



Proposal Defense

Doctor of Philosophy in Department of Computer Science

“MIMAC: A MicroMacro-component based Software Architecture for a multi-cycle computation model ” by Hanzhong Zheng

Date: December 3, 2020

Time: 10:00am – 12:00pm

Place: [RSVP for Zoom Meeting Information](#)

Committee:

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Abstract:

The evolutionary development in software architecture reflects the increasing needs of entrepreneurs. Software architecture is the foundation of the software development life cycle (SDLC). It describes the components of software system in the way of communication, cooperation and execution. A well-designed software architecture determines the reliability, functionality, scalability, flexibility, resistibility and maintainability of the final software products. Resource efficiency was the top priority in the software architecture design before, is due to the memory constraints. Over the past decades, the unprecedented improvement in the computer architecture, especially the decreasing of memory cost, triggers the growing requirements in software architecture. Software has progressively shifting towards to distribution, loose-coupling, modularization, independency. The service-oriented and component-based software architecture become the elixir to this challenge. The state-of-the-art software architectures turn to be designed as ‘Micro’ to fulfill this development trend. However, in the ‘big data’ era, analyzation and computation become important in the software architecture design, which are the limitations of the ‘Micro’ software architectures.

In this thesis, we proposed a new software architecture MicroMacro-Component (MIMAC) that aims to preserve the advantages of service-oriented software architecture, while can solve their



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limitations. The concept of ‘Micro’ represents that the modularization, loose-coupling, and distribution in MIMAC, and ‘Macro’ represents that MIMAC allows the high computational power components to satisfy certain requirements such as big data analytics or deep learning tasks. MIMAC utilizes the idea of multi-cycle computation to reduce the communication cost between the ‘Micro’ and ‘Macro’ components. To introduce the concept of MIMAC, this thesis presents a ‘wellbeing health multi-cycle computation system’ consists of data collection, storage, analyzation, prediction, and recommendation system components working together for health-caring task.