

先端科学技術研究科 修士論文要旨

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論文題目	Test Case Generation for Python Libraries Using Execution Traces of Client Projects' Test-Suites		
要旨			
<p>Software developers often leverage open-source libraries to accelerate their development processes. The reliance on libraries makes libraries' quality increasingly important. Although most modern libraries have their own tests to maintain quality, these tests are not perfect, and writing effective tests is both difficult and time-consuming. Automatic test generation techniques have been studied as a means of generating effective tests with less effort, however, automatic test generation for dynamically typed languages, such as Python, is a challenging task due to the lack of type information. This paper proposes a test case generation method for Python libraries. By instrumenting both the library and its client projects, we gather execution traces that capture what data is passed to the library, as well as what data is returned from the library during the tests' execution of the client project. These traces are then employed to reconstruct how the library is used in practice, enabling the generation of test cases that accurately reflect real-world usages of the library. We evaluate the proposed method using three open-source Python libraries, each with three client projects. The evaluation is conducted by measuring line coverage of the generated test cases along with the original test cases in the library. The proposed method achieved coverage improvements for all target libraries, demonstrating its potential to generate effective test cases for Python libraries.</p>			