

Title: Augmenting Alias Analysis With An Enhanced KillFlow Algorithm

Stronger memory dependence analysis creates additional and more efficient options for automatic parallelization.

CAF, the collaborative analysis framework, developed at Princeton, is to the best of our knowledge the strongest open source memory analysis engine for automatic parallelization of general purpose programs. Using memory profiling, we identify areas of weakness in the CAF memory dependence analysis engine.

Despite CAF's precision, our investigation reveals that its KillFlow module, while effective in many scenarios, faces limitations when dealing with certain loop patterns found in many applications. We propose a stronger KillFlow algorithm that is able to handle dependences involving inner loops, and show how it disproves many dependences not already disproven by CAF.