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Advanced Bug Tracking Analysis System

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Abstract

From many years Bug-tracking mechanism is used only in a number of the massive software development houses. Most of the others never bothered with bug tracking in the least and instead simply relied on shared lists and emails to watch the status of the defects. Bug Report Application is an ideal solution to track the debugs in their product by individually or group of developers. This can be called as Defect Tracking System. The Bug Report Application can dramatically increase the productivity and accountability of individual employees by providing a documented workflow and regeneration permanently performance.

INTRODUCTION

Authenticate user: Here user login with Username and Password as well the system starts authenticating the user during which the username and password should be matched. If the entered details are matches then it is allowed to the foremost page or else if failed to meet the criteria, it warns the user for invalid username or password.

Admin: The admin can add new user or existing user. The user details are saved in this module.

Bug Details: It allows adding bugs and updating the existing bugs. As the number of bugs are very large this technique is given efficient filtering. The user can filter the bugs with priority. The bugs will stores in database where user can able to find.

Bug Tracking: Here the user can add child nodes and he can modify existing nodes. The bugs which are saved in database will have a specific hierarchy.

View: It displays the hierarchy of the bugs, those bugs are displayed within the parent child nodes.

Convolutional Neural Network

The CNNs are multilayer neural networks that are constructed by one or more convolutional and subsampling layers. These are widely adopted in speed recognition, image recognition etc... In this paper the CNNs are used to extract the syntactic and semantic feature vectors.

Data Pre-processing

Bug reports may include textual information then a standard NLP process is employed in our approach as the first step. Initially there are three steps in Data pre-processing.

- **Parsing Tokens:** The bug report having words in text format those are parsed. These parsed text fields will be converted into a stream of characters such as capitals, punctuation, brackets etc.… will be removed. A word can be regarded as Token.
- **Stemming:** The target of stemming is to find the stem of words without multiple grammatical forms.
- **Removing stop words:** Same words that do not carry significant information will be removed.

Word Embedding

word embedding are used to transfer tokenized words into real-valued feature vectors by using unsupervised pre-training. Here, we employ randomly-generated embedding's in comparison with baselines and word2vec in other comparisons. Detailed discussion of the embedding layer,

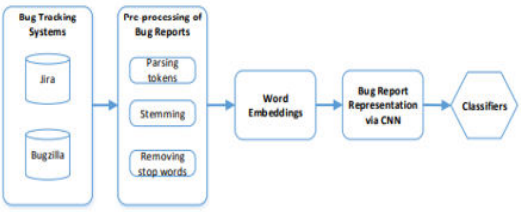

Fig.1 Overall workflow of our approach

CNN Bug Report representation

We use word embedding's as the input layer which provide real-valued feature vectors to the convolutional layer. Then the convolutional layer and max-pooling layer are used to build two distributed vector representations of any two input bug reports. After that, we can obtain the similarity score (i.e., textual features) of two input bug reports. The convolutional layer iteratively employs the filter on the sub-matrices of U as follows.

$$vi = w \cdot U[i : i + h - 1], (1)$$

To obtain the featuremaps of bug reports with CNN, a bias term and an activation function are employed as follows.

$$gi = f(vi + b)$$

We can obtain the feature maps (g1, g2) of the input pair of bug reports (rg1, rg2). And the cosine similarity of (rg1, rg2) is defined as:

$$Sim(r_{g_1}, r_{g_2}) = \frac{g_1 \cdot g_2}{\|g_1\| \, \|g_2\|}.$$

Evaluation Measures

Two widely adopted metrics F-measure and Accuracy are employed in this paper to measure the performance of detection.

$$F\text{-}measure : F = \frac{2 * P * R}{P + R}.$$

And the Accuracy is,

Accuracy = Number of correct detections Number of bug report samples.

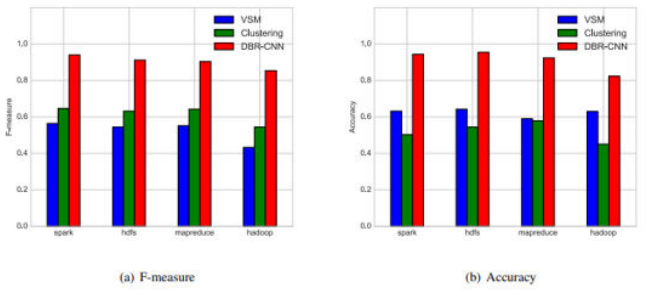

Fig.2 Performance comparison with baselines

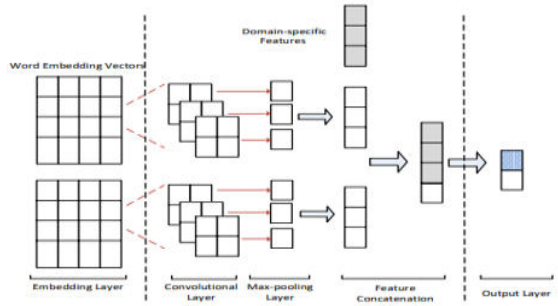

Fig.3 CNN bug report representation

ADVANTAGES

Advantages mainly depend upon the type of bug tracking software used. The most common advantage of this tools is that it allows companies to keep track of all records of the issues that are recorded, who fixed them, and how much time it took to fix the issue.

DISADVANTAGES

Customers need to be extremely detailed with the issues, if they failed in issuing the issue request then they won't get correct response.

The length of issues that are submitted can likewise turn into an issue in such a case that there are an excessive number of issues submitted and insufficient designers to address them.

CONCLUSION

The Bug Tracking System mainly helps to detect and manage the bugs in software products efficiently.

It tracks the bugs in the project modules and assists in troubleshooting errors for testing and for development process. It highly avoids all sources of delays in bugs and as application deployed in company servers, it is much more secure.

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