Department of Informatics and Artificial Intelligence	Prof. Said Krayem

A standpoint of supervisor regarding PhD Thesis
"Fault Tolerance for Big Data Scientific Workflows in Cloud Computing Environments"
By Ammar Nassan Alhaj Ali

I am glad to have with us today an authentic, intelligent and hardworker researcher, I knew him for more than 20 years, and he was always enthusiastic willing to know more, to learn more, to developed new ideas and he always offered his help and support for other people and students. He always shared his knowledge and experience with humbleness and confidence. He never spared efforts to developed himself, his knowledge and shared this development transparently and clearly with other team members, students and interested parties.

Ammar despite all the readings and the subjects he studied during his PhD preparation,he attended more than 30 different online courses to sharpen his knowledge and skills in the Data Science, AI and machine learning, and he is one of the top participants in the Kaggle platform. I cannot believe that 5 years already passed since he joined the research in my group, I can recall it was 2016.

As the title of his thesis indicates, his work was aimed at preparing the fault tolerance model and fulfill the reliability of Big Data scientific workflows on cloud computing. As the cost of reliability improvements by reducing failures is paid, this problem is not that simple for many failures, and there is no endless budget to improve reliability.
Ammar worked to optimize the reliability and execution cost of Big Data scientific workflows on cloud computing environments and presented Two approaches, the first one uses GA to optimize the schedule of workflows and achieve a trade-off between the reliability and the cost, and the second one applies the Greedy Algorithm and moves the reliability requirement of the workflow to the sub-reliability requirement of each task to satisfy sub-reliability with minimum execution cost.
The structure of his submitted thesis reflects the aims mentioned above. The theoretical part provides information regarding cloud computing systems and focuses on the scientific workflow management system design , describes its components in detail, presents scientific workflow scheduling objectives, presents the taxonomy of scheduling objectives and scheduling algorithm then offers fault-tolerant techniques for scientific workflows. The final section in the theoretical part presents the genetic algorithm and basic concepts regarding it.
The experimental part provides the description of research, experiments, and discussion of the results. All experiments have been implemented on WorkflowSim. He evaluated the model on different sizes and types of scientific workflows that are taken from diverse domains. His work was successfully finished and these results are prepared for publication in scientific journals.
Based on his previous experiences, Ammar developed and improved his theoretical knowledge in fault tolerance techniques, cloud computing, and scientific workflows. and has demonstrated

excellent practical skills in CloudSim and analytical skills in interpreting the final results. Ammar has been able to analyze scientific problems, propose suitable solutions, perform experiments, and discuss the results autonomously.

Last but not least, as an open, kind, friendly, and enthusiastic person, always acting in a civil manner and Ammar was a very nice co-worker. In my opinion, the PhD thesis submitted meets all formal requirements and therefore I support the acceptance of the thesis and recommend it for defense.

In Zlin, 25-8-2021