

Popular Science *Seminar Series 6*

**DK 2, 111-Block C17, Faculty Science
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2.00 - 2.30 pm**



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Big data, modeling, simulation, and platform for 4iR

Naturally, the mathematical process starts from proving the existence and uniqueness of the solution by using the theorem, corollary, lemma, proposition, dealing with the simple and noncomplex model. Proving the existence and uniqueness solution are guaranteed by governing the infinite amount of solutions and limited to the implementation of a small-scale simulation on a single desktop CPU. Accuracy, consistency and stability were easily controlled by a small data scale. However, the fourth industrial revolution (4iR) can be described the mathematical process as the advent of cyber-physical systems involving entirely new capabilities for researcher and computer algorithm and machines (Xing, 2017). In numerical perspective, the 4iR required the transition from non-complex model, small scale simulation to complex model and big data analytics for visualizing the real-world application in digital dialectical and exciting opportunity. Thus, a big data analytics and its classification are the problem solving for these limitations. Some applications of 4iR will highlight the extension version in terms of models, derivative, discretization, dimension of space and time, behavior of initial-boundary conditions, grid generation, data extraction, numerical method and image processing with high resolution feature in numerical perspective. In statistics, a big data depends on data growth, however from numerical perspective, a few classification strategies will be investigated deal with the specific classifier tool.

This research will investigate the conceptual framework for a big data classification, governing the mathematical modeling, selecting the superior numerical method, handling the large sparse simulation, investigating the parallel computing and communication strategy on high performance computing (HPC) platform. Distributed memory architecture of HPC requires the networked communication to support the message passing parallel programming paradigm. The conceptual framework will benefit to the big data provider, algorithm provider, system analyzer to classify and recommend the specific strategy for generating, handling and analyzing the big data. Numerical analysis and parallel performance evaluation are the indicators for performance investigation of the classification strategy. This research will benefit to obtain an accurate decision, predictions and trending practice on how to obtain the approximation solution for science and engineering applications. Thus, the development of repository software for performing mathematical simulation and solution will benefit to end user. As a conclusion, classification strategies are the alternative framework for generating a fine granular mesh, identifying the root causes of failures and basic issues in real time solution. Furthermore, the big data-driven and data transfer evolution towards high speed of technology transfer to boost the economic and social development for the 4iR.