1ST PAN AFRICAN CONFERENCE ON ARTIFICIAL INTELLIGENCE AND SMART SYSTEMS ACCRA, GHANA – OCTOBER 6-8, 2021

Keynote Lecture (*Preliminary draft. Please do not circulate. Do not distribute*)

Title

A Practical Framework for Impactful Statistical Machine Learning in Artificial Intelligence

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Duration

1 hour

Abstract

"Practice without theory is blind. Theory without practice is lame". This old adage clearly implicitly points to the eternal quintessential duality between theory and applications, and definitively a similar pearl of wisdom hints at the duality between inductive and deductive learning, also making it clearly that one cannot be fully understood without this other. In this lecture, I will meticulously traverse the landscape of statistical machine learning in its role/capacity as a servant of artificial intelligence, and I will use what I have codenamed the 7 Wheels of Statistical Machine Learning, to provide a candidate framework that can be adopted in all practical artificial intelligence problem solving, highlighting throughout using a refined taxonomy of research effort, that theory is just as important as application. Indeed, I argue, that in order for an artificial intelligence application to be sound, solid, impactful and lasting, It has to have been created with all the 7 wheels of SML carefully considered.

Keywords

Data, Randomness, Random Samples, Probability Distributions, Statistical Theory, Function Space, Hypothesis Space, Loss Functions, Risk Functionals, Regularization, Ensemble Learning, Cross Validation, Model Selection, Gradient Descent, Maximum Likelihood, Penalization, Computational
Complexity, Convergence