

Journal of Chinese Computer Systems, co-published by Chinese Academy of Sciences  
and China Computer Federation

To appear in 2016/02

## **A Container - Destructor – Explorer Paradigm to Code Smells Detection**

LIN Tao<sup>1</sup>, GAO Jian-hua<sup>1</sup>, FU Xue<sup>1</sup>, LIN Yan<sup>2</sup>

<sup>1</sup> (Department of Computer Science and Technology, Shanghai Normal University, Shanghai, 200234, China )

<sup>2</sup> (Department of Information System, The University of Auckland, Auckland, 92019, New Zealand)

**Abstract:** Software refactoring is increasingly significant in software engineering, besides it is a fundamental task for the detection of code smells being indefinite and non-quantitative for the purpose of refactoring. After essential concepts and signals are migrated to software engineering, the paper presents a detection paradigm, where the algorithm is based on dendritic cell algorithm in danger theory, which regards code smells as antigen. Software metrics values convert to the danger signal and the safe signal for processing, in which mature signal and semi-mature signal is calculated by weight equation. Code smells can be confirmed in comparison of relative values. Variety of code smells' priority is determined by mature context antigen value. There are lower false positive rates in the paradigm. The experiment proves that this approach is competitive effectiveness in F-score(0.784) as well as Kappa analysis (0.756) and outperformance compared to other detection technique.

**Keywords:** software refactoring; dendritic cell algorithm; software bug; software quality; artificial immune systems; danger theory