

# The Orthogonal Defect Classification-based Software Error Pattern Ontology Construction Researches

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**Abstract**—Orthogonal defect classification is a multi-dimensional measurement system with both qualitative and quantitative features, which is widely used in the software industry. However, the level of abstraction is high, which leads to limited semantic information. Therefore, it has a limited effect in the process of software engineering of complex software systems. To solve this problem, this paper first analyses the software error lifetime from the perspective of knowledge-based software engineering and presents the error generation model. Furthermore, based on the orthogonal defect classification, the concept of software error pattern is proposed, and its constituent elements and value sets are given. Moreover construct the software error pattern ontology in the requirements analysis phase, focusing on the elements such as “scenario”, “error-manifestation” and “solution”. The example verification part takes unmanned aerial vehicle flight control and management system software as an example to carry out the software requirements error pattern ontology representation and conducts software verification activities based on this and measures the development quality. The results show that the software error pattern can effectively guide the verification of complex software systems and measure the development quality. Therefore, the proposal of software error pattern is of great significance to improve the quality of software development and verification.

**Keyword**—orthogonal defect classification, software error, pattern; ontology, software-intensive systems



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