Will Artificial Intelligence change entomology research and education?

It is a known fact that Artificial Intelligence (AI) is revolutionising various aspects of human life, especially research and education. The AI is changing the way humans approach their critical aspects of daily life. Today we hear that AI along with ChatGpt and other such online information management tools are imbibed in the critical aspects of our life. OpenAI's ChatGPT, the AI powered chatbot has crossed one million users in less than a week since it was officially made available to the public. ChatGPT was made available for public testing on Dec 15, 2022. Many of us have at least started discussing it, while the few futuristic ones have by now started using it for many day-to-day academic and research activities. There are more AI-based chatbots like GPT4, and BioGPT, which many of our younger generation computer savvy entomologists/ academics are aware of. The front runners amongst us, who are using these for many of the routine requirements of teaching and research, also unfortunately deploy these many times in an undesirable manner.

In life sciences, especially in the frontier areas of crop protection, from toxic material discovery, and pest and disease diagnosis/ IPM to education, AI has started showing great promise. It helps us in being more objective and more so in specific tasks like improving IPM decisions, strategies and their impact assessment. It is also changing the dimensions of teaching in entomology and other crop protection components, and the research endeavours thereupon. It enhances learning and provides more authenticity and accuracy in addition to saving time and efforts. Considering challenges like lack of generalisation, risk of over-reliance and other similar aspects, utmost caution is required in their application. Lot of standardization and thoughtfulness will be required for their efficient and successful integration. There will be a need to shun hurry and over board adoption, as it envisages diligent and effective handling of AI to accomplish the right and incremental dividends. Many times it might even boomerang with undesirable outcomes, if not deployed correctly.

Especially in life sciences like in entomology, there are multiple tiers of interactions between organisms, their ecology and evolution. Artificial intelligence can change the way we approach these intricate interactions and their complex scientific aspects. Academicians and researchers have been using AI-based approaches over the last two decades. The emergence of ChatGPT, GPT4, and BioGPT has provided a new handle. We as researchers and educators are exploring these emerging systems. It requires a lot of brainy efforts to effectively leverage these for our essential logistics and workflow, especially when we are building a learning framework around these tools. Many areas of entomology and their essential and core disciplines have started witnessing widespread adoption of AI. These have been initiated to a large extent mainly in the critical aspects of pest and disease diagnosis, genetic basis of multitrophic interactions, analysing images, toxic material discovery, chemical profiling etc. These enable fast tracking of many of the essential components of IPM, especially the decision-making processes, designing of strategies, and their evaluation. Such a development of relevant essential knowledge and its application have resulted in the required fastness compared to the traditional methods that rely on labour-intensive and expertise-reliant processes. The image analysis and diagnosis to aid IPM have been given an impetus of unseen magnitude with the adoption of these AI based tools especially through expedited and accurate image analysis and diagnosis.

I wish to end this editorial note with a note of caution. It is for the front runners amongst us, who are using these for daily requirements in an undesirable manner. Yes, I mean it becomes "undesirable", when these tools are used for circumventing the deployment of intellectual components of human intelligence, and the associated hard work and time that is inherently required in such endeavours.

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