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Sentiment Based Severity Prediction of Software Bugs

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ABSTRACT

A crucial stage of software development is software maintenance. To gather defects for improvements in the software application, developers, quality assurance engineers use bug tracking tools. Through such software defect tracking systems, users report defects and assign a severity level to such bugs. An essential characteristic of a bug that determines how soon it ought to be resolved. It enables developers to quickly fix significant bugs. The goal of this study is to address the existing challenges by automating the entire process of determining the severity level for newly reported bugs in order to replace manual severity determining.

This study provides an autonomous Emotion analysis based deep neural network-based approach for estimating the severity with multiple levels (Trivial, Blocker ,Critical, Enhancement, Major, Minor and Normal)of bug reports and also assess their priority level as high , medium and low. In this research first use natural language processing methods to preprocess the text of problem reports. Second, for each bug report, author calculate and assign an emotion score. Finally, inputs the emotion score of each bug report to a classifier built using a deep neural network to assess the severity and priority.

Using data from the Bugzilla bug tracking system and bug reports from the open-source projects Eclipse and Mozilla, the performance of the suggested approach was assessed. Performance is evaluated using the F1-Score, recall, accuracy, precision, and accuracy. The suggested method, which uses a DNN Multi class classifier combined with emotion analysis, has an accuracy rate for severity prediction models of 83.77% and for priority prediction models of 80.58%.

Keywords: Bug Severity, Multi classification, Deep Neural Network