

Source Code Analysis and Manipulation

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1 Introduction

The special section contains nine papers which are extended versions of papers originally published in the proceedings of the IEEE workshop on Source Code Analysis and Manipulation (SCAM 2004). The papers cover the spectrum of analysis and manipulation work from traditional transformation application areas concerned with optimisation through to more novel application areas such as transformation for evolution of websites; they cover the use of linguistic source code aspects which arise from the semantics of the language to more ephemeral, yet higher level domain-related information.

The special issue brings together work on algorithms, tools, empirical results and novel approaches to source code analysis and manipulation. There are five papers on analysis and four on manipulation in this special issue. The next two sections describe the papers on analysis and manipulation respectively.

2 Analysis Papers

The papers by Souter and Pollock, Anderson et al. and Chen et al. concern traditional issues of control and data flow, while the paper by Antoniol et al. concerns the application of control, data flow and metric information to the problem of clone detection. Finally the paper by Van De Vanter presents a different perspective in which the subject of the analysis is the information locked in the natural language parts of the source code.

The paper by Souter and Pollock concerns the problem of more precise analysis of call graphs. For traditional 3GL languages this problem is largely straightforward. However, for Object Oriented (OO) languages, there arises a possibility that many static call chains may not be possible. Of course, determining an infeasible call path is generally not decidable [8], but Souter and Pollock use safe approximation based upon type information. They implemented their algorithm and used it to analyse several programs, revealing that up to 10% of the call paths are infeasible according to their analysis.

This may appear, at first sight, to represent only a small improvement. That is, 10% may appear to be a relatively modest precision improvement. However, one has to bear in mind that the analysis which produces call graphs is at a relatively coarse granularity and many subsequent analyses will depend upon it. Therefore, imprecision in the call graph may lead to knock-on amplification in imprecision for subsequent finer-grained analyses. Also, the authors indicate that the programs they studied did not make heavy use of the OO features which lead to type infeasible call chains. It is therefore possible to (cautiously) conclude that the initial result of 10% may reflect a lower bound on the level of imprecision which can be ameliorated by detection of infeasible call chains.

The work of Chen et al. also attempts to improve analysis efficiency by detecting infeasible aspects of programs. In this case the problem is to determine which statements are dead. In a traditional sequential program, such a problem is that of determining infeasible paths in a Control Flow Graph, which is analogous to the infeasible call-path problem addressed by Souter and Pollock. In the world of concurrent programs, the problem is more complex because of the possibility of non-determinism. In this world, the problem of

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SCAM, 2017 **SCAM 2004** Institute of Electrical and Electronics Engineers, Inc. Staff, IEEE, International Workshop on Source Code Analysis and Manipulation, 2003 **2016 IEEE 16th International Working Conference on Source Code Analysis and Manipulation** Bonita Sharif, Christopher Parnin, Johan Fabry, 2016 **Source Code Analysis and Manipulation; Proceedings** Jurgen Vinju, Cristina Marinescu, 2010 18th IEEE International Working Conference on Source Code Analysis and Manipulation IEEE International Working Conference on Source Code Analysis and Manipulation, 2018 **The Art and Science of Analyzing Software Data** Christian Bird, Tim Menzies, Thomas Zimmermann, 2015-09-02 The Art and Science of Analyzing Software Data provides valuable information on analysis techniques often used to derive insight from software data This book shares best practices in the field generated by leading data scientists collected from their experience training software engineering students and practitioners to master data science The book covers topics such as the analysis of security data code reviews app stores log files and user telemetry among others It covers a wide variety of techniques such as code change analysis text analysis topic analysis and concept analysis as well as advanced topics such as release planning and generation of source code comments It includes stories from the trenches from expert data scientists illustrating how to apply data analysis in industry and open source present results to stakeholders and drive decisions Presents best practices hints and tips to analyze data and apply tools in data science projects Presents research methods and case studies that have emerged over the past few years to further understanding of software data Shares stories from the trenches of successful data science initiatives in industry *SCAM 2002*, 2002 Seventeen papers from the October 2002 workshop explore techniques for analyzing and manipulating the source code of computer systems The four sessions address testing metrics and maintenance source transformation and processing dependence graphs and static analysis and slicing Topics include *2015 IEEE 15th International Working Conference on Source Code Analysis and Manipulation (SCAM 2015)*, 2015 **Proceedings**, 2002 **Source Code Analysis and Manipulation; Proceedings** IEEE Computer Society. Technical Council on Software Engineering, Computer Society, Institute of Electrical and Electronics Engineers, 2009-01-01 **Proceedings**, 2014 **Empirical Research towards a Relevance Assessment of Software Clones** Saman Bazrafshan, 2017-06-30 Redundancies in program source code software clones are a common phenomenon Although it is often claimed that software clones decrease the maintainability of software systems and need to be managed research in the last couple of years showed that not all clones can be considered harmful A sophisticated assessment of the relevance of software clones and a cost benefit analysis of clone management is needed to gain a better understanding of cloning and whether it is truly a harmful phenomenon This thesis introduces techniques to model analyze and evaluate versatile aspects of software clone evolution within the history of a system We present a mapping of non identical clones across multiple versions of a system that avoids possible ambiguities of

previous approaches Though processing more data to determine the context of each clone to avoid an ambiguous mapping the approach is shown to be efficient and applicable to large systems for a retrospective analysis of software clone evolution The approach has been used in several studies to gain insights into the phenomenon of cloning in open source as well as industrial software systems Our results show that non identical clones require more attention regarding clone management compared to identical clones as they are the dominating clone type for the main share of our subject systems Using the evolution model to investigate costs and benefits of refactorings that remove clones we conclude that clone removals could not reduce maintenance costs for most systems under study **SCAM 2007** Bogdan Korel,Michael W. Godfrey,2007

Software Language Engineering Anthony Sloane,Uwe Aßmann,2012-04-25 This book constitutes the thoroughly refereed post proceedings of the 4th International Conference on Software Language Engineering SLE 2011 held in Braga Portugal in July 2011 The 18 papers presented together with 4 tool language demonstration papers were carefully reviewed and selected from numerous submissions SLE s foremost mission is to encourage and organize communication between communities that have traditionally looked at software languages from different more specialized and yet complementary perspectives SLE emphasizes the fundamental notion of languages as opposed to any realization in specific technical spaces

Proceedings Third IEEE International Workshop on Source Code Analysis and Manipulation , Tools and Techniques for High Performance Computing Guido Juckeland,Sunita Chandrasekaran,2020-03-25 This book constitutes the refereed proceedings of 3 workshops co located with International Conference for High Performance Computing Networking Storage and Analysis SC19 held in Denver CO USA in November 2019 The 12 full papers presented in this proceedings feature the outcome of the 6th Annual Workshop on HPC User Support Tools HUST 2019 International Workshop on Software Engineering for HPC Enabled Research SE HER 2019 and Third Workshop on Interactive High Performance Computing WIHPC 2019 **Tenth IEEE International Working Conference on Source Code Analysis and**

Manipulation Jurgen Vinju,Cristina Marinescu,2010 Artificial Intelligence Methods For Software Engineering Meir Kalech,Rui Abreu,Mark Last,2021-06-15 Software is an integral part of our lives today Modern software systems are highly complex and often pose new challenges in different aspects of Software Engineering SE Artificial Intelligence AI is a growing field in computer science that has been proven effective in applying and developing AI techniques to address various SE challenges This unique compendium covers applications of state of the art AI techniques to the key areas of SE design development debugging testing etc All the materials presented are up to date This reference text will benefit researchers academics professionals and postgraduate students in AI machine learning and software engineering Related Link s First IEEE International Workshop on Source Code Analysis and Manipulation ,2001 **SCAM 2006** Massimiliano Di Penta,Leon Moomen,2006

Unveiling the Magic of Words: A Overview of "**Source Code Analysis And Manipulation Proceedings**"

In a global defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their power to kindle emotions, provoke contemplation, and ignite transformative change is truly awe-inspiring. Enter the realm of "**Source Code Analysis And Manipulation Proceedings**," a mesmerizing literary masterpiece penned with a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve into the book is central themes, examine its distinctive writing style, and assess its profound affect the souls of its readers.

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