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The Role of Artificial Intelligence in Studying Human Behaviour

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Abstract-- Disciplines like psychology, sociology, and economics have long focused on understanding human behavior—why people think, feel, and act the way they do. Even though they are useful, traditional methods like surveys, observations, and experiments frequently fall short in capturing the complex and dynamic nature of behavior. Large-scale, real-time, and context-aware behavioral analysis has been made possible by the development of artificial intelligence (AI), which has completely changed this environment. AI can identify patterns, forecast results, and offer tailored interventions in a variety of fields by utilizing methods like machine learning, deep learning, natural language processing, and computer vision. With a focus on applications in psychology, consumer behavior, education, and social interaction, this chapter examines how artificial intelligence is revolutionizing behavioral science. It critically looks at ethical issues such as algorithmic bias, privacy concerns, accountability, and the effects of behavioral manipulation by AI. The paper highlights the significance of responsible, transparent, and ethically guided AI deployment by incorporating interdisciplinary viewpoints. By bringing in insights from different disciplines, the chapter emphasizes the need for using AI responsible way, transparently, and ethically. It wraps up by discussing potential directions for future research, such as creating explainable AI frameworks, ensuring moral safeguards, and exploring wider applications in public policy, education, and neuromarketing (Brynjolfsson & McAfee, 2017; Hofman, Sharma, & Watts, 2017).

Keywords-- Artificial Intelligence, Human Behavior, Behavioral Science, Ethical AI

I. INTRODUCTION

Understanding the complexities of human behavior—why we think, feel, and act the way we do—has been a central quest for disciplines such as psychology, sociology, and economics for centuries. Traditionally, this pursuit has relied on methods such as surveys, direct observations, and controlled experiments. While invaluable, these methods often face limitations in terms of scale, objectivity, and the ability to capture behavior in its natural, dynamic context.

The emergence of Artificial Intelligence (AI) has fundamentally transformed this landscape. By leveraging machine learning, deep learning, natural language processing (NLP), and computer vision, AI offers a powerful set of tools capable of analyzing vast, diverse, and complex datasets that reflect real-world human activity. Whether it is social media interactions, online shopping habits, or even biometric data like facial expressions, tone of voice, and movement patterns, AI can handle a level of behavioral data that would be impossible for humans to manage alone. This capability allows researchers to identify subtle trends, uncover hidden correlations, and spot predictive cues in behavior that they might have missed before (Russell & Norvig, 2021; Lazer et al., 2009).. This allows researchers to uncover subtle trends, hidden correlations, and predictive behavioral cues that were previously beyond reach.

Importantly, AI does not merely replicate traditional methods more efficiently—it redefines how we study behavior. It facilitates continuous, real-time observation of individuals across multiple contexts, creating opportunities for longitudinal analysis and predictive modeling. This shift allows for greater personalization in behavioral interventions, from mental health support and education to marketing and policymaking. Furthermore, AI-powered tools are increasingly integrated into our daily lives through recommendation systems, digital assistants, wearable technologies, and mobile apps, all of which collect and respond to behavioral data—thus making the line between studying behavior and influencing it increasingly fluid.

However, the use of AI in understanding human behavior also invites critical questions: How do we ensure ethical use of behavioral data? Are AI predictions reliable and unbiased? What are the risks of reducing human complexity to algorithmic logic? These are not merely technical challenges but deeply philosophical and ethical concerns that must guide the design and deployment of AI systems.

This chapter explores how AI is not merely an advanced analytical tool but a revolutionary force that offers new paradigms for studying, understanding, and even predicting human behavior. We delve into the key applications, emerging methodologies, and interdisciplinary collaborations shaping this evolving field. Additionally, we examine the ethical frameworks and challenges that must accompany the rise of AI-driven behavioral science. As we move forward, the convergence of artificial intelligence and behavioral research holds immense potential—but it must be approached with responsibility, inclusivity, and a commitment to preserving human dignity.

- To explore the transformative role of Artificial Intelligence in studying, understanding, and predicting human behavior beyond traditional research methods.
 - To determine the most important uses of AI in a variety of behavioral science fields, such as psychology, consumer behavior, education, and social interaction. (Zuboff, 2019; Kietzmann, Paschen, & Treen, 2018).
 - To critically analyze the ethical considerations and challenges associated with using AI to study human behavior, including issues of privacy, bias, and accountability.
- To explore the transformative role of Artificial Intelligence in studying, understanding, and predicting human behaviour beyond traditional research methods

Artificial Intelligence (AI) is not just a tool for analyzing existing data, it's a paradigm shift in how we study, understand and shape human behavior. Traditional behavioral research methods—surveys, structured interviews, observational studies, and controlled experiments—though essential, have inherent limitations such as self-reporting, sample bias and difficulty in capturing real-time or context specific actions. These methods also cannot capture the complexity of human behavior which is influenced by cognitive, emotional, and social factors that are often unmeasured.

AI on the other hand provides a dynamic, scalable and adaptive framework for understanding behavior in its natural context. With computational techniques such as machine learning, deep reinforcement learning, natural language processing (NLP) and computer vision, AI can handle massive, multi-dimensional data—from social media interactions and biometric data to online consumer activity and real-world behavioral signals.

This allows researchers to detect patterns, predict actions and personalize interventions in ways that were previously unimaginable.

A key emerging application of AI is “AI for Human Learning and Behavior Change.” This uses AI tools to help people learn new skills and change their behavior through personalized recommendations, instant feedback and tailored information. For example AI driven platforms can enhance traditional teaching by tailoring the learning experience to individual performance. Think of a learner practicing piano. AI can track every key stroke, identify recurring mistakes and give real time feedback to speed up skill mastery. Similarly in behavior modification programs – such as those for smoking cessation – AI can track habits and offer timely interventions to encourage positive change. This level of personalization not only makes learning and behavior change more effective but more engaging and sustainable.

AI's role in influencing human decision making is just as powerful. A study by CSIRO's Data61 shows how AI systems using recurrent neural networks and deep reinforcement learning can learn to identify and exploit human choice patterns. In controlled experiments – from guiding people's choices between options to manipulating response patterns in cognitive tasks – AI was able to steer people towards specific decisions. Such findings show AI can understand decision making vulnerabilities and influence behavior which can be used ethically in areas like public health (healthy diets), environmental policy (renewable energy) and personal well being (steering away from harmful online content).

This shows AI goes beyond being an analytical tool; it shapes human behavior by offering tailored real time interventions and influences decision making. It provides a continuous, context aware and adaptive approach to behavioral science – bridging the gap between understanding behavior and guiding it to desirable outcomes. But this power requires careful ethical consideration to ensure AI's influence respects human autonomy and is used for the greater good not manipulation.

- To determine the most important uses of AI in a variety of behavioral science fields, such as psychology, consumer behavior, education, and social interaction. (Zuboff, 2019; Kietzmann, Paschen, & Treen, 2018).

This objective seeks to thoroughly investigate the applications of AI in diverse behavioral science domains, producing knowledge that can be put to use and expanding the research's usefulness.

By interpreting complex, large-scale data and offering real-time, adaptive solutions that capitalize on the dynamic nature of human behavior, artificial intelligence (AI) has emerged as a behavior-changing enabler in behavioral studies. AI-powered chatbots based on cognitive-behavioral therapy, such as Woebot and Wysa, provide large-scale, personalized emotional support. Early diagnosis of PTSD, anxiety, and depression is made possible by software for voice analysis and facial recognition that interprets subtle emotional cues. (Yarkoni & Westfall, 2017; Fitzpatrick, Darcy, & Vierhile, 2017).

AI in psychology helps with mental health screening and treatment. By analyzing text-based data, such as patient diaries or messages on social media, NLP-based algorithms are able to detect emotional distress. Cognitive-behavioral therapy-based AI-powered chatbots, like Woebot and Wysa, offer individualized emotional support on a large scale. Software for voice analysis and facial recognition helps interpret subtle emotional cues, enabling the early diagnosis of PTSD, anxiety, and depression.

AI is transforming how companies comprehend and impact consumer behavior, which is closely related to your research interests. In order to identify the unconscious factors influencing consumer choice, predictive analytics models examine past purchases, online browsing patterns, and even biometric information from eye-tracking or EEG-based neuromarketing tools (such as Affectiva and Emotiv). This enables companies to improve product placements, optimize marketing campaigns, and generate highly customized recommendations.

AI in Education-powered adaptive learning platforms in education, like DreamBox, Duolingo, or Coursera's personalized pathways, adjust the way content is delivered according to each student's learning style, strengths, and shortcomings. Intelligent tutoring systems provide real-time feedback, monitor progress, and even predict when a student is likely to disengage. By closing achievement gaps and raising student motivation, this individualization guarantees that educational interventions are more successful.

AI is used in social interaction and public behavior to investigate group behaviors in online communities, influence patterns, and opinion dynamics. Sentiment analysis driven by AI is used by platforms to monitor the evolution and dissemination of ideas, which is essential for crisis management, political campaigns, and policymaking. AI has the potential to influence collective behaviors for the benefit of society, as evidenced by the successful adoption of sustainable practices, healthy lifestyle adoption, and vaccination uptake in public health through AI-driven behavioral interventions.

This goal highlights the adaptability of AI in behavioral sciences by identifying these applications, turning it from a field that relies solely on observation to one that can perform proactive intervention, prediction, and personalization. Additionally, it positions AI as a cross-disciplinary collaborator that provides instruments to improve the accuracy, scalability, and impact of research. Crucially, connecting these uses to cutting-edge fields like consumer neuroscience and neuromarketing demonstrates how AI enables researchers to go beyond conventional data analysis and reveal more nuanced aspects of human behavior.

Key Applications of AI Across Domains of Behavioral Science

Domain	AI Applications	Examples/Tools
Psychology	Emotional state detection through text, speech, and facial expression analysis; AI-driven therapy tools.	Woebot, Wysa (AI chatbots), facial recognition for mental health assessment.
Consumer Behavior	Predictive analytics for purchase behavior; neuromarketing using EEG and facial coding; hyper-personalized marketing.	Affectiva (emotion AI), Emotiv (EEG devices), AI-driven product recommendations (e.g., Amazon).
Education	Adaptive learning platforms; intelligent tutoring systems; personalized content delivery based on student progress.	Duolingo, DreamBox, Coursera AI-based pathways.
Social Interaction	Sentiment analysis; mapping opinion dynamics; behavior tracking for public health and social policy interventions.	AI tools for misinformation detection, AI-driven public health campaigns.

- To critically analyze the ethical considerations and challenges associated with using AI to study human behavior, including issues of privacy, bias, and accountability.

Understanding and forecasting behavior on previously unheard-of scales is made possible by the incorporation of artificial intelligence into the study of human behavior. To make sure that the application of AI does not jeopardize social justice, individual rights, or public confidence, a number of ethical issues are brought up by this development and need to be carefully considered.

One of the most pressing concerns is privacy. Large datasets, including location tracking, biometric signals, digital communication, and personal information from social media activity, are commonly used in AI-powered behavioral research. Such data allows for deeper behavioral insights, but it blurs the boundaries between the public and private domains. Many times, people are unaware that their data is being gathered or utilized. (Tufekci, 2015; Zuboff, 2019). This increases the risk of surveillance-like activities, especially when AI systems are used to monitor online activity for commercial or research purposes. Ethical AI research must employ strict informed consent protocols, data anonymization, and robust data protection measures to safeguard individual autonomy.

Another major issue is algorithmic bias, which occurs when AI systems inherit biases from their training data or from developers' design choices. For instance, biased algorithms in hiring platforms may discriminate against specific demographic groups, and sentiment analysis tools may misinterpret emotions due to linguistic or cultural differences. In behavioral research, these biases can lead to erroneous interpretations, reinforce stereotypes, and produce false conclusions. (Rahwan et al., 2019; Hofman, Sharma, & Watts, 2017). Accountability is another big problem. Many AI models used in behavioral research, especially deep learning systems, operate as "black boxes," producing results without offering clear explanations for the decisions made. This lack of explainability undermines transparency and makes it difficult to hold researchers, organizations, or developers responsible for errors or harm caused by AI-driven interventions. To address this, explainable AI (XAI) frameworks must be put in place to ensure that algorithms generate results that are understandable and justified, particularly when impacting critical domains like public policy, criminal justice, or mental health diagnosis. (Rahwan and others, 2019). Furthermore, the potential for behavior manipulation raises ethical questions about autonomy and free will.

Experiments like those conducted by CSIRO's Data61 demonstrate that AI can identify and exploit weaknesses in human decision-making. Even though these tactics may be used for good—for instance, to promote pro-social behavior or healthy lifestyles—they run the risk of being misused for political or commercial gain. Establishing ethical standards and oversight processes is necessary to ensure that AI interventions respect human dignity and are in line with societal values. Donnellan (2021).

When these issues are critically examined, it becomes clear that the ethical quandaries brought up by AI in behavioral research are not only technical but also deeply philosophical and social. They require interdisciplinary dialogue that considers the perspectives of legislators, technologists, behavioral scientists, and ethicists. Only through such cooperative frameworks, which strike a balance between creativity and moral rectitude, can AI be ethically integrated into the study of human behavior. Furthermore, ethical concerns regarding autonomy and free will are brought up by the possibility of behavior manipulation. AI can recognize and take advantage of flaws in human decision-making, as shown by experiments such as those carried out by CSIRO's Data61. Such strategies run the risk of being abused for political or commercial gain, even though they might be employed for good—for example, to encourage pro-social behavior or healthy lifestyles. To guarantee that AI interventions uphold human dignity and are consistent with societal values, ethical standards and oversight procedures must be established.

Examining these concerns critically reveals that the moral dilemmas raised by AI in behavioral research are not just technical issues but also profoundly philosophical and social ones. They necessitate multidisciplinary discussion that takes into account viewpoints from ethicists, technologists, behavioral scientists, and legislators. AI can only be ethically incorporated into the study of human behavior through such cooperative frameworks, striking a balance between creativity and moral rectitude.

II. FUTURE SCOPE

There is a lot of room for further study and development at the nexus of behavioral science and artificial intelligence. Exploring explainable AI (XAI) frameworks that increase the transparency of complex algorithms is urgently needed as AI technologies advance, especially in delicate areas like education, mental health, and policymaking.



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In the study of human behavior, more research can concentrate on creating morally sound AI systems that reduce bias, safeguard privacy, and guarantee accountability. Additionally, there is a lot of room to grow the use of consumer neuroscience and neuromarketing applications, utilizing AI-powered technologies like facial coding and EEG to gain a better understanding of subconscious decision-making processes. Future research in education can look into adaptive AI-driven learning systems that anticipate and stop learning disengagement in addition to personalizing instruction. Moreover, interdisciplinary research integrating behavioral science, ethics, and policy studies is necessary to understand how AI influences broad social behaviors like advancing sustainability, enhancing public health, and thwarting disinformation. These paths demonstrate that AI is a catalyst for influencing human development in addition to being a tool for comprehending behavior. In order to guarantee that these innovations are used responsibly and promote both academic progress and societal well-being, scholars, practitioners, and policymakers can work together.

III. CONCLUSION

In the study of human behavior, artificial intelligence has become a revolutionary force, providing previously unheard-of chances to examine, comprehend, and even affect intricate behavioral patterns. By combining cutting-edge computational methods like deep reinforcement learning, machine learning, and natural language processing, artificial intelligence (AI) allows researchers to examine human decision-making, emotions, and thought processes at previously unreachable depths and scales. Through its ability to predict behavioral outcomes, personalize interventions, and enhance our comprehension of human cognition and social dynamics, this chapter has highlighted the diverse applications of AI in psychology, consumer behavior, education, and social interaction. But there are also serious methodological and ethical issues with integrating AI into behavioral science. Careful thought must be given to concerns about algorithmic bias, privacy, accountability, and the possibility of behavioral manipulation.

For technological advancements to be in line with societal values and respect human autonomy, it is imperative that AI applications in this field be guided by strong ethical frameworks, open methodologies, and interdisciplinary collaboration.

The ethical application of AI in behavioral research ultimately holds the potential to transform human learning, adaptation, and interaction, with significant ramifications for social advancement, organizational efficacy, and individual well-being. However, this promise can only be fulfilled if innovation is pursued in concert with a dedication to protecting human dignity and ethical vigilance.

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