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1. **Towards Automatically Repairing Compatibility Issues in Published Android Apps**
Zhao, Yanjie; Li, Li; Liu, Kui; Grundy, John **Source:** *Proceedings - International Conference on Software Engineering*, v 2022-May, p 2142-2153, 2022, *Proceedings - 2022 ACM/IEEE 44th International Conference on Software Engineering, ICSE 2022*; **ISSN:** 02705257; **ISBN-13:** 9781450392211; **DOI:** 10.1145/3510003.3510128; **Conference:** 44th ACM/IEEE International Conference on Software Engineering, ICSE 2022, May 22, 2022 - May 27, 2022; **Sponsor:** Association for Computing Machinery (ACM); IEEE Computer Society; IEEE Technical Council on Software Engineering (TCSE); Special Interest Group on Software Engineering (SIGSOFT); **Publisher:** IEEE Computer Society

**Author affiliation:**
Monash University, Melbourne, Australia
Huawei, Hangzhou, China

**Abstract:**
The heavy fragmentation of the Android ecosystem has led to se-vere compatibility issues with apps, including those that crash at runtime or cannot be installed on certain devices but work well on other devices. To address this problem, various approaches have been proposed to detect and fix compatibility issues automatically. However, these all come with various limitations on fixing the com-patibility issues, e.g., can only fix one specific type of issues, cannot deal with multi-invocation issues in a single line and issues in re-leased apps. To overcome these limitations, we propose a generic approach that aims at fixing more types of compatibility issues in released Android apps. To this end, our prototype tool, Repair-Droid, provides a generic app patch description language for users to create fix templates for compatibility issues. The created tem-plates will then be leveraged by RepairDroid to automatically fix the corresponding issue at the bytecode level (e.g., right before users install the app). RepairDroid can support template creations for OS-induced, device-specific and inter-callback compatibility issues detected by three state-of-the-art approaches. Our experimental re-sults show that RepairDroid can fix 7,660 out of 8,976 compatibility issues in 1,000 randomly selected Google Play apps. RepairDroid is generic to configure new compatibility issues and outperforms the state-of-the-art on effectively repairing compatibility issues in released Android apps.


**Main Heading:** Android (operating system)

**Uncontrolled terms:** Android - Android apps - Automated program repair - Bytecodes - Compatibility issue - Description languages - Generic approach - Prototype tools - Runtimes - State-of-the-art approach

**Classification Code:** 723 Computer Software, Data Handling and Applications

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