Subject: Tracking discussion
Posted by StefanoSpataro on Wed, 25 Sep 2013 14:08:20 GMT
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Dear all,
since the tracking discussion in Bochum was somehow cut in the middle, I would propose to continue here in the forum, and to discuss also in the next SeeVogh meeting, next Monday, 30th September.

Andreas put this table in wiki:

http://panda-wiki.gsi.de/cgi-bin/view/Computing/PandaRootDetectors#TRACK ING

My general impression is that we have "a lot" of manpower in tracking, but not equally distributed. Many people, many packages, but I believe we should try to focus on some goals.

In particular:
a) there is only one guy involved in forward tracking, all the others are working on barrel tracking.
b) only one algorithm considers time based stream, all the others not.
c) there are many new algorithms, without completing the old ones.

The triplet finder was the only one using time information, but if I have understood well Marius left and nobody will continue it.

I think more people should be involved in the forward, and we should close algorithm w/o time and focus on time based reconstruction. The objections of the referees for STT were about t0 determination, and I have not seen any algorithm solving it in practice, Peter proposed his method which was never implemented (as far as I know, maybe in the triplet finder?).

In this sense new algorithms (even for new hardware, FPGA, GPU,...) not using time information are, my opinion, a bit dangerous, since in general people tends to continue to improve the algorithm instead of evolving towards our data stream. And without daq we will have no data.

About forward, I would like to see more people joining this part, but this will be hard

Moreover, we should define a strategy on:
a) how to retrieve the MC truth of one track. At present the PndMCTrackAssociatorTask is used in the standard reconstruction, but FairLinks should be used. Who will implement such modification?
b) how to assign a track to a MC particle, to evaluate efficiency and resolution, in particular when more particles produce hits in the same track, and when the same particle is reconstructured in more than one track
c) which track selections to have good quality track? At least XX number of hits? At least X hits in parallel and Y in skewed hits? fitted? non fitted?
d) standard task for all the tracking objects, to have the same efficiency/resolution definition.

These are just my informal thoughts, I would like to listen to your opinions about.

Regards

Subject: Re: Tracking discussion
Posted by Andreas Herten on Thu, 26 Sep 2013 07:06:29 GMT
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Hey Stefano,

first off: We might have a few people involved in tracking, but I think every person fellows their research into individual approaches / niches. So, IMHO, they are not all doing exactly the same. Anyway, you're absolutely right that manpower and things might not be as efficiently distributed among the PANDA tracking challenges as it could be and we should definitely exchange thoughts, results – and work.

Quote:b) only one algorithm considers time based stream, all the others not.
True. AFAIK only the Triplet Finder is built, right from the very basis of its algorithmic idea, around time-basedness. But I think there are more algorithms which can, in principle, use timed hits instead of event'ed hits. You are right, though, I don't know of anyone looking into that. Because, at least for me, that's another level of complicatedness on top of already complicated things .

Quote:c) there are many new algorithms, without completing the old ones.
I only can say something to this for my / our case in Jülich. We are looking into algorithms and, on the way, get better / more promising ideas. So we follow up on these ideas. At the moment we are still continuing researching in all algorithms we touch, though. Well, besides the Triplet Finder…

Quote:…but if I have understood well Marius left and nobody will continue it.
You have understood correctly. That was the reason I brought that up during the Bochum meeting. Maybe someone would have liked to continue working on this algorithm. At the moment, though, I have not heard from anyone.

Concerning your last points c) I think Tobias was looking into some paper write ups to see how other experiments / researchers are doing this. But probably he should continue on that.

In any case: I think we have a lot of things to talk about and to decide on about the future of tracking in PANDA. I'd like to meet up somewhere to discuss !

Subject: Re: Tracking discussion
Posted by MartinJGaluska on Thu, 26 Sep 2013 15:18:48 GMT
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Hello all,

concerning Stefano's discussion point b)
Stefano Spataro wrote on Wed, 25 September 2013 16:08
b) how to assign a track to a MC particle, to evaluate efficiency and resolution, in particular when more particles produce hits in the same track, and when the same particle is reconstructured in more than one track

I would like to draw your attention to a very nice paper by Rainer Mankel:
http://arxiv.org/abs/physics/0402039

Section 2.5 (Evaluation of Performance) deals with possible definitions of efficiency, clone and ghost rate. I believe that these definitions are in line with the ones which Tobias presented in his talk at the last tracking session in Bochum. The only differences are that Tobias suggested a finer distinction of the category "reconstructed track" and a slightly different definition for "reconstructable tracks" / "reference set". I would be in favor of using Tobias' / Mankel's suggestions as a basis also in order to have comparable definitions to the ones used in other experiments.

Kind regards,
Martin

Subject: Re: Tracking discussion
Posted by Gianluigi Boca on Thu, 26 Sep 2013 15:21:45 GMT
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Dear Stefano (and Andreas) I have a few remarks to your
message.

Stefano Spataro wrote on Wed, 25 September 2013 16:08
My general impression is that we have "a lot" of manpower in tracking, but not equally distributed. Many people, many packages, but I believe we should try to focus on some goals.

I disagree. I notice that as far as the Pattern Recognition is concerned, even if in principle there are people working
on it, in actuality almost always those persons are
involved in other projects at the same time and that has the consequence to slow down the PR they are working on.

Quote:
b) only one algorithm considers time based stream, all the others not.

In order to avoid misunderstanding, let me say that the PR I
am working on is exactly suited to deal with the realistic
experimental situation (== time based stream of hits) since
the PndTrkTracking task has embedded the possibility of switching on the
pileup hits from previous/subsequent DPM events.
It is true that in my case the time-based simulation is not yet used.
That is so because in order to function all PR (exctept the triplet finder) must have a T0.
Unfortunately a task providing the T0 is not yet present in Pandaroot (I have been preaching for the last year that we need someone to work on the T0 issue, see my presentations at the PANDA meetings).
I am going to say a couple of things on a possible T0 task in Pandaroot on Monday.

Cheers Gianluigi
