Analysis train

M.Gheata

ALICE offline week, 17 March '09

Issues for the analysis train

- Most analysis in AliRoot migrated to AliAnalysisTask model
  - Big diversity of implementations…
    - Tasks in common PWG libraries or compiled run time
    - A lot of analysis macros, for every run mode, some not usable anymore
- Analysis configuration loaded in many ways
  - Macros, helper classes, hardcoded in the tasks, …
  - Makes analysis hardly reproducible
- Only some analysis tasks run on AOD data
- Par files are over-used

Current snapshot

NOTE: this table is not complete and will be update as soon as the developers report the correct status

Group	class	Comment	Input	Output	local	CAF	GRID
PWG0	AlidNdEtaTask	First physics	ESD/MC	Histograms	OK	OK	OK
PWG0	AlidNdEtaCorrectionTask	First physics	ESD/MC	Histograms	OK	OK	OK
PWG0	AliMultiplicityTask	First physics	ESD/MC	Histograms, Ntuple	OK	OK	OK
PWG1		Reconstruction			N/A	N/A	N/A
PWG2	AliAnalysisTaskProtons	p/pbar analysis	ESD/AOD/MC	Histograms, CF containers	OK	OK	OK
							OK
							OK
							?
							OK
							?
PWG2	AliAnalysisTaskFlowEvent + tasks using info from this	Flow analysis	ESD/AOD/MC	AliFlowEventSimple + QA hists Histograms	OK	OK	OK
PWG2	AliRsnAnalysisSE	Resonances analysis	ESD/MC	Histograms	OK	OK	OK
PWG3	AliAnalysisTaskSEVertexingHF	HF vertexing	ESD/AOD	delta AOD	OK	OK	OK
PWG3	AliAnalysisTaskESDMuonFilter	MUON filtering	ESD	AOD+ (adding muons to tracks)	OK	OK	OK
PWG3	AliAnalysisTaskFromStandardToMuonAOD	MUON AOD	AOD	new AOD with muons only	OK	?	?
PWG4	AliAnalysisTaskParticleCorrelation + different plugged-in analysis	Particle correlations	ESD/AOD/MC	AOD+ (adding pi0, gamma) Histograms	OK	OK	OK
PWG4	AliAnalysisTaskJets	JETAN	ESD/AOD/MC	AOD+ (reconstructed jets) Histograms	OK	OK	OK

There are more tasks in AliRoot. If they do not appear here it is because the responsibles did not asked us to check them in train mode.

Old train

- Approach: maintain a train macro running in all modes
  - Wagons added and configured based on pieces of code picked-up from user macros
  - Tested after each new task inclusion
- Any new train version became obsolete quickly due to the fast development of analysis code
  - Still helped a lot for migrating to the framework
- Impossible to maintain in future
  - Too many analysis tasks and styles
  - We need something that does not depend on the changes in the analysis code

New approach

- Adopt a uniform style towards self-configured wagons that get attached to the main train created in the steering macro
  - Using analysis task macros under PWG repository space and responsibility
- Main train "picking" wagons and running on relevant data after this is produced
  - Results accessible from a common place
- All modified configuration files patched very frequently into the release and made available in AliEn

Practical how-to

- The steering macro *AnalysisTrainNew.C* creates the analysis manager + event handlers, defines the input data and analysis mode
- Each wagon task provides a macro AddTaskXXX.C
  - Implement a method *AliAnalysisTaskXXX *AddTaskXXX()* that follows some standard steps to create, configure and connect the task to an existing analysis manager
  - The data containers are also connected from this macro
    - Introduced common input and output containers for ESD and AOD
- Each macro should be in SVN, kept in sync with task code
- Tasks should be compiled in libs, train will run with libraries
- The train macro will also be available in SVN

Steering code functionality

- Define analysis type and which wagons are included

```
Int_t iAODanalysis = 0;          Int_t iAODhandler = 1;          Int_t iESDfilter = 1;
Int_t iJETAN = 1;                Int_t iPWG4partcorr = 0;        Int_t iPWG2spectra = 1; …
// Create analysis manager and attach handlers
AliAnalysisManager *mgr = new AliAnalysisManager("Analysis train");
if  (iAODanalysis)  mgr->SetInputEventHandler(new AliAODInputHandler());
else                mgr->SetInputEventHandler(new AliESDInputHandler());
```

- Load libraries and define chain or dataset

```
if (iJETAN) gSystem->Load("libJETAN.so");
if (iPWG2spectra)   {   gSystem->Load("libCORRFW");      gSystem->Load("libPWG2spectra");}
TChain *chain = CreateChain();
```

- Load wagon macros and start analysis

```
if (iJETAN) {
  gROOT->LoadMacro("AddTaskJets.C");
  AliAnalysisTaskJets *taskjets = AddTaskJets();}
mgr->StartAnalysis(mode, chain);
```

AddTaskXXX template

```
AliAnalysisTaskJets *AddTaskJets() {
// Get static access to analysis manager
   AliAnalysisManager *mgr = AliAnalysisManager::GetAnalysisManager();
   if (!mgr) {::Error("AddTaskJets", "No analysis manager"); return NULL;}
// Check for the analysis type. Can be "ESD" or "AOD"
   TString type = mgr->GetInputHandler()->GetDataType();
// Create the task and configure it
   AliAnalysisTaskJets *jetana = new AliAnalysisTaskJets("JetAnalysis");
   mgr->AddTask(jetana);
//… configuration according analysis type via task or helpers interface follows…
   AliUA1JetFinderV1 *jetFinder = new AliUA1JetFinderV1();   …
// Create only output containers of this task and connect to common ones
   AliAnalysisDataContainer *cjet = mgr->CreateContainer("cjet", TList::Class(),
                                    AliAnalysisManager::kOutputContainer, "jethist.root");
   mgr->ConnectInput(jetana, 0, mgr->GetCommonInputContainer());
   mgr->ConnectOutput(jetana, 0, mgr->GetCommonOutputContainer());
   mgr->ConnectOutput(jetana, 1, cjet);
   return jetana;
```

More details on:

http://aliceinfo.cern.ch/Offline/Activities/Analysis/AnalysisFramework/NewTrain.html

Status and to do's

- Macros AddTaskXXX.C made and tested for a number of tasks
  - ESD filters, proton analysis, jet analysis, resonances
  - Work has to continue at level of each PWG
- We are testing a small train in all modes before adding it in SVN
  - Should run soon regularly
- Template for AddTaskXXX + instructions to use published on analysis pages
  - Please have a look: only tasks that provided the AddTaskXXX macro can be tested with the new train
- Please contact us if you have questions on how to implement these macros