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A STUDY ON DESIGN SOFTWARE DEFECT PREDICTION MODEL USING LSTM AND SWARM TECHNIQUES

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Abstract

Software defect prediction studies aim to predict defect-prone components before the testing stage of the software development process. The main benefit of these prediction models is that more testing resources can be allocated to fault-prone modules effectively. While a few software defect prediction models have been developed for mobile applications, a systematic overview of these studies is still missing. Therefore, we carried out a Systematic Literature Review (SLR) study to evaluate how machine learning has been applied to predict faults in mobile applications..The top five most preferred machine learning algorithms are Naïve Bayes, Support Vector Machines, Logistic Regression, Artificial Neural Networks, and Decision Trees. Researchers mostly preferred Object-Oriented metrics. This is the first study that Only a few studies applied deep learning algorithms including Long Short-Term Memory (LSTM), Deep Belief Networks (DBN), and Deep Neural Networks (DNN).It will pave the way for further research in mobile software fault prediction and help both researchers and practitioners in this field.

Keywords: software defect prediction[1], software fault prediction, deep learning, machine learning, Global Spider Algorithm, Long Short term Memory

Introduction

The ultimate aim of the research will be to design and develop a proposed software defect prediction model based on the proposed optimized deep learning-based time domain classifier named proposed Global spiders Algorithm-based Deep Long Short Term Memory (Global spiders Algorithm-based Deep LSTM)[1]. The proposed global spiders algorithm-based Deep LSTM will be developed with the integration of the proposed global spiders algorithm with the deep LSTM model in such a way that the tunable parameters of Deep LSTM will be optimally decided so that the performance of the software defect prediction will be enhanced. On the other hand, the dataset considered will be PROMISE dataset[7], which further boosts the prediction performance due to the specific and related features of defects and no-defects in the software. The proposed Global spider algorithm will be developed through integrating the features, like age-based foraging and social characteristics of spiders considered from the standard optimizations, like Social Spider Algorithm (SSA) and Ageist Spider Monkey Optimization Algorithm (SMO). Thus, the overall steps in this research include:

1. Feature selection
2. Software defect prediction using Optimized deep LSTM

The input data will be taken from the PROMISE DATASET[4] , which will be further subjected to the feature selection module, where the significant features will be directly selected from the dataset using the global spiders algorithm. The highly significant features relating to the defect and no-defects will be extracted using the feature selection step such that the computational

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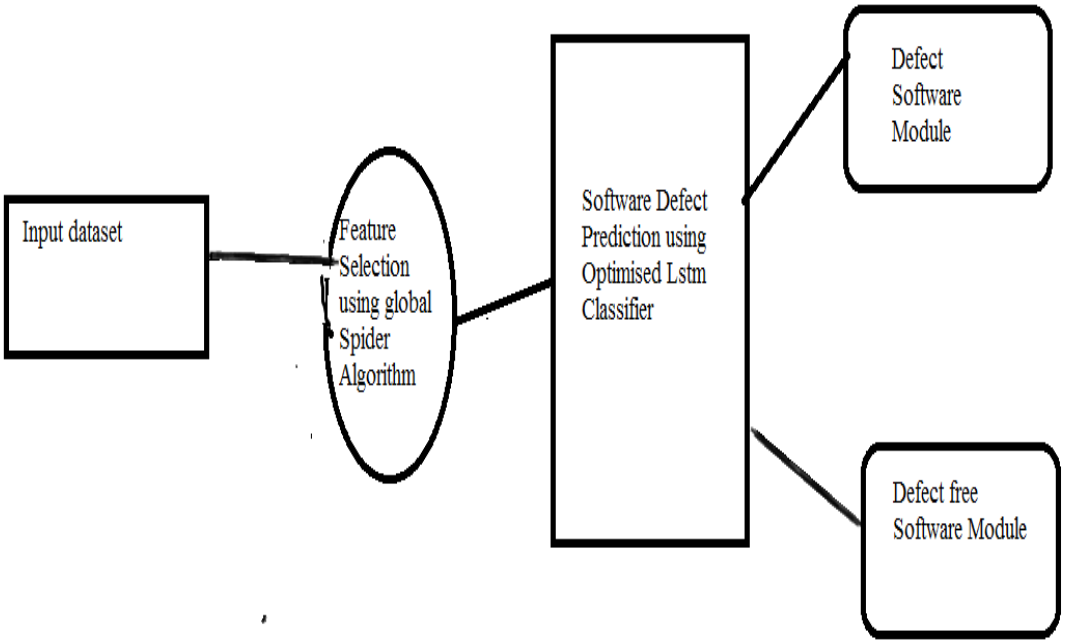
complexity will be further reduced. The final feature vector will be fed to the software defect prediction module, where the proposed Optimized deep learning classifier named as proposed global spiders algorithm-based Deep LSTM[11]. The implementation will be done in python and the comparative analysis of the proposed prediction model with respect to the existing models will be done based on the performance metrics, such as Accuracy, Precision, Recall, and F-Measure. The comparative methods employed for the analysis of the proposed method will be Linear regression model, Support vector machine, decision tree, NN, Social spider-NN, GWO-DBN, Spider Hunt-Deep CNN, and deep LSTM[5]. Figure1 shows the architecture of the proposed prediction model.

Figure 1: Block Diagram of the SDP Model



Conclusion

Early detection of software defects plays an important role in the software development cycle. In the automotive sector, development of software has largely adopted the model development paradigm that enables the easier integration of multi-provider functionality. Deficiencies are detected early and the intended functionality, robustness and compliance with model safety standards is verified and validated extensively – the quality and confidence of automotive software can be substantially improved. Effective approaches and instruments support cost reduction and reduction in development time. SDP is now dignified as a developing research zone using ML technologies. It is a challenging task to detect software failures during the first phase of SDLS, as well as to finance high-quality software systems. The main highlight in this paper were several methods for predicting defects such as integrated approach, cross-project

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model and machine learning algorithms. On the basis of the analysis, the best solution can be selected to analyze, predict and avoid all mistakes and their limitations.

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