Review of: "Approach to Data Science with Multiscale Information Theory"

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Potential competing interests: No potential competing interests to declare.

In the presented manuscript, the authors have proposed Multiscale Entropy Dynamics (MED) framework for Data science applications. It is an extension of the entropy dynamics approach to Quantum mechanics Ref 10. Overall, the research work is promising. There are many Advanced algorithms based on Artificial Intelligence and Machine learning that are being employed in Data Analytics. Example, Federated Learning, Machine Learning etc. After reviewing the article, I found that the article is in a different direction i.e. irrelevant to the real time Data Science applications. However, the following are my observations:

(1) In the introduction section, very basic information pertaining to quantum mechanics and information theory is provided. The authors should incorporate more precise literature related to presented research.

(2) In section 2, ED formulation of Quantum mechanics is incomplete. It does not provide the relevant information about entropy. The authors must see Ref 10.

(3) There is repeated content in section 3 and 4. The authors should take care of it and present precise content in every section.

“Equation (7) is the extension of the entropy functional in [10]. As we are dealing with multiscale, the additional ingredient is to sum over all scales. Here $Q(x', s'|x, s)$ is called the prior probability distribution, which we get from our data set. The unknown function is the transition probability $P(x', s'|x, s)$, which is analogous to the transition probability distribution for a single particle when it moves from the position x to a neighbouring point x', where s, s' are scaling indices or arbitrary variables of the data set which is under consideration. Our goal is to find the transition probability”

“Equation (8) is the extension of the entropy functional in [10]. As we are dealing with multi-scale, the additional ingredient is to sum over all scales. Here $Q(x', s'|x, s)$ is the prior probability distribution, and $P(x', s'|x, s)$ is the transition probability distribution as the particle moves from x to a neighbouring point x', where s, s' are scaling indices. Our goal is to find the transition probability. But first, we must determine the prior probability distribution.”

(4) In the Eq. 1, there is no term {\sigma^2}/2. What is the correct interpretation of diffusion constant?

(5) The manuscript claims the proposed method of MED towards data science. However, after looking at section 4, the content moves towards different direction (Application of Multi-scale Entropy Dynamic to a Quantum Mechanical System of Particles) regardless of data science application.

(6) What is the significance of section 5 (REDUCTION OF GNSE TO SOME RELEVANT FORMS) related to the manuscripts? Is it necessary in the context of data science applications?