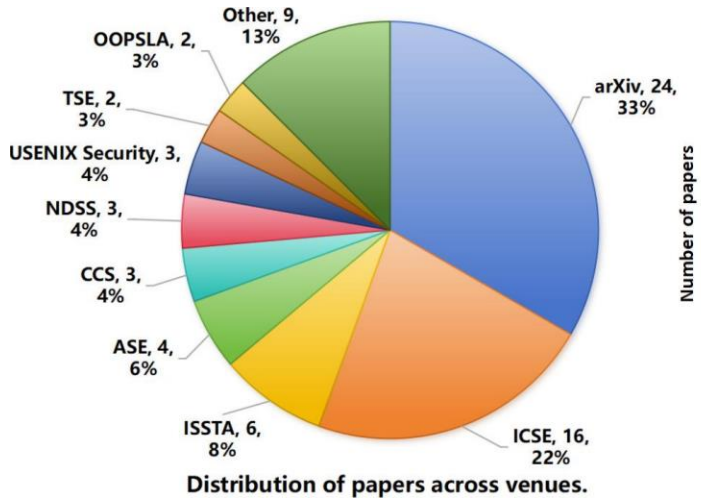
Software defect detection using large language models: a literature review

Yu CHEN, Yi SHEN, Taiyan WANG, Shiwen OU, Ruipeng WANG, Yuwei LI, Zulie PAN

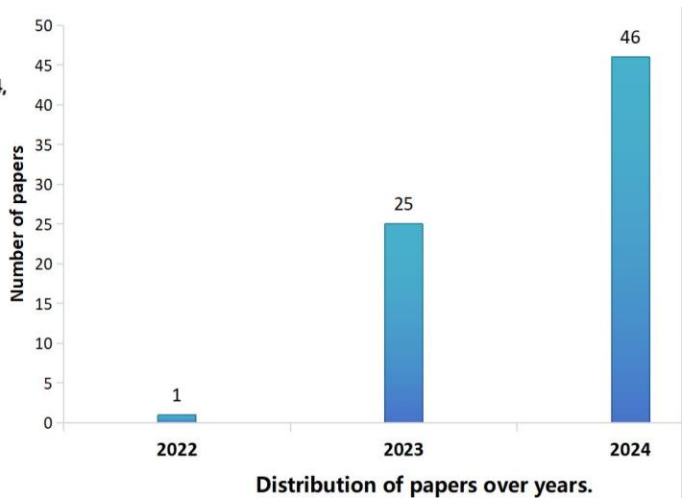
Frontiers of Computer Science, DOI: 10.1007/s11704-025-40672-2

Problems & Ideas

- Problems of inadequate investigation on the development of LLM-based software defect detection techniques:
  - Model Selection Criteria: Treating small models as LLMs.
  - Application Scope Limitation: Broad focus, not focused on defect detection.
  - Comprehensive Literature Timeframe: Failure to consider recent and up-to-date research.
- Ideas: We collect high-quality research papers focusing on LLM-based software defect detection, study the progress of related technology development, and predict the development prospects.



Distribution of papers across venues.



Distribution of papers over years.

Main Contributions

- Contributions:
  - We categorize and summarize existing research based on the distinct applications of LLMs in dynamic and static detection scenarios;
  - We analyze the LLMs utilized in the collected papers, the datasets employed, the target software addressed, and the technical performance outcomes;
  - We summarize the overall concepts and trends of existing research and propose potential directions for future LLM-based software defect detection studies.