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SMI++ Object Oriented Framework used for automation and error recovery in the LHC experiments

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In the SMI++ framework, the real world is viewed as a collection of objects behaving as finite state machines. These objects can represent real entities, such as hardware devices or software tasks, or they can represent abstract subsystems. A special language (SML) is provided for the object description. The SML description is then interpreted by a Logic Engine (coded in C++) to drive the Control System. This allows rule based automation and error recovery. SMI++ objects can run distributed over a variety of platforms, all communication being handled transparently by an underlying communication system - DIM. This framework has been first used by the DELPHI experiment at CERN since 1990 and subsequently by BaBar experiment at SLAC since 1999 for the design and implementation of their experiment control. SMI++ has been adopted at CERN by all LHC experiments in their detector control systems as recommended by the Joint Controls Project. Since then it has undergone many upgrades to cater for varying user needs. The main features of the framework and in particular of SML language as well as recent and near future upgrades will be discussed. SMI++ has, so far, been used only by large particle physics experiments. It is, however, equally suitable for any other control applications.

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