
Subject: Overview of Different Methods of Running Over TTree / TNTuple

Posted by [Andreas Herten](#) on Mon, 23 Jun 2014 12:47:52 GMT

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There are different methods you can employ when running over ROOT's TNTuples and TTrees to generate plots for your work: Loop over every single branch with `tree->SetBranchAddresses`, or just take all entries and project them onto a histogram, either with `tree->Draw()` or `tree->Project()`.

I was interested in the pros, the cons, and the performances.

So I dug into analyzing TTrees and compared different approaches.

Here's my result: <http://static.andreasherten.de/2014/06/23/ROOT-NTuple-Analysis.html> -- a summary follows.

Do you do anything differently when analyzing trees? Do you know of any cool shortcuts? Or ways to do things more efficiently? I love to hear them in the replies.

Summary:

All links go to the corresponding sections on the detailed page.

The most explicit way to get to the data in a TTree's branch is this:

```
float value;
tree->SetBranchAddresses("branchValue", &value);
for (int i = 0; i < tree->GetEntries(); i++) {
    tree->GetEntry(i);
    std::cout << value << std::endl;
}
```

In the loop, `value` can be used to fill a histogram, to print, to create a `TLorentzVector` for further analysis, ... This requires a lot of temporary variables, has a loop and is, in general, quite a lot of code. A speed-up can be gained by disabling individual, not-used branches with `SetBranchStatus`, more structured code can be achieved when creating small structs as data containers for your variables (e.g. for all daughter particles).

ROOT offers a shortcut to get data from a branch to one's own histogram. `Project` and `Draw`. The following two statements are equal:

```
TH1F * hist = new TH1F("hist", "Very Histogram", 100, 0, 1.0);
tree->Project("branchValue", "hist");
tree->Draw("branchValue >> hist");
```

If you don't want a TCanvas popup when invoking `Draw`, add a "goff" as a third parameter. Accessing values in branches like this is very efficient and has only few lines of code. You can `Project/Draw` under conditions (`Project("branchValue", "hist", "branchValue > 23 && branchValue < 1337")`) and do more sophisticated stuff when also employing `TEntryLists`.

Performance: When running in macro (uncompiled) mode, `Project/Draw` is two times faster than the other approach. When running compiled (with `root macro.C++`), the explicit variable declaration is two times faster. At least for my tested example case.
