

先端科学技術研究科 修士論文要旨

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要旨			
<p>This study proposes a method to assess the reproducibility of Jupyter Notebook files using execution traces.</p> <p>Jupyter Notebook is a popular tool for sharing scientific findings which can be replicated. However, scientists cannot verify whether shared Jupyter Notebook files are not able to reproduce the original results because the files may produce different results for each execution.</p> <p>To address this issue, this study proposes a method to automatically compare execution traces, such as API calls, while ignoring non-deterministic execution traces.</p> <p>This thesis has conducted an experiment to compare the proposed method with an existing method with two datasets: Jupyter Notebook files on Kaggle and GitHub.</p> <p>The Kaggle dataset consists of 368 Notebook files sharing scientific findings.</p> <p>The existing method can assess the reproducibility of 41.8% of the notebook files, although the proposed method makes it possible to assess the reproducibility of 77.4% of them.</p> <p>The GitHub dataset includes 936 non-scientific notebooks such as educational notebooks in addition to scientific notebooks.</p> <p>The existing method alone can assess the reproducibility of 77.6% of the notebook files, on the other hand, combining the existing method and the proposed method makes it possible to assess the reproducibility of 97.4% of them.</p> <p>The contribution of the paper is twofold. First, the proposed method is able to assess the reproducibility of Jupyter Notebook files with different output results for each execution, which is impossible to assess the reproducibility using an existing method. Secondly, combining the proposed method and the existing method make it possible to confirm the reproducibility of more Jupyter Notebook files than the existing method.</p>			