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Blending Statistics with Artificial Intelligence

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In the previous century, statisticians played the most central role in the field of data analysis, which was primarily focused on analyzing structured data, often stored in relational databases. Statistical techniques were commonly employed to extract insights from these data. The last few decennia have marked a substantial change in the way data are generated, used and analyzed. The term data analysis is mainly replaced by data science now to encompass a broader scope that combines elements of statistics, computer science, and domain knowledge to extract knowledge and insights, including both structured and unstructured data. This changing and expanding landscape requires a collaborative effort involving computer scientists, mathematicians, engineers and statisticians, inherently rendering the role of statisticians more limited as it used to be.

During the last few years this broader data science field was revolutionized itself by the rapid expansion of Artificial Intelligence (AI), where concepts such as Deep Learning, Convolutional Neural Networks and Large Language Models have proven to be nothing less than disruptive in many fields, not the least in industrial applications and quality engineering –the home ground of industrial statisticians.

In this talk I will share some of the opportunities I see for statisticians in the field of Artificial Intelligence. I will touch upon aspects such as variable and sample selection (and relate it to Design of Experiments) and outlier detection (and relate it to robust statistics) and provide examples where we blended statistics into an efficient AI learning strategy.

Keywords

statistics, artificial intelligence, combination

Classification

Both methodology and application

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