

检索证明

经检索《Science Citation Index Expanded》（SCI-EXPANDED）数据库、《Journal Citation Reports》（JCR）数据库和《中国科学院文献情报中心期刊分区表升级版》，以下 1 篇文献的收录简要信息、期刊的影响因子及分区如下：

标题: FedDualFix: Hierarchical federated learning for adaptive multi-agent program repair via dual-modality modeling
作者: Ju, XL (Ju, Xiaolin);Liu, QY (Liu, Qingyun);Li, C (Li, Chang);Wang, HC (Wang, Haochen);Cao, HL (Cao, Heling);Chen, X (Chen, Xiang)
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Web of Science 核心合集中的“被引频次”：1 次
期刊《APPLIED SOFT COMPUTING》2025 年影响因子为 7.8。
经检索《中国科学院文献情报中心期刊分区表升级版》，2025 年分区如下：

刊名	APPLIED SOFT COMPUTING		
年份	2025		
ISSN/EISSN	1568-4946/1872-9681		
Review	否		
OA Journal Index (OAJ)	否		
Open Access	否		
Web of Science	SCIE		
	学科	分区	Top 期刊
小类	COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 计算机：人工智能	2	
小类	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS 计算机：跨学科应用	2	
大类	计算机科学	2	是

特此证明
(详细内容见附件)



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注：因 JCR 数据更新滞后，新出版论文的期刊影响因子以最新版 JCR 数据为参考。

第 1 条, 共 1 条

标题: FedDualFix: Hierarchical federated learning for adaptive multi-agent program repair via dual-modality modeling

作者: Ju, XL (Ju, Xiaolin);Liu, QY (Liu, Qingyun);Li, C (Li, Chang);Wang, HC (Wang, Haochen);Cao, HL (Cao, Heling);Chen, X (Chen, Xiang)

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摘要: Recent advances in large language models (LLMs) have enhanced automated program repair (APR) by interpreting failures, generating context-aware patches, and iteratively refining fixes, thereby improving repair accuracy and coverage. However, existing methods still face three key limitations: they often rely on centralized training on sensitive codebases; their pipelines are rigid, one-pass processes that cannot adapt to the complexity of a defect; and they do not fully exploit auxiliary semantic signals, such as bug reports or documentation. To address these challenges, we propose FedDualFix, a federated multi-agent repair framework that improves repair accuracy, efficiency, and semantic coherence in heterogeneous and data-locality-constrained environments. FedDualFix decomposes the repair process into specialized agents for (i) context modeling, (ii) semantic slicing, (iii) fault localization, (iv) patch generation, and (v) cross-modal alignment. A hierarchical controller with confidence-guided scheduling enables early exits for simple defects and triggers deeper, structure-aware reasoning for complex or ambiguous cases. Dual-modality alignment further associates code-level edits with natural-language descriptions to enhance semantic plausibility. Experiments on Defects4J using several LLMs, including GPT-4o, show that FedDualFix produces 58 correct repairs and achieves 52.1% Top-1 precision, outperforming representative APR baselines and a same-backend GPT-4o Direct baseline. The adaptive scheduling mechanism reduces inference time by more than 25%, and ablation studies demonstrate the contribution of hierarchical control, multi-agent design, and dual-modality integration. These results highlight the potential of combining federated coordination with adaptive multi-agent reasoning to support accurate and scalable APR in real-world software maintenance settings.

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