

Editorial

Advances in artificial intelligence

Recent advances in artificial intelligence have powered a new digital revolution. These advances have an impact on many industries, from health care to agriculture, the number of applications continues increasing in a daily basis [1]. Two main factors have allowed for these applications to thrive. First, the calculation capabilities of modern computers. Improvements in speed, reliability, adaptability, storage and accuracy, modern computers are far from the systems we had two decades ago [2]. Second, the vast amount of data from many sources. As an example, the ubiquity of mobile devices allows people to feed information in real time from everyday situations to social networks [3].

The transformative power of artificial intelligence to improve responses to humanitarian emergencies, increase crops productivity, and help doctors to identify illnesses, also come with challenges. Some of such are technical challenges, as for example, selecting the right data set. Data-driven models are at the core of artificial intelligence, black-box or data-driven models, are models based exclusively on constructing a model from empirical data from the task at hand [4]. Ensuring a high-quality data-set for model development is key for the development of any artificial intelligence solution.

Collecting data that accurately represents the process upon which we want to make predictions is not a straightforward task. There are many applications where data is scarce, and difficult to collect. As an example, we are interested in analyzing fraudulent transactions, however, the data set we have available contains only few verifiable examples of such transactions. To address this problem there are two approaches that have proven to be useful in many applications: a) to use synthetic data [5] or b) the use of transfer learning [6].

Aside the technical challenges, there are also some ethical concerns related to artificial intelligence. There are some concerns ranging from issues of transparency, trust and security, to concerns about displacing jobs and exacerbating inequalities [7]. For example, machine learning can be used to generate fake video and audio to influence votes, policy-making and governance. In face of these challenges, a reasonable question to ask is: what is the role of us as engineers to ensure artificial intelligence is used for good?

Our responsibility is to adopt relevant international standards and share important details and transparent information from our research. Thus, allowing others to replicate and asses our work. Adopting these practices have boosted the advances in artificial intelligence research. It is paramount to continue and reinforce these practices, as this is the only way to bring the benefits of AI advances to the entire world, while mitigating its negative effects.

Milton Sarria
Editor Revista CESTA
Universidad Santiago de Cali

REFERENCES

- [1] R. Cioffi, M. Travaglioni, G. Piscitelli, A. Petrillo & F. De Felice, “Artificial intelligence and machine learning applications in smart production: Progress, trends, and directions,” *Sustainability*, vol. 12, no. 2, pp. 1–26, 2020. <https://doi.org/10.3390/su12020492>
- [2] N. Gupta, “Chapter One - Introduction to hardware accelerator systems for artificial intelligence and machine learning,” in *Advances in Computers*, vol. 122. Ned: Elsevier, 2021, pp. 1–21. <https://doi.org/10.1016/bs.adcom.2020.07.001>
- [3] V. Tyagi & A. Kumar, “Internet of Things and social networks: A survey,” presented at *2017 International Conference on Computing, Communication and Automation*, ICCCA, Greater Noida, In, 5-6 May. 2017, pp. 1268–1270. <https://doi.org/10.1109/CCAA.2017.8230013>
- [4] E. Ntoutsis, P. Fafalios, U. Gadiraju, V. Iosifidis, W. Nejdl, M. E. Vidal, S. Ruggieri, F. Turini, S. Papadopoulos, E. Krasanakis, I. Kompatsiaris, K. Kinder-Kurlanda, C. Wagner, F. Karimi, M. Fernandez, H. Alani, B. Berendt, T. Kruegel, C. Heinze, K. Broelemann, G. Kasneci, T. Tiropanis & S. Staab, “Bias in data-driven artificial intelligence systems—An introductory survey,” *WIREs*, vol. 10, no. 3, pp. 1–14, Dec. 2019. <https://doi.org/10.1002/widm.1356>
- [5] C. Shorten & T. M. Khoshgoftaar, “A survey on image data augmentation for deep learning,” *J Big Data*, vol. 6, no. 1, pp. 1-48, jul. 2019. <https://doi.org/10.1186/s40537-019-0197-0>
- [6] X. Han, Z. Zhang, N. Ding, Y. Gu, X. Liu, Y. Huo, J. Qiu, L. Zhang, W. Han, M. Huang, Q. Jin, Y. Lan, Y. Liu, Z. Liu, Z. Lu, X. Qiu, R. Song, J. Tang, J.-R. Wen, J. Yuan, W. Xin Zhao & J. Zhu, “Pre-trained models: Past, present and future,” *AI Open*, In press, 2021 <https://doi.org/10.1016/j.aiopen.2021.08.002>
- [7] K. Siau & W. Wang, “Artificial intelligence (AI) ethics: ethics of AI and ethical AI,” *JDM*, vol. 31, no. 2, pp. 74–87, 2020. <https://dx.doi.org/10.4018/jdm.2020040105>