Research project for Summer Scholarship holders
(offered by Dr. Jun Yan)

Title:
Facilitating workflow monitoring in decentralised workflow management systems

Description:
Workflow management systems model business processes and manage the execution of workflows through the use of software. Over the past decades, workflow management systems have demonstrated great power in supporting business process automation and have become an essential asset of organisations. In order to provide advanced non-functional features, there is a growing trend that the next generation of workflow management systems will be developed in a decentralised manner using, for example, the peer-to-peer computing paradigm. Such systems remove centralised control as much as possible and allow for direct interaction/communication/collaboration between distributed software components (i.e., working peers) to fulfil workflow functions.

A trade-off of decentralised workflow management is that workflow monitoring which refers to tracking, scanning, and reporting on workflow events, instance status, performance data, and historical information during workflow execution, may become more difficult. This is one major obstacle to deployment of decentralised workflow management in the real world and needs to be addressed urgently.

This project will be carried out in the context of SwinDeW, a peer-to-peer based decentralised workflow management system, aiming at facilitating efficient workflow monitoring. A special monitoring component (i.e., monitoring peer) will be designed and integrated into SwinDeW, which is able to interact with other working peers to perform monitoring functions. Communication protocols and mechanisms supporting both proactive monitoring (request/response) and passive monitoring (subscribe) will be developed. By these means, a global view of the workflow management system and running workflow instances will be obtained and offered in a visualised fashion as a “mental map”. Finally, prototypical work will be carried out for the purpose of demonstration.

Expected outcomes:
This project addresses a critical issue (workflow monitoring) in an important area (decentralised workflow management). At least an initial solution to a very difficult question can be proposed and integrated into the existing framework, which will be demonstrated through a proof-of-concept prototype. It is expected that the proposed techniques, after possible extension and improvement, can be published as fully referred research paper in major international conferences. The project will contribute significantly to developing a complete solution to decentralised workflow support for business process management and will enable future research on related areas such as workflow performance evaluation, workflow knowledge management, and so on.

The student will be involved in various research activities such as problem identification and analysis, literature review, design, implementation, and paper writing up. By completing this project, the student is expected to:
1. be familiar with the concepts of business processes, business process management, workflow, workflow management, decentralised workflow management, workflow monitoring, etc, and the importance of workflow management to the real world organisations,
2. understand the advantages and limitations of today’s workflow management techniques, including decentralised workflow management,
3. be trained with various research skills, including research literature reading strategies, critical thinking abilities, research collaboration skills, paper writing up skills, etc.
4. be encouraged to carry out research in the future as Honours and/or HDR student.