

Annotation Based Build Process Automation for Cyber Foraging Frameworks

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Abstract— Cyber Foraging is a technique introduced to utilize the computing resources in the vicinity to improve the performance and the standby of the portable mobile devices. There have been various attempts to enable Cyber Foraging in smartphones, and they require lots of developer effort to offload the work from the applications in the mobile device, where the developers are required to do lots of code modifications or additions. We introduce an annotation based approach to automate the work offloading in a Cyber Foraging system to a greater extent, which requires minimal developer workload, through flexible technique. This can be refined in the future and be automated using machine learning algorithms, reducing developer effort furthermore.

Keywords— **Annotation, Automation, Offload, Cyber Foraging**

I. INTRODUCTION

This section gives a brief background to the cyber foraging, specifying the problem we are focusing on and the motivation towards the proposed annotation based approach. Then the methodology used in the research is specified.

A. Background

As the portable devices become smaller and smaller the computing capabilities and the standby time of them have become a questionable. Having a bigger battery and having a very powerful processor is no longer an option due to the requirement of smaller size factor. Cyber Foraging is a technique introduced by Satyanarayanan, which can help portable devices to take advantage of the unused computing resources in the vicinity. This exploited computer infrastructure is known as a Surrogate machine.

Cyber Foraging leads one step closer to M. Weiser's vision of ubiquitous computing, where the environment is saturated with technology, working together towards improving the experience of the user. Due to the higher developer effort required to create a cyber foraging system, or to enable cyber foraging application, the adoption of Cyber Foraging techniques into mobile applications is low.

There are so many attempts and approaches made towards achieving Cyber foraging, each having its own techniques, which will be reviewed in the section II. In section III, we will discuss the solution we propose and its limitations. Section IV discusses the testing and evaluation of the proposed approach, and section V concludes the paper, also specifying the future work.

B. Methodology

Literature survey was done to analyse existing work and gain the background knowledge. 57 preliminary researches had been conducted in the domain of enabling Cyber foraging (Lewis & Lago, 2015), and the survey published by Lewis & Lago was helpful in revisiting the approaches, and also recent approaches had been surveyed and considered within the scope of this research.

Empirical evidence was gained based on observing and experimenting on incorporating aspect orientation in development phase in the direction of reducing developer efforts, rather than going for older methods such as developing and deploying the surrogate and mobile components separately. Furthermore, experiments were done in order to identify support for most types of the commonly used method signatures and return types, therefore to understand correct boilerplate methods to be generated in the compilation time of the mobile application.

We worked on designing and developing the proposed solution on top of the IntelliJ Idea development platform for Mobile Application Development, which is used by Google under the name of Android Studio. Google has officially stopped the support for the eclipse; however, it was made sure that supports legacy systems as well.

II. EXSISTING WORK

In this section we discuss and review the approaches used in the existing cyber foraging work to offload the work from mobile device to the surrogate machine, in order to understand the gap, we intend to fill using the approach we propose in this paper.

One of the major reasons why cyber foraging adaptation rate is low is because of the developers' burden on