

REVIEW ON VARIOUS BUG TRIAGE TECHNIQUES AND APG FOR EFFICIENT SOFTWARE BUG TRIAGING

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Abstract: In recent development almost every software organization spending more than half of their project revenue for fixing bugs and these bugs are generating continuously for open source projects, and the most of the existing methods to fix bugs are manual and this process is not feasible every time and it is tedious task to the software companies, so a novel method should be proposed in order to avoid bug fixing problems, hence herewith proposing Automatic Patch generation (APG) method. Patch generation is one of the important tasks in software maintenance i.e on debugging activities such as fault localization and prioritization. In practice, debugging cannot be completed without patch generation even if a fault is accurately localized or efficiently prioritized. Patch generation is recognized as an essential task in software development since most contemporary software systems inevitably contain bugs that need to be fixed. As the size and complexity of software systems get larger and higher, significantly more number of bugs are found and reported. Naturally, the corresponding cost for resolving the bugs is rapidly increasing. PROFIX Pattern is an automated technique for patch generations which lead novel pattern-based repair technique learned from human-written patches.

Keywords: APG, Patches, PROFIX Pattern

INTRODUCTION:

Now a day's Open source software projects often provide their programmers and developer communities with an open bug repository for reporting the software bugs in order to be resolved by developers. Each bug report usually undergoes a triage process in which a group of developers, known as triagers involve in software testing. Triage is French medical word which comes from verb Trier. The logic of this tenure is to split, sort and select of bugs. Generally triage term used in medical and pharmacy to illustrate the priority of particular patient

base on severity of condition. The ailing peoples are divided into three different categories: patients who will pass on no matter what you do, those who will recover even if unaided, and those who will recover only if aided. If an above situation occurs in a hospital and too many patients then doctors be supposed to be focused on last option.

Triagers check whether it contains sufficient amount of information for the developers, whether it is not a duplicate of a previously reported bug and is the bug is reported at the right place. The triagers should assign each bug report to a developer in order to hopefully resolve the issue. In a company large open source projects where hundreds or thousands of developers are collaborating with each other the main question is which person would be the best candidate for fixing a newly reported bug. Human triagers often take developers' fields of expertise and interest into consideration in order to reduce the bug resolution cost for the project. However, since the number of bug reports and the rate of their production could become very large, the bug triage process itself might become labor intensive when performed manually.

RELATED WORK

In this part of review, the discussion will be on the methods which are used in order to fix the bugs and the functionalities of each method,

SUPERVISED MACHINE LEARNING TECHNIQUES

Naive Bayes classifier is a supervised machine learning technique and it is used for to predict the correct developer to fix bug. Antoniolet al. describes the different types of classifier and is cussed the drawback the Naïve Bayes classifier in detail. A feature selection technique applicable to categorization based bug prediction is proposed.

Technique is applied to foresee bugs in software changes, and execution of Naive Bayes and Support Vector Machine (SVM) classifiers is characterized. The Naive Bayes classifier strongly simplifies the learning by assuming that features are independent given class.

TOSSING GRAPH TECHNIQUES

When a bug report has been assigned and if the assigned developer cannot fix this bug, then developers can reassign the bug to other developers for fixing that bug. This process of reassignment of bug is called "Bug Tossing". Jeong et al. [9] find out that in manual bug triage, 37 to 44 percent of bug reports are "tossed" i.e. reassigned to other developers. Bug tossing is same as ticket routing [10]. Limited researches have been done on reassignment of bug reports. D'Ambros et al. [11] visualized the life cycle of bugs, with the assignment of developers. Halverson et al. [12] defined patterns in bug reports; from them one was the reassignment of developers.

BUG TRIAGE USING VOCABULARY-BASED EXPERTISE MODEL OF DEVELOPERS

D. Matter et al. [17] present an approach to automatically suggest the developers, who have the appropriate expertise to handle a bug. D. Matter et al. [17] model the developer expertise using the vocabulary which was found in their source code contributions. Then they compare this vocabulary to the vocabulary of bug reports. Later they recommend developers whose contribution vocabulary is lexically similar to the vocabulary of the bug report [17]. An advantage of this approach is that, it doesn't need a record of previous bug reports. D. Matter et al. [17] is able to recommend developers who did not work on bugs previously.

FUZZY SET-BASED AUTOMATIC BUG TRIAGING

A. Tamrawi et al. [21] proposed a technique called Bugzie, a novel approach for automatic bug triaging. Bugzie is based on fuzzy set-based modeling of bug-fixing expertise of developers. It considers a system to have multiple technical aspects. Each of this is

associated with technical terms. Then, Bugzie uses a fuzzy set to represent the developers who are capable of fixing the bugs which are relevant to each term. The membership function of a developer in a fuzzy set is calculated via the terms extracted from the bug reports that (s) he has fixed [21]. When new fixed reports are available then the function gets updated. For a new bug report, its terms are extracted and as per the terms corresponding fuzzy sets are union'ed. Based on their membership scores in the union'ed fuzzy set, Potential fixers will be recommended [21]. Bugzie achieves higher accuracy and efficiency than other approaches.

PROBLEM DESCRIPTION

Now a days many software organizations mostly which are developing the open source projects are spending over 40% of Effort in maintaining and fixing with software bugs .like Net beans, Eclipse, Mozilla, VirtualBox, Boost, CryEngine and so on from all these open source projects, we identified nearly 120000 bugs and only Net beans reports in an average 20 bugs for a day to bug repository. Managing software bugs is bug triage, Bug triage aim is to assign an expert developer to fix new bug. Basically a bug repository is a software repository for storing reports of bugs and Description of bugs. Due to the huge amount of daily reported bugs, the bug reports are increasing and the scaling up in the repository is being high as well. Noisy bugs and redundant bugs are degrading the quality of bug reports which is held in the repositories. Bug triage is one of the least time taken procedures in handling of bugs in software projects and of course the most proper way. Manual bug triaging is a lengthy process and error zone because of the arrival of large number of bug data and lack of developers who has an accurate knowledge of the bug to be fixed with. According to the literature survey in traditional software development new bugs are triaged by humans, but due to the large number of daily reported bugs and lack of expert developers manual bug triage is tedious task to the organizations in way of time, cost and less accuracy for bug fixing. Triage is actually a French word meaning "Sorting." Triage is a system used by medical or Battlefield

Ex: Situation where in a hospital admitted large number of emergency patients but hospital resource is less to treat or care the patients.

Ex : In software organization where bugs are more numbers when compared to expert developers who are ready to fix the bugs

CONCLUSION

After analyzing review of various bug fix techniques the major process in software maintenance is Bug Triaging and in order to avoid this process the software company has to investment lot money and labor effort, mainly when an approach to the issue of manpower and time cost. To fix bug, the modern system aims to outward appearance compact and high quality bug data in software development and thereby maintenance. The data processing techniques like instance selection and feature selection are used for data reduction. Former techniques were tossing graphs, collaborative filtering (CF) and semi-supervised learning (SVM). The second system is practical for any open source projects that generate huge and large amount of bug data. Several software companies' does projects like banking, food chain management can consider the application of the current technique which is more beneficial and effective.

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