TRG information for new commer

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TRG open tasks for new commer

Task	Urgency	Technical difficulty	Rough timescale	Purpose
ECLTRG calibration (page14)	★★	★	0.5~1year	improve ECLTRG timing, energy resolution
ECLTRG MC performance study for high luminosity	★★★	★★	1~2year	investigate possible problem with high lumi, BG with MC and consider counter measure
Neural network on GRL	★	★★	1~2year	develop NN logic on GRL to improve signal/background separation with all subtrigger input
Versal (new FPGA candidate for UT5) test board study	★	★★	0.5~1year	play with new FPGA and confirm performance to judge if it can be used for UT5 and new board for ATLAS
DQM modification for TRG efficiency monitor with kinematic variables	★★	★	~0.5year	establish way of efficiency evaluation of CDC-ECL matching to reduce L1 rate
CDCTRG FE<->TSF direct connection, R&D of new tracking logic	★★	★★	~1year	modify TSF firmware to bypass MGR and test at Ehut. R&D of new logic with new CDCFE.
R&D of new CDCTRG logic for LS2 with upgraded CDCFE	★	★★	1~2year	develop new CDCTRG logic with enriched input information from upgraded CDCFE
KLMTRG firmware development	★★★	★★	1~2year	core developer responsible for KLMTRG firmware (taking over from Richard and Kurtis). commissioning new tracking algorithm, maintenance, trouble shooting during physics run.
CDCTRG 3DHough/NN development	★★★	★★★	1~2year	core software and hardware developer responsible for 3DHough/NN (taking over from Felix, Sebastian.) Design and optimize core logic with simulation. Implement it to FPGA, commissioning, maintenance.

-If you are interested, please contact Taichiro Koga frankly

-Tasks in LS1: https://confluence.desy.de/display/BI/task_list_LS1

TRG performance open tasks for new commer

-Slide at Performance meeting (page7)

- **Improvements to TSIM.** This will be easier once TSIM is firstly more thoroughly documented.
  - This will be an open service task very soon so interested groups should contact Chris.
- **Generic data/MC comparison of the response of the trigger to fundamental "objects", tracks, clusters, muons.**
  - The exact channels still need to be worked out.
  - Example studies: Cluster energy turn on curves. Tracking efficiencies.
  - Example channels: Radiative muons are a good example, $ee \rightarrow \mu\mu\gamma$.
  - Nobody has stepped up to do this yet, and overlaps well with dark sector and low multiplicity physics.
- **A sample analysis package is being put together show people how to measure their L1 trigger efficiency.**
  - We will want some physics groups to go through it and provide feedback when ready.

-If you are interested, please contact Christopher Hearty frankly

TRG related document

●Document of TRG system

Sorry, actually there are no good documents but let me share some materials..

-trigger system: https://www.phys.hawaii.edu/~idlab/taskAndSchedule/local_DAQ/main_update.pdf

-trigger system2: https://indico.inp.nsk.su/event/20/contributions/933/attachments/618/705/20200225_Belle_L1_TRG.key.pdf

-trigger menu: https://www.dropbox.com/s/q7ocmli0zmlc2g8/koga_trg_2021_12_08.pdf?dl=0

-(for CDCTRG student) CDCTRG master thesis:

  -https://docs.belle2.org/record/2085?ln=en

  -https://docs.belle2.org/record/823?ln=en

●Example documents for TRG performance study

I picked up a few notes:

-tau efficiency study: https://docs.belle2.org/record/1944?ln=en

-single photon efficiency study: https://docs.belle2.org/record/1972?ln=en

-mumu efficiency study: https://docs.belle2.org/record/1917?ln=en

-trigger operation summary: https://docs.belle2.org/record/2817?ln=en

TRG related Meetings

○TRG meeting, every Thursday 10:30-12:00 or 16:00-18:00 (JST)
- -trg@belle2.org
- -https://confluence.desy.de/display/BI/Trigger+Meetings?src=contextnavpagetreemode
- -main meeting of entire TRG group.

○TRG performance meeting, every other week Thursday 23:00-24:00 (JST)
- -physics-performance-trg@belle2.org
- -https://indico.belle2.org/event/6552/
- -physics performance meeting dedicated for TRG.

○(optional)TRG KEK local meeting, every Monday 17:00-18:00 (JST)
- -trg-local-kek@belle2.org
- -https://confluence.desy.de/display/BI/Trigger+japanese+student+meeting
- -local meeting with a few students and postdoc working with Koga to discuss the weekly progress frankly

subscribe to the above mailing lists from sympa (https://lists.belle2.org/sympa/home)