

BOOK REVIEW

Tribes in Transition: Avadhesh Kumar 321 - 326
 Livelihood, Development
 and Sustainability

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Artificial Intelligence and Social Science: Insights To Opportunities

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Abstract: *The potential for artificial general intelligence has been seen in light of recent developments in artificial intelligence. Numerous studies on the intersection between social science and artificial intelligence have been prompted by the growing human-like capabilities of AI. The field of explainable artificial intelligence has recently seen a rebirth as practitioners and researchers attempt to make their algorithms more transparent. It should not be controversial to state that examining how people explain to one another can be a helpful beginning point for explanation in artificial intelligence. However, since AI is being used more and more in every aspect of contemporary life, it is imperative to talk about how it can be used in the social sciences. Present paper focuses various areas in which social science can face an impact of any nature, with the intervention of artificial intelligence and how later can be utilized to provide a help in social science research.*

Keywords: Artificial, Intelligence, Social Science, Online, Research, Subject

Introduction

Artificial intelligence (AI), it is commonly assumed that the study of natural sciences is where it belongs. The frequently made correlation gives the impression that hard science influences AI's nature and would be relevant to its derived applications.

mostly in the same industry. While AI may be successfully applied to a wide range of fields due to its evolving, interdisciplinary nature and, consequently, its multifaceted usage, media promoted the spread of AI-powered advances in robotics, IT, medicine, bioengineering, automotive, etc. Only once the organizational, social, and physical infrastructure have been established can the architecture of an independent, cooperative future be finished.

Social science is one of the rarely discussed academic disciplines where AI would make a significant contribution. Using clever, solution-focused methods to tackle today's complicated social issues could bring them closer to resolution than any social scientist's prior efforts.

Data collection, processing, and analysis were the social sciences' most resource-constrained areas. By providing fresh approaches to promote social welfare, technological developments—particularly in the area of artificial intelligence (AI)—such as data mining, machine learning, intelligent agents, intelligent procedures, and evolutionary computing—proved to broaden the scope of social science study in the present day.

Discussion

Applications of artificial intelligence in social Science

By the end of the 19th century, artificial intelligence (AI) was being used in the social sciences for purposes such as designing sampling plans, evaluating qualitative field notes, and using symbolic reasoning to advance theories (Brent, 1989). The present situation is depicted in a different way by technical developments, particularly in the areas of machine learning, artificial intelligence, and social science theory. Social science data sets can now be included in the same category as STEM data thanks to the development of big data and cloud computing (Wallach, 2014).

As a result, studies shifted from small, static network picture projects to larger, more intricate, dynamic ones with high-resolution data used for in-depth structural and content study of social processes. Social scientists can gain important insights by observing the social behaviours over longer periods of time and in virtual laboratories.

The migration of modern life to various social platforms (e.g., social interaction on Facebook and Twitter; online courses on Udemy and Coursera; dating on Tinder and Happn; networking on LinkedIn and InterNations; crowdfunding on Kickstarter and Kiss Kiss Bank Bank, etc.) brought about the majority of the social science that emerged from AI and its subsets, machine learning, data science, and data mining. By transferring interactions from real life to a virtual environment, new social behaviours are created (Wallach, 2016).

Social networking is used as a screening tool for possible employees. In the entertainment sector, attracting attention and boosting the quantity of "views," "likes," and "shares" produces a new workflow and currency. More relevant research questions, such as how much online behaviour influences or reflects offline environments and how (Althoff, 2017) it creates a more integrated ensemble between social science and computation.

Over an extended period of time, a vast amount of data can be gathered from the internet environment. Mao (2016) tackled the social problem of collaboration and its methods from a different angle by creating the "prisoner's dilemma" game to demonstrate the effects of applying the new computational tools in social science.

The time frame for the earlier research would have been little more than a few hours. Alternatively, this experiment was conducted in a virtual laboratory over 20 weekdays, gathering 94 people for 400 10-round "Prisoner's Dilemma" games.

In order to access the virtual laboratory, participants could log in from any location. The study was set up as a game in which two subjects in pairs would pretend to be two people who were suspected of committing murder, but only one of them actually did. Both of them would have the opportunity to strike back. One would be free if they chose to betray without being betrayed, while the other would be sentenced to three years in prison. Both would serve two years if they betrayed each other. There would be several rounds where subjects would be asked to make decisions. Each time, the participant would balance the advantages of cooperating with the risk of lengthier detention and the temptation to be released.

According to preliminary research, players would begin using retaliation in the early game stages as soon as they realized it was the right thing to do. However, the cooperation rate is highest during the initial rounds.

The results were different from those of the earlier, preliminary research. According to Mao et al. (2016), 40% of the participants shown resilience as cooperative individuals who would not retaliate, even at their own expense.

Extending the duration of an experiment and enabling it to be carried out from any location will eliminate the constraints of traditional social science and enable the academic field to grow beyond all prior limits, enabling it to investigate human behaviour and intricate social issues with greater precision and depth. The crisis mapping project (Watts et al., 2016) serves as an example of digital humanitarianism to demonstrate the impact of using a solution-oriented approach and the new computational tools within social science to a real-life environment.

Prior research supporting the relationship between team size and productivity revealed conflicting data, i.e., that a larger team would result in members being more likely to be idle as opposed to more productive and efficient because of the members' ability to specialize in a particular area and handle a set number of tasks.

Watts (2016) argued on the subjectiveness of the interpretability of results according to the different causal mechanisms and conducted an experiment in crisis mapping in a virtual lab, with varying teams in number, from 1 to 32 members. The objective was to create a real-time information map based on the posts from the social platforms that would serve the Philippino populations affected by the typhoon. The team's significant motivation was given by the real impact the application could have in the world. The more the size of the team increased, the more idle members of the team became. Notwithstanding, findings resulted in having the idle effect outweighed by the collective outcome from the collaborative effort of the large-sized team.

The motivation element may have an impact on the finding that a larger team is more productive even in the presence of the idle effect. Trying to solve a real-world issue where minimizing harm or saving lives can make all the difference. However, multidisciplinary research that employed clever social science methodologies in the "Prisoner's Dilemma" experiment and the crisis-mapping study would be necessary to get to this realization. The solutions found in a solution-oriented approach to real-world issues may wind up circling around a plethora of conflicting hypotheses that are poorly understood and have limited applicability.

Because of the global trend of social networks, which connects social science and computer science, scholars in both disciplines collaborate with the industry primarily to comprehend this new social behaviour in relation to social platforms. Since social science is expanding, an interdisciplinary approach is now necessary and cannot be put off. The methods listed below demonstrate how AI can be effectively used in social science:

1. Addressing the Issue of Incoherency

According to Hofman (2017), the incoherency problem occurs when a wide range of social science theories are not examined in relation to one another or in context. As a result, whether combined or interpreted separately, their explanations produce inconsistencies and contradictions.

According to Hofman, the collective incoherence of the theories would be resolved by a solution-based approach rather than theoretical advancement. When social scientists use the same theoretical and/or methodological framework to every idea they are investigating, problems arise. As a result, this systemic approach wins out when testing the theories is either impossible or not possible.

Social scientists may verify their theories in practice and produce precise forecasts with the help of the newly available AI resources. These days, social science can assess both individual and collective behaviour more accurately, on a greater scale, and over a longer time span thanks to digital traces and historical data. These days, the tests are more complicated and can be done virtually or even in virtual labs.

Gelam (2014) provides a partial answer to the incoherence problem by arguing in "Statistical Crisis in Science" that social science should emphasize the significance of replicability more than the novelty element. Once hypotheses must be repeatable rather than merely innovative in order to be deemed true, the number of published theories will begin to decline. According to Hofman (2017), it would be a first step in reducing the number of hypotheses, but it would not resolve the incoherence between the opposing ideas.

Reducing the problem's scope and using the AI common-task framework (Donoho, 2015) to social science might be a second way to address the incoherence issue. As opposed to a variety of opposing viewpoints on the same topic that branch out into numerous antithetical theories, the rivalry will arise between social scientists who would strive to solve specific tasks of an issue. Performance measurements will serve as the benchmarks for the solution, and performance can be evaluated openly using datasets accessible to all social scientists.

Over the past three decades, machine-learning algorithms for the common-task framework have made significant strides, particularly in machine translation (Cortana, Siri, etc.). The second potential solution's disadvantage is that social scientists would prefer to comprehend causation equally rather than merely being content with extremely precise forecasts.

2. Using some efficient methods, such as prediction or classification

Techniques of Artificial Intelligence are generally effective and efficient on achieving classification and prediction operations over objective data. In social sciences, it is an effective way to apply classification or predictions to analyse and understand more about the objective data. Social scientists have greatly diminished the value of prediction and substituted the interpretation of causal mechanisms. Instead of considering whether a specific, pertinent event can be predicted given the theory, one of the crucial features is that a particular coefficient from a model is regarded as statistically relevant for the prediction (Watts, 2014). Consequently, the incoherence

problem and a wave of criticism in the social science field were brought on by consistently nonreplicable results.

The social science landscape is expanding toward prediction as a means of explanatory capacity relevant to the topic matter due to technology improvements. By adding the pertinent context of the forecasts to their field of study rather than just their accuracy, computer scientists get an equal advantage.

The intricacy of human behaviour is and will continue to be a constraint on predictions. It ranges from somewhat predictable to extremely unpredictable. Findings for generally predictable behaviour include things like forecasting the whereabouts of 50,000 mobile phone users at any particular moment. According to Song et al. (2010), the prediction's accuracy would be 70% since all users would be in one of their most frequented locations 70% of the time. Furthermore, events like presidential elections, for example, are supported by results that are consistently predictable. Depending on the specifics of the task, the probability of obtaining a more accurate prediction varies.

The third group is exemplified by extremely erratic human behaviour, or "black-swan events" (Hofman, 2017), which are by definition unpredictably occurring (such as the 2008 financial crisis). Two limiting factors are still insufficient data and a significant degree of unpredictability. Nevertheless, Hofman (2017) contends that even with limitless data, the chance of outcomes changing is little, and it is even less for data that is hard to collect.

3. Monitoring target objects

The concept of tracking used here is for explaining the effectiveness of Artificial Intelligence in analysing big amount of data, which is often associated with social sciences oriented issues. Thanks to advanced abilities of intelligent techniques in this manner, it is easier to get the desired solutions rather than using traditional methods taking more and more time and wasting energy considering chaotic behaviours of social sciences oriented problems – objects to illustrate how well AI analyses large amounts of data, a capability frequently linked to problems in the social sciences. Considering the chaotic

behaviours of social science-oriented problems and objects, it is easier to obtain the desired solutions thanks to the increased skills of intelligent approaches in this way rather than utilizing traditional methods that take more and more time and waste energy.

There are occasions when the massive volume of data created makes it difficult to evaluate and extract the relevant information. The decision-making process consequently becomes more challenging, particularly during a complex social gathering. The statistical techniques' ability to handle the uncertainty component of data is particularly restricted. Leading developments in information processing and analysis made it possible for AI and decision support systems to work together to create the Intelligent Decision System (IDS), which combines the ability to understand human behaviour with the ability to help people decide on the best course of action. Nadu (2016)

4. Support for Expert Systems

Expert knowledge is frequently useful in the social sciences for problem-solving and thought processes. Here, expert systems can be used appropriately for objective social science-focused challenges that call for prior knowledge from subject matter experts in order to assess the objective problems and, if required, produce original solutions.

The SAGE platform, which combines natural language processing and expert systems to give students access to a comprehensive social science taxonomy and semantics search and recommendation engine that covers 1.5 million articles and more than 250 000 reference works, is an example of intelligent technology used successfully. Based on prior inquiries and the underlying relationships between concepts, topics, and content across social science disciplines of study, the platform suggests scholarly literature. It provides pertinent item finding from the text and categorizes and groups unstructured stuff.

Challenges in integrating AI into social science

Quasi-interdisciplinary approach.

Wallach's (2014) perspective on quasi-interdisciplinary environments, where a team of researchers is composed of either social scientists with computational interests or computer scientists with social

interests, but rarely cohesive teams of each, exemplifies one of the largest challenges in applying AI to social science. As a result, the technique does not adequately address the social issue, which hinders and fragments the research. The disparity between the research and the lack of agreement over the scientific goal, which can occur in the aforementioned kinds of settings, is another disadvantage.

Interpretation and Forecasting

Social scientists concentrate on the causative mechanisms, how behaviours are conditioned, what caused them to arise, etc., after first defining the conditions under which social behaviours occur. Intelligent methods created to improve data analysis or forecast accuracy are ignored at the price of responsible justifications. Prediction bias gave rise to the belief that prediction accuracy might produce intricate models that are uninterpretable because of their low generalization and provide information that is not very useful. Conversely, for a variety of reasons, causal mechanisms and prediction accuracy are not mutually exclusive.

1. According to Hofman et al. (2017), generalization errors happen to both basic and complicated models equally. The reason might be computational (i.e., modelling limitations) or specific to each researcher and their methodology. According to Schapire (2003), "bagging and boosting" is a technique that reduces generalization error without reducing it by making the model more complex.
2. By optimizing and minimizing the generalization error, nearly ideal prediction and insight can be obtained.

By developing a more reproducible social science that is more practical and solution-focused, the multidisciplinary path can be carved out and the bias for prediction can be reversed once these three factors are enabled. It is not appropriate for sophisticated predictive modelling to take the role of conventional social science methods.

If the investigation use established benchmarks or other studies to validate with preregistered expectations, the likelihood that a causal mechanism would be repeatable will improve steadily. Based on exploratory investigation, the replicability drastically declines if

subjective interpretation is allowed, and there is little predictive accuracy.

Resistance to AI – Trust

Practical, clever, solution-oriented approaches are gradually replacing traditional, statistical methodologies, which are no longer valid. According to Enkel (2017), there are five steps in the general process of skilled jobs: 1) Collecting data, 2) Processing data, 3) Interpreting the results, 4) Selecting the best course of action, and 5) Putting it into action. As a result, the skill set required for any job that uses this broad workflow will change. In the near future, AI will overtake humans due to its unrelenting pace, volume of learning, increased storage capacity, data processing, and precise prediction.

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The banking sector offers yet another illustration. Sentient Company used AI to execute programs on 1.5 million CPUs and trade equities without the need for human interaction. The AI system had more experience than the world's top trader since it could trade continuously in the digital age, extending the 24-hour period, and it could make trillions of judgments at a high trading frequency rate. (Hodjat, 2015). Notwithstanding the instances in which AI can support workers across a variety of businesses and in social science, the same kind of resistance exists in all corporate domains and is less prevalent in research.

Although more accurate analysis of objective data can lead to better conclusions and quicker, creative solutions, resistance to automated reasoning is frequently seen, especially when significant decisions must be made.

Trusting technology and trussing the firm are the two key problems that currently prevent the use of intelligent procedures instead of current statistical methodologies, according to Harvard Review (2017). According to the report, operational safety and data security are the two requirements for people to trust technology. Additionally, three secondary aspects—usability, trialability, and cognitive compatibility—were demonstrated.

The alignment of user values with an AI-powered system is known as cognitive compatibility.

It explains how if the algorithm was clear, a consumer would be more likely to trust technology.

While usability refers to how intuitive technology turns out to be and so lessens users' resistance when meeting an accessible interface, trialability is defined as enabling the user to do a trial in order to perceive the danger or lack thereof.

Furthermore, in order for trust to be developed, clever strategies that could result in quicker, creative solutions would need to be applied gradually, enabling social learning to occur gradually. The likelihood that consumers would adopt new technology was influenced by transparency and stakeholder alignment. Even if there seems to be less resistance to using AI in social science than in the commercial sector, trust is still a crucial component required for AI to be successfully used in research across all boundaries.

Conclusion

It is recommended that an interdisciplinary platform be developed in order to foster a socially-computationally advantageous environment that advances AI and social science. It is not necessary to study STEM and the social sciences apart from any other complementing fields. With the cooperation of social scientists and computer scientists who share the same research goal, contemporary, complicated social issues can be examined through a practical, solution-oriented lens.

Small steps, such as attending conferences outside of one's own field of study, participating in interdisciplinary workshops, and creating collaborative projects that may lead to dual publication in two

scientific journals of the various disciplines, can lead to interdisciplinary research.

The two parties must completely comprehend the same research objective and begin doing joint research based on it, which highlights one crucial element. In order to reduce subjective interpretability, it might occasionally be advantageous for both sides to restrict the study's scope. Collaboration success can be determined by mutual understanding of each other's disciplinary code of work, methodology, organization, and standards.

Furthermore, in order to address the necessity of separating computer science from social science and not restricting the use of AI to anyone further suggestion would be to begin training the next generation of researchers in an interdisciplinary setting in order to address the need to avoid separating social science from computer science and to not restrict the use of AI to any other area it may be useful to. Scientists of the future may foster an unbiased perspective, be computationally and socially minded, and adhere to curricula that would enable the study of both the natural and social sciences in tandem. This benefit would make it easier to train in both fields under a single curriculum. Examining social science from an artificial intelligence perspective will push the limits of existing knowledge, resolve the incoherence issue, provide a better understanding of human behaviour, and assist in resolving intricate societal challenges.

The analytical depth of research studies can be greatly increased by using AI's ability to do intricate statistical analysis and create visuals based on real data. Additionally, AI provides new tools for NLP tasks like sentiment analysis and topic modelling, which are being used more and more in social science research (Babu & Kanaga, Citation 2022; Ciechanowski et al., Citation 2020). By assisting researchers in identifying hidden patterns and feelings in huge datasets, these technologies can enhance their analysis.

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Women Empowerment: A Key To Sustainable Development

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Abstract: *The present research paper explores the importance of Women Empowerment as one of the key factors in Sustainable Development. Empowering women is one of the important goals in achieving sustainable development throughout the world. It has been found that men have greater access to resources and opportunities as compared to women. Such kind of gender inequality can be found in other aspects of life as well, such as – access to education, finances, jobs, etc. The UN Women (2011) has made Gender Equality to be the goal which should be achieved. The present paper shall try to explain the concept of Women empowerment and how empowering women can lead to sustainable development. In addition, the paper shall also try to present the prevailing status of Women Empowerment in India.*

Introduction

The term ‘Women empowerment’ refers to the process through which tools, resources, and prospects are made available to women, thus, enabling them to attain equality in all spheres of life viz. social, economic and political aspects. One of the main objectives of women empowerment is to form an inclusive and unbiased society where all women can enjoy the freedom to participate and thrive.

Various researchers have defined Women empowerment in numerous ways. Following is some of the definitions which throw light on the meaning of the concept of “Women Empowerment”: