Pairwise Testing Revisited for Structured Data with Constraints

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Résumé

Pairwise testing (PT) exercises the interactions of pairs of input parameters. The approach is classically defined for a flat set of parameters, the number of which is fixed. Such a definition does not fit well with applications that process structured data like XML and JSON documents. This paper revisits the PT concepts to accommodate hierarchical data structures. The choices and pairs are created by considering the multiplicity of data instances, their access paths and common ancestors. The revised PT approach is implemented on top of on a recent data generation tool, TAF. TAF mixes random sampling and constraint solving to produce diverse data from XML-based models. Our PT implementation interacts with TAF by inserting pair coverage constraints into the models. It monitors overall coverage progress by XPath queries on the data returned by TAF. The approach is demonstrated for two data models: a 3D scene for an agricultural robot, and a population of taxpayers for a tax management system.

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