Feicim
A browser for data and algorithms

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For

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Overview

1. Motivation
2. Functions
3. Software architecture
4. Demonstration
5. Conclusions and outlook
Rationale for Feicim

Image of “How physicists make measurements”

- View and understand detector level variables
- View and verify higher level quantities
- Create and view physics quantities
- Analyse physics quantities
- Create, view, analyse control channels/systematics
- Present, review and publish result
Rationale for Feicim

Image of “How physicists make measurements”

View and understand detector level variables

View and verify higher level quantities

Create and view physics quantities

Analyse physics quantities

Create, view, analyse control channels/systematics

Present, review and publish result

Reality: All of that, BUT...

- Approx. 6 months to get comfortable with code
  - Data set discovery
  - Data discovery
  - Algorithm discovery

- Time spent finding and extracting information, particularly
  - During commissioning / detector understanding phase
  - For new-comers
What is Feicim? (Irish for “I see”)

Feicim will be a browser for...

1. Data-files (DSTs) location and content
   - Locate data (interface to Grid)
   - View data and histogram variable(s)
   - Simple filtering

2. Algorithms and tools
   - View existing algorithms/tools
   - Create new algorithms/tools

3. Analysis jobs
   - Combine algorithms (visually)
   - Output subset of DST as a Root file or MicroDST
   - Run on grid using Ganga/Dirac
**Browse data location**

- **CERN data (via Grid)**
- **Find data-files on Grid or local machine**
- **Local data**
Data browsing

- DST represented as tree
  - Selection with box ticking
    - Histograms
    - NTuples
  - Simple selection/filtering can also be done
Browsing algorithms and tools (Concept!)

Algorithm/tool list

Editing workspace

Drag algorithm from list into workspace for editing
Browsing algorithms and tools

Algorithm/tool list

Editing workspace

Click on algorithm box to see/configure parameters
**Overview**

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### Functions

- **Browser for analysis jobs**
  - View jobs
  - Run jobs → To Grid (using Ganga/Dirac)
  - Connect algorithms together (built in type checking)
  - Choose number of evts and submit to Grid
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Software architecture (for data browsing)

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Software architecture (for data browsing)

Feicim can be used via a GUI or a Python console

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LHCb
Software architecture (for data browsing)

DST’s are located (on Grid) using a Name Server and loaded using Bender as an interface to the LHCb software framework.
Software architecture (for data browsing)

- Java
- Python
- Native
- Data

Associated DST and object meta-data is loaded
The data stored in the DST is put into a database using MySQL.
The user can now:

➤ examine the data
➤ perform simple filtering
➤ create histograms/NTuples (ROOT)
➤ create MicroDST’s (LHCb software)
See these URLs for videos:

http://www.ucd.ie/physics/lhcb/dget/demo.htm
http://www.ucd.ie/physics/lhcb/dget/demo1.htm
Choose between local or CERN file-space

Clicking is highlighted in red
Demonstration

Browse CERN file-space

Clicking is highlighted in red
Demonstration

Browse CERN file-space

Clicking is highlighted in red
Demonstration

Browse CERN file-space

Feicim Demo

Intranet settings are now turned off by default. Intranet settings are less secure than internet settings. Click for options...

Clicking is highlighted in red
Demonstration

Browse CERN file-space

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Demonstration

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LHCb
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Demonstration

Browse CERN file-space

Clicking is highlighted in red
**Demonstration**

**Browse CERN file-space**

In Intranet settings are now turned off by default. Intranet settings are less secure than Internet settings. Click for options...

In Feicim Demo, clicking is highlighted in red.
Demonstration

Browse CERN file-space

Clicking is highlighted in red
Demonstration

Browse CERN file-space

Feicim Demo

Menu

Files

Query result

name

[P02_Gauss - v15r11]
[P02_ANY]

Clicking is highlighted in red
Demonstration

Browse CERN file-space... view DSTs available

Clicking is highlighted in red
Demonstration

Choose DST

Clicking is highlighted in red
Demonstration

Read in 10 events
Demonstration

LHCb software working in background

Clicking is highlighted in red
**Demonstration**

10 events loaded... explore data

Clicking is highlighted in red
Demonstration

Browse MC particles

Clicking is highlighted in red
**Demonstration**

Browse MC particle momenta

Clicking is highlighted in red
Demonstration

Select Pz

Clicking is highlighted in red
Click query button

Clicking is highlighted in red
LHCb Overview

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View query result

Clicking is highlighted in red
Right click on Pz column and make histogram
Demonstration

View histogram

Clicking is highlighted in red
Select more variables (Px and Py)

Clicking is highlighted in red
LHCb Overview

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CHEP 2007

Motivation    Functions    Software architecture    Demonstration    Conclusions and outlook

Clicking is highlighted in red
Demonstration

Histogram Py

Clicking is highlighted in red
Demonstration

View histogram

Clicking is highlighted in red
Demonstration

Selection criteria can be applied

Clicking is highlighted in red
Save table as NTuple by clicking ‘Export’
Motivation

Functions

Software architecture

Demonstration

Conclusions and outlook

Clicking is highlighted in red

Save NTuple to local directory
Conclusions and outlook

➤ Feicim will reduce computing overhead for physicists
  ➤ Faster, intuitive access to data
  ➤ Particularly useful for new users
  ➤ Encourages data exploration (aids with detector commissioning)

➤ Will allow data browsing and analysis to be done visually
  ➤ Output as NTuple or MicroDST
  ➤ Job submission to Grid (via Ganga/Dirac)

➤ Partially complete, work in progress!
Currently

Fully tested

1. Data-file (DST) browser
   ➤ Can view any DST variable as a histogram
   ➤ Simple filtering

2. Algorithm browser
   ➤ View existing algorithms
   ➤ Create new algorithms

3. Analysis tool
   ➤ Combine algorithms (visually)
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   ➤ Potential to run on grid using Ganga/Dirac
Future work

In testing...

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