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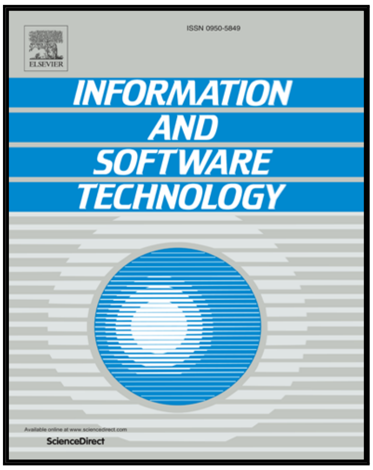

Cross Project Defect Prediction Using Class Distribution Estimation and Oversampling

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Cross Project Defect Prediction Using Class Distribution Estimation and Oversampling

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Abstract

Context: Cross-project defect prediction (CPDP) which uses dataset from other projects to build predictors has been recently recommended as an effective approach for building prediction models that lack historical or sufficient local datasets. Class imbalance and distribution mismatch between the source and target datasets associated with real-world defect datasets are known to have a negative impact on prediction performance.

Objective: To alleviate the negative effects of class imbalance and distribution mismatch on performance of CPDP models by using Class Distribution Estimation and Synthetic Minority Oversampling Technique. A novel approach called Class Distribution Estimation with Synthetic Minority Oversampling Technique (CDE-SMOTE) is proposed to optimize and improve the CPDP performance and avoid excessive oversampling.

Method: The proposed CDE-SMOTE employs CDE to estimate the class distribution of the target project. SMOTE is then used to modify the class distribution of the training data until the distribution becomes the reverse of the approximated class distribution of the target project. Four comprehensive experiments are conducted on 14 open source software projects.

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