

Graduate School of Science and Technology Master's Thesis Abstract

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Thesis title	An Empirical Study on Removing Library Dependencies for Open Source Libraries		
Abstract			
<p>The widespread use of libraries within modern software ecosystems creates complex dependency networks. Libraries are useful for software developers to develop software projects, allowing them to avoid starting from scratch. However, these dependencies can be fragile, outdated, or redundant, potentially leading to cascading issues in dependent libraries. One mitigation strategy is reducing dependencies when problems occur. This thesis investigates dependency removal in the NPM ecosystem. By analyzing a dataset of 52,115 commits from 2,763 NPM libraries, I found that 58.92% contained at least one dependency removal before December 31, 2019. During the analysis, I examined the dependency history of each library and filtered the commits related to dependency removal. I then matched these filtered commits with their corresponding pull requests. The reasons for dependency removal were analyzed through commit messages, code changes, title and description of pull request. The analysis revealed that the most frequently removed dependency was lodash (71 times), with the primary reason being developers replacing the dependency with built-in functions or custom code. This finding highlights the origin of problems related to dependencies and offers valuable insights to guide software development practices. Additionally, this work suggests ideas for future research, such as creating tools to detect code that relies on specific dependencies within a project.</p>			