

Amogh Margoor

Email id: amargoor@gmail.com

Mobile No: +919845022117

Summary

Currently pursuing research in the field of Programming languages and developing static analysis tool for verification. In future, I would like to involve in developing interesting static analysis tools. I have prior experience of designing and implementing applications for mobile and embedded systems in C++ and Symbian C++.

Education

Master of Science (Engineering), Computer Science and Automation

Indian Institute of Science, Bangalore. Expected August 2012

Research Work:

“Improving scalability and precision of sound, demand-driven, backward analysis of object-oriented programs”

Research work is to address various challenges faced by demand-driven backward analysis when analysing real world object oriented programs. In this work, existing *null-dereference analysis* of Java Programs using *over-approximated weakest pre-condition analysis* is studied to find factors harming the scalability and precision of the technique. Existing technique is *sound, context-sensitive, demand-driven* and use *abstract interpretation* for over-approximation. Following were the observation:

- *Java Collection Framework*: Usage of these general purpose containers can affect the precision because their implementation uses complex data structures which are difficult to analyze and precision is lost due to over-approximation.
- *Difficult virtual calls* i.e resolving to too many targets in call graph: Analyzing all targets increases analysis time significantly. Thus existing technique avoids analysing difficult virtual calls by performing conservative assumption causing precision loss.
- *Library calls* and *library callbacks* : It is observed analysing libraries can make analysis not scalable on many real world programs. Even in this case existing technique performs conservative assumption to make analysis scalable causing precision loss.

- *User-defined recursive data structure*: To analyse their elements precisely *Shape analysis* is needed which is expensive.

Our proposed solution for above mentioned problems has been evaluated for 8 real world JAVA programs. False positives are reduced by 48%. Proposed solution comprises of :

- Creating manual summaries for API accessing Java containers using their specification and deriving *transfer functions* from it instead of analysing API's implementation.
- Use *Thin Slicing* technique to skip the irrelevant code. It is observed in many cases that libraries and difficult virtual calls are not relevant according to thin slice and can be skipped.
- Use compressed access paths to deal with user-defined recursive data structures. Compressed access paths enables backward analysis to abstract all the elements of recursive data structure as a single node.

We believe some or all of these solutions can be extended to many demand-driven backward analysis techniques.

Teaching Assistant:

Program analysis and verification: August-December 2011

Publication:

Acknowledged in **Null dereference verification via over-approximated weakest pre-conditions analysis**. In *Proceedings of the 2011 ACM international conference on Object oriented programming systems languages and applications (OOPSLA '11)*.

Course Project:

- “*Finding null dereference bugs in Java Programs*” : Implemented an intra-procedural data-flow analysis for detecting null dereference bugs in java programs with high precision. Program analysis framework used was **Soot** and language was Java.

Course work (both credited and audited):

Program analysis and Verification, Design and analysis of Algorithms, Formal Methods in Software Engineering, Automata theory and Computation, Compiler Design, Computer Architecture.

Bachelor of Engineering in Computer Science,

M.S.Ramaiah Institute of Technology, Bangalore. 2003 -2007

Grade: 73%

Project work:

“Implementing software to facilitate interaction between Personal Computer and Visually-challenged user”: Visually impaired users could do normal functions like browsing through PC, reading mails, sending mails, play songs. User will interact through mouse click (input device) and speakers (output device).

Languages : C++ and Java.

Experience

Software Engineer at BridgeCo

December 2008 - July 2010 (1 year 8 months)

Member of SDK development team for Digital Media Player written in C++, built on processor built by BridgeCo. It streams audio from Internet Radio, UPnP devices such as PC's, mobile phones etc and also has iPod dock functionality available .

Role:

- Worked on *Whole Home Audio* feature at the application level which uses UPnP.
- Worked on *DLNA* certification and *Windows 7* certification both *WLK 1.4* and *WLK 1.5*. Important features like *seek through media controller* were developed by me for this project.
- Worked on the Internet Radio functionality of the player at application level based on service provided by *VTuner*.
- Worked on User Interface of the music player.

Languages : C++

Version control system: *SVN*

Software Engineer at Roamware India Private Ltd, Bangalore

January 2008 - Novemeber 2008 (11 months)

Involved in design and implementation of mobile application “*MediaCall*” on *Symbian* platform using *Symbian C++* which aims at enhancing ring-time experience of mobile users. It is a “*Content Discovery and Delivery Platform*” which allows user to discover and use the multimedia content, thereby enriching user experience.

Team size: 3

Role:

- Implemented and owned the module which made HTTP requests to server for downloading content, module which interacted with profiles of handset, module for

displaying thumbnails in list displayed, module to display after-call image and other miscellaneous feature like “Autostart” of application on booting up of phone, handling roaming status and few configurable items of the application.

- Interacted with the documentation team to get the “User Guide” ready.
- Involved in deployment and maintenance of the application.

Languages : Symbian C++

Version control system: *Perforce*

Graduate Software Engineer at Symbian Software India, Bangalore

July 2007 - January 2008 (6 months)

Member of System Management Group, which looks after overall performance of the *Symbian* operating system. Following were my roles in team:

- Held the position of Defect Coordinator.
- Owned Regression management process.

Hobbies

- Swimming, Table Tennis, Badminton
- Listening music, Yoga

References

Furnished upon request.