

Bug Localization in Game Software Engineering: Evolving Simulations to Locate Bugs in Software Models of Video Games*

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Abstract. Video games have characteristics that differentiate their development and maintenance from classic software development and maintenance. These differences have led to the coining of the term Game Software Engineering to name the emerging subfield that intersects Software Engineering and video games. One of these differences is that video game developers perceive more difficulties than other non-game developers when it comes to locating bugs. Our work proposes a novel way to locate bugs in video games by means of evolving simulations. As the baseline, we have chosen BLiMEA, which targets classic software engineering and uses bug reports and the defect localization principle to locate bugs. We also include Random Search as a sanity check in the evaluation. We evaluate the approaches in a commercial video game (Kromaia). The results for F-measure range from 46.80% to 70.28% for five types of bugs. Our approach improved the results of the baseline by 20.29% in F-measure. To the best of our knowledge, this is the first approach that is designed specifically for bug localization in video games. A focus group with professional video game developers has confirmed the acceptance of our approach. Our approach opens a new research direction for bug localization for both game software engineering and possibly classic software engineering.

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