

Testing of Compiler's Optimization Done by ANN

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Abstract: Compiler is a software program that transforms high-level source code that is written by a developer in a high-level programming language into a low-level object code (binary code) in machine language, which can be understood by the processor. The optimization of the compiler is very necessary because of the programs that are executed by the compiler are becoming complex. We propose a method to optimize the compiler by ANN and check its factor like time of execution, memory consumed and power consumed.

Keywords: Compiler's Optimization

1. Introduction

Compiler optimization means (1) altering compiler so that it compiles the program faster, in today's world time has become more important than anything so fast compilation would save the time of the user. (2) minimizing the memory occupied by compiler. Minimizing memory occupied by memory may not be the case now but it was a crucial case in the earlier days. (3) portability and minimizing the power consumption of the compiler. Generally, time consumed can be reduced by minimizing the loops in the compiler, but it's not the optimal solution for all the compilers. Similarly, there are several techniques of optimization but the problem is to find the best technique that suits the compiler & the order in which the optimization has to be done.

2. Literature Survey

In this paper they have mentioned the needs for optimization. They also mentioned the problems that are faced by the traditional optimization methods such as ordering of optimization and finding the best methods for optimization. They mentioned some simple methods for optimization of the compiler they are Code motion, Reduction of strength, Common sub expression elimination, Loop unrolling and Instruction level parallelism using pipelining architecture. They have proposed the best methods for the optimization of complex compilers that is by using Artificial Neural Networks (ANN). Artificial Neural Networks are the computational models that are inspired by animals' nervous system which are capable of Machine Learning and Pattern Recognition which are interconnected by the 'neurons' that feed information through the network. The paper includes some of the literature review

like Phase ordering of optimization techniques, Phase ordering with genetic algorithm and Automatic Feature generation. The proposed system includes ordering of different optimization techniques using ANN that is implemented in 4Cast-XL as it is a dynamic compiler. 4Cast-XL constructs ANN, Integrates the ANN like RVM's optimization driver and then evaluates ANN. The methods that has to be repeated are (1) Generate a feature vector of current method's state (2) Generate profiles of the program. At the end use ANN to predict the best optimization to apply.

The main objective was to compile the opinions of the undergraduates for a textbook thereby improving the readability and applicability of a textbook. The textbook here referred was a book based on nursing. This paper also highlights the importance of medical with education where it speaks to elevate the number of nurses with quality education! Now, the paper gives a method in which an investigation is carried out by involving 279 nursing undergraduates through a self-made questionnaire. The questionnaire helped to analyse and study the students' suggestions and opinions on the content of the biochemistry textbook. In this questionnaire a quantitative evaluation to the contents of the textbook were applied to evaluate significance, interest level and degree of professional association; and comments and suggestions were also collected. There were contents of questionnaire, questionnaire survey, and structure of textbook, statistical analysis. Thus, the end result where students suggested that the textbook should be closely related to nursing and the contents, structure and charts of the textbook should be adjusted properly. Thereby saying that the textbook should be driven by the needs of the nursing major and focus on simplifying the content. The important part here was the correlation between importance and interest of the field and graph revealed the analysis.

3. Proposed method

It's better to apply ordering of optimizations for individual methods rather than applying the same optimization technique to the entire program. The selection of optimization sequence can be done using Genetic Algorithms. First is finding the optimization sequence of our benchmarks then calculating the speedup of the optimization using the running time. Calculate the average speedup of the benchmarks to discover the

optimization ordering the worked best on average of all our benchmarks. Second is to find the optimization sequence for each of the benchmarks.

Automatic feature Generation system that comprises of training data set, feature search and machine learning. Training data set is used to extract compiler's intermediate representation. Feature search provides the feature values to machine learning tool. The machine learning tool computes the goodness of the feature at predicting the best heuristic value in addition features with other features in the base feature set. Similarly, collect number of examples of inputs to the heuristic and find out what the optimal answer should be for those examples. At last generate a feature vector of the current method's state, then generate profiles of the program at the end use ANN to predict the best optimization to apply.

To check the impact on memory, time, portability we make the note values of these three factors before and after optimization of each function of the compiler. We store this data in the MS Excel. Then entering the data into SPSS software, we analyse the co-relation between the three factors. We can easily analyse the effect of optimization on each factor.

4. Conclusion

We made the study of the impact of the optimization techniques of compiler on memory, time, power consumption easy by using MS Excel and SPSS software. The main advantage is when an optimization is done such that speedup is negligible and the memory consumed is too high means is just a waste of optimization. These kinds of optimizations can be stopped by this method of analysis.

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