Summary of the Paper

Link for the paper: - <https://ieeexplore.ieee.org/document/8665494>

Topic – Automatically Identifying Bug Entities and Relations for Bug Analysis

What is the paper about?

* The paper proposes an approach for automatically extracting bug entities and their relations from bug reports in bug repositories to support bug analysis activities such as bug understanding, localization, and fixing. The approach uses neural networks, specifically the Bi-LSTM-RNN model and dependency parser, to extract rich semantics and relations from the freestyle and noisy text in bug reports. The paper also presents the challenges faced in bug entity and relation extraction and provides a preliminary evaluation of the proposed approach.

What have they done?

* The authors propose an approach for automatically extracting bug entities and their relations from bug reports in bug repositories using a combination of the Bi-LSTM-RNN model and dependency parser. They manually examine the textual content of bug reports to define the classification categories of entity relations and use the work of Zhou et al. to define the bug entity categories. The approach is evaluated on a corpus of 500 bug reports from the Mozilla project using precision, recall, and F1 measures. The results show that the proposed approach outperforms the existing bug-named entity recognition method BNER in bug entity recognition and improves the accuracy of bug relation extraction compared to the SDP-LSTM method.

What is the result and what they have found?

* The evaluation results show that the proposed approach outperforms the existing bug-named entity recognition method BNER in bug entity recognition and improves the accuracy of bug relation extraction compared to the SDP-LSTM method. The precision of bug entity recognition improved from 81.5% to 83.7%, and recall improved from 74.1% to 75.2%. For bug relation extraction, the precision improved from 53.74% to 66.3%, and recall improved from 51.7% to 61.5%. The authors have found that their proposed approach, which combines the Bi-LSTM-RNN model and dependency parser, is effective in automatically extracting bug entities and their relations from the freestyle and noisy text in bug reports and can improve the accuracy of bug entity recognition and bug relation extraction compared to existing methods.

Overall Description and what they are working on: -

* The authors identify that accurately extracting and expressing rich semantics and relations from bug reports is important for various bug analysis activities such as bug understanding, localization, and fixing. However, the text in bug reports is usually in a free-style and noisy form, which makes it difficult to extract and process them. To address this challenge, the authors propose an approach that incorporates the neural networks Bi-LSTM-RNN with a dependency parser to automatically extract bug entities and their relations from bug reports. The authors first analyze the classification criteria for bug entities and entity relations and then introduce the techniques used to extract bug entities and relations. They use a manual annotation process to build a labeled corpus for training of the prediction model. They employ the Bi-LSTM-RNN model and dependency parser to recognize bug entities and further identify the relations between them. The output of the model is a set of triples for each pair of entities in the form of (Entity1, Relation, Entity2), where Entity1 and Entity2 represent bug entities, and Relation represents the relation type. The authors conduct a preliminary evaluation on 500 bug reports from the Mozilla project and use Precision, Recall, and F1 to evaluate their approach for bug entity and relation extraction. They compare their approach with existing methods and show that their approach outperforms them in bug entity recognition and bug relation extraction. The authors conclude that their proposed approach is effective in automatically extracting bug entities and their relations from bug reports, and can improve the accuracy of bug analysis activities.