Bonn, August, 2015.

[2] Leandro A.F.Fernandes, Manuel M .Oliveira.
*Real -time line detection through an improved Hough transform voting scheme.*Universidade Federal do Rio Grande do Sul-UFRGS, Instituto de Informática-PPGC, CP 15064 CEP 91501-970 Porto Alegre, RS, Brazil, Germany, Received 2 September 2006; received in revised form 6 March 2007; accepted 13 April 2007.

Primary author: Mr NOORI SHIRAZI, Amir (Siegen University)

Co-author: FLECK, Ivor (Universitaet Siegen (DE))

Presenter: Mr NOORI SHIRAZI, Amir (Siegen University)

Track Classification: 0 : Algorithms and theoretical analysis