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Improving Software Quality of the ALICE Data-Acquisition System through Program Analysis

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The Data-Acquisition System designed by ALICE, which is the experiment dedicated to the study of strongly interacting matter and the quark-gluon plasma at the CERN LHC (Large Hadron Collider), handles the data flow from the sub-detector electronics to the archiving on tape. The software framework of the ALICE data-acquisition system is called DATE (ALICE Data Acquisition and Test Environment) and consists of a set of software packages grouped into main logic packages and utility packages.

In order to assess the software quality of DATE, and review possible improvements, we implement PAF (Program Analysis Framework) to analyze the software architecture and software modularity. The basic idea about PAF is recording the call relationships information among the important elements (i.e., functions, global variables, complex structures) firstly and then using the different analysis algorithms to find the Crosscutting Concerns which could destroy the modularity of the software from this recording information.

The PAF is based on the API of Eclipse C/C++ Development Tooling (CDT) because the source codes of DATE framework is written in C language. The CDT project based on the Eclipse platform provides a fully functional C and C++ Integrated Development Environment. The PAF for DATE could also be used for the analysis of other projects written in C language.

Finally we evaluate our framework through analyzing the software system of DATE. The analysis result proves the effectiveness and efficiency of our framework. PAF has pinpointed a number of possible optimizations which could be applied to DATE and help maximizing the software quality.

Student? Enter 'yes'. See <http://goo.gl/MVv53>

yes

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