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Impact of Artificial Intelligence on human behavior and psychology

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Abstract

Psychology uses psychological theories to solve real-world human behavior problems (e.g., therapy, industrial-organizational), while Artificial Intelligence (AI) utilizes machine learning and computer systems to simulate cognitive functions, automate tasks and solve practical technical problems. Both intersect in areas like mental health chatbots and user experience design, but they differ in focus: one is human-centric/empathetic, the other system-centric/analytical.

Keywords: Human behavior-Natural and Machine Induced; AI-cum-Psycholocal status; Chatbot; Intelligence Analogue (IA).

1. Introduction

Artificial intelligence (AI) has emerged as a transformative force in various fields, including psychology. With its ability to analyze vast amounts of data, it identifies patterns and makes predictions, AI has the potential to revolutionize the science, practice and education of psychology. However, as AI continues to evolve, ethical considerations, privacy concerns, and the need for human oversight remain critical in harnessing its full potential and minimizing harm while upholding the values and ethical standards of the psychological profession. This paper seeks to provide an overview of AI, its impact and application as it relates to the three pillars of the Canadian Psychological Association (science, practice, education), and highlights perceived challenges and recommended first steps. Artificial Intelligence deals with problem-solving, automation, data analytics, and efficiency. Methods followed are machine learning, algorithms, data analysis, and predictive modeling. Goal is to simulate human cognitive abilities for automated decision-making and pattern recognition. Examples are AI chatbots for screening patients, analyzing large behavioral datasets, automated customer support, etc. Psychology deals with human well-being, behavior modification, emotional understanding, and mental health treatment. Methods followed are therapy, behavioral observation, qualitative assessments, and human-centric interventions, etc. Goal is to understand, treat, or improve human life in areas like clinical practice, education, and business. Examples are providing counselling to patients, designing user-friendly interfaces (UX), optimizing workplace performance(Turing, 1950).

Background: AI acts as a tool within psychology for data analysis, but human professionals are still needed for empathy, ethical reasoning, and nuanced understanding (Dwivedi et al, 2021).Applied psychology centers on empathy and human connection, whereas Applied AI focuses on technical capability and automated efficiency.AI poses risks of bias, misinformation, and privacy issues if not monitored, whereas psychology focuses on mitigating these risks (Collins et al, 2021). The evolution of AI is credited with laying the foundation of our early understanding of AI in modern times (Turing, 1950). Turing described the possibility of creating intelligent machines that could simulate human-like intelligence. However, during a conference in1956, John McCarthy described AI as “the science and engineering of making intelligent machines” (Russell & Norvig, 2010) thereby coining the term “Artificial Intelligence.” Early research in the developing field of AI intended to develop high-level cognition AI. This research aimed to go beyond mere recognition of concepts, perception of objects, and performance of complex motor skills. Instead, the aim of the early

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research in AI was to discover whether AI could engage in multi-step reasoning, understand the meaning of natural language, generate novel plans to achieve goals, and demonstrate meta-cognitive abilities (Langley, 2011).

2. Discussion and Analysis

It has been said that AI research has experienced AI "summers and winters" (Russell & Norvig, 2020). Since the 1990s, coinciding with the development of the Internet and renewed interest in neural networks, developments in AI have gradually advanced. The shift in the 1990s and 2000s went from a narrow focus on development of expert systems (e.g., speech recognition) to data-driven approaches with machine learning techniques. This has generally coincided with advancements in computational power (e.g., high-powered processors) and availability of increasingly larger datasets due to sharing of data through the Internet. These two decades witnessed improvements in recommendation systems, fraud detection, and data mining to name a few examples. Since John McCarthy (McCarthy et al., 2006) coined the term, AI has been used to broadly encompass different technologies, machine learning, natural language processing programs, data mining, and neural networks (Baker & Smith, 2019). However, it is important to emphasize that AI is not a specific, narrowly defined technology but rather a broad category of technologies. At a surface level, these technologies are designed and often appear to emulate human neurocognitive functions (e.g., receptive/expressive language, visual analysis/classification). "Artificial intelligence" is thus a misnomer: it mimics the functions of some component neurocognitive processes but does not (yet) approximate actual (i.e., human) intelligence, since the latter emerges as a result of dynamical interactions between multi-faceted underlying component processes. As such, alternative terms such as "intelligence analogue" (IA) may be preferrable to "artificial intelligence" to avoid implicit identification of machine traits with those unique to human beings. Now we are seeing proliferation of use of "chatbot" applications such as ChatGPT and BingChat in education, business, and healthcare. Psychology educators, practitioners, and researchers can expect imminent growth in the number and diversity of available AI-augmented tools with potential for application to their professional activities. AI developers will surely continue to demonstrate the many potential ways of their technologies which can be applied in the practice of psychology. However, they cannot provide guidance regarding how or why – to what end? – AI should be incorporated into the world of psychology. Answering this latter question will require broad engagement with the Canadian public as well as with experts in philosophy, law, policy, and public health. Below we describe the challenges and promises of using AI-based applications in psychological education, practice, and science.

Recent and expected developments in AI present myriad opportunities and challenges to psychology in Canada. AI provides psychological scientists the opportunity to analyze vast amounts of data efficiently. In the context of education, AI can be a helpful support for code and essay writing, assignments, tests, and background summaries in mere seconds. It also allows for harnessing massive search power. AI is relevant to the practice of psychology in sofar as it will become increasingly implicated in the daily lives of professional psychologists and in the health/functioning of the clients and patients whom they serve. Artificial Intelligence (AI) has the capability to process vast amounts of data quickly. It can sift through large datasets to identify patterns and correlations, detect trends, and predict outcomes. The analytics are often based on quantitative analysis of the data where the processing of big data is done for reporting, prescriptive and predictive purposes (Wirtz et al., 2018). AI provides highly sophisticated statistical and probabilistic methods. Access is cheap and it comes with enormous computational power. However, research has found the analysis and processing of heterogenous data to be problematic (Dwivedi et al., 2021). There are ethical dimensions to consider in relation to data sharing and discrimination. In the case of discrimination, even though the analysis and decision making are not being conducted by humans, the AI algorithm reflects the pervasive discriminatory attitude of the engineer or the source data. A number of challenges have also been highlighted around data usage and data integrity. As technology matures, these issues need to be resolved to ensure full confidence in the research stakeholders. Another area of research that has taken off is speech analytics. Software has been developed for the recognition and processing of language. It is able to understand or respond to natural language as well as translate from spoken to written language. These developments have seen huge savings on time for researchers. In other areas, researchers have broken the tasks that AI performs into three: mechanical, thinking and feeling (Huang, Rust, & Maksimovic, 2019). Huang and colleagues (2019) felt that AI could easily take over the mechanical (robotics) and thinking tasks (processing, analyzing and interpreting data). However, it was felt that the feeling tasks should be left to human (communication). Huang et al. (2019) did not take into consideration that any bias present in the input used to train an AI system persists and often further amplified. In education, scholars are able to plan, organize, compare, and synthesize disparate sources, as well as create new material such as computer code, art, and even optimal personalized study schedules. Undoubtedly, this will allow for rapid developments in scholarship. Recognizing the many potential benefits of AI within scholarship, there are of course many risks. For example, although AI can serve as a helpful "co-pilot" in scholarship, there are now free plug-ins that will identify the most likely correct answer in un-proctored online quizzes, thus allowing for students to bypass educational experiences altogether, where AI effectively becomes the captain rather than the co-pilot. Likewise, un-proctored writing assignments may be entirely written by AI, and there is currently no reliable and valid way to detect that which

is written by AI, and detection may be biased against certain populations (Liang et al., 2023). Educators are left with the question of "how much AI support is "too much" support, and the age-old questions of "how do we best teach and assess knowledge?" It is important to remember that, despite the advent of widespread access to AI, the process of learning for humans has not changed, although the roles and actions of instructors may need to. Well known to psychologists, attention, encoding, storage, and retrieval continue to be critical considerations for instructors, despite the advent of AI. However, to facilitate thorough and deep information processing, instructors may need to re-design tests and assignments to ensure that requisite activities for learning are not bypassed. Further, developing assignments that integrate benefits of AI and limit risks will require assignments that demand more than simple regurgitation of facts. For example, creating assignments that emphasize synthesizing masses of AI-generated information can support students in developing skills to better assess what they are reading and these skills will almost certainly be needed across disciplines and industries, and knowing how to harness the power of AI within ethical boundaries will enable students to respond to current and future needs in an increasingly tech-based world. Just as students can benefit from AI in their student-based work when done with integrity, AI is also assistive for instructors when used with integrity. AI may be considered as akin to having an incredibly efficient teaching assistant who can automate the grading for multiple-choice and short answer questions. The ready availability of AI chatbots can provide immediate help for a student struggling with an assignment question at home when the teacher is unavailable. AI is always there, ready to answer. Relying exclusively on chatbots to answer questions is of course problematic, however, if incorrect or incomplete, or biased information is being given. AI is also well-positioned to collate class-based data to help inform teaching practices, allowing for rapid responses from instructors. Of perhaps particular interest to psychologists, AI can also analyze primary data on an individual student's academic performance and can suggest tailor-made approaches, interventions, and alternate learning avenues to meet their specific needs (Bell, 2021; Rouhiainen, 2019). The reality is that, in the context of education, there are pressing and paramount calls to action for educators, scholars, and policymakers. There is a lack of scholarship demonstrating the "who, what, where, why, when, and how" of best practices for integrating AI into education, and as yet, there are no clear emerging guidelines of the ethics of integrating AI into work from authoritative bodies. This is not a criticism—indeed, this technology is so new that overviews regarding responsible scholarship and integrity have yet to emerge. The Office of Educational Technology in the USA has very recently (month of May, 2023) released a report regarding AI and teaching and learning. The core themes from this report are that AI enables new forms of interaction, can help educators to address variability in student learning, support adaptivity, enhance feedback loops, support educators, and importantly, it can increase existing risks and create new risks that have not yet been considered. In response to these themes, they recommend that humans must be "in the loop," aligning models to a shared vision for education, designing AI using modern learning principles, prioritize strengthening trust, and prioritizing educators being informed and involved regarding AI in teaching and learning (Office of Educational Technology, 2023). As in other domains, AI-based tools could theoretically enhance or replace the work of trained human clinicians and technicians. For instance, currently available AI technologies could be used to automate some of the time- and labour-intensive aspects of clinical practice and thereby stimulate gains in efficiency of and access to psychological services in both public and private sectors. As the diversity and availability of AI-based technologies increases, so too will their potential applications within the practice of psychology in Canada. It is conceivable that AI will eventually allow for development and implementation of autonomous "psychologibots" that could provide wholly automated psychological services. While the main benefits of AI-supported psychological practice appear to be related to efficiency and access, there are associated costs and equivocal impacts that are more difficult to discern and anticipate. For one, developing and operating AI systems confers considerable economic and environmental burden. As it can also be anticipated, as AI-based clinical tools could amplify existing forces of marginalization and make redundant the work of persons engaged in meaningful, rewarding, prosocial vocational activities. In addition, the potential ethical and legal costs of incorporating AI into psychological practice are numerous. These include novel threats to the maintenance of professional standards related to privacy, safety/efficacy, dignity, and responsibility to society. Incorporating AI-based technology into the practice of psychology could moreover have untold philosophical impacts; it could alter humanity's collective identity and basic conceptions of knowledge, life, reality, and existence. It should be appreciated that, beyond the psychology clinic, the clients served by practicing psychologists will experience an increased presence of AI-based technologies in their environment, and these will have potential to impact their psychological well-being. For example, research has already documented adverse effects on humans of interacting with AI algorithms that are designed by profit-generating firms to optimize the user's behavioural, cognitive, and emotional engagement with their service (e.g., social media, online gambling).

3. Conclusion

Suggestions are to establish a working group or committee to explore in depth the impact that AI is having and will have on psychology , populate the working group with representatives from the three Canadian Psychological Association(CPA) pillars – Science, Practice, and Education - including a board liaison but the working group could be tasked with consulting with experts and stakeholders to create position and policy recommendations based on review of applicable

codes and laws, reviewing the CPA Code of Ethics, Tri-council Policy Statement: Ethical Conduct for Research Involving Humans, educational/institutional policies, and laws/regulations governing the practice of psychology with a view to identifying challenges and solutions related to AI implementation. A society of understanding of diverse human needs, behaviours and aspirations drive legislation, policies and programs for individuals, organizations and communities in advancing research, knowledge and the application of psychology in the service of society through advocacy, support and collaboration.

Compliance with ethical standards

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