

In 1998, Hayashi Chikio argued for data science as a new, interdisciplinary concept, with three aspects: data design, collection, and analysis. In contrast, data science deals with quantitative and qualitative data (e.g., from images, text, sensors, transactions, customer information, etc.) and emphasizes prediction and action. Andrew Gelman of Columbia University has described statistics as a non-essential part of data science. Moreover, both fields benefit from critical thinking and domain knowledge, as understanding the context and nuances of the data is essential for accurate analysis and modeling. Turing Award winner Jim Gray imagined data science as a "fourth paradigm" of science (empirical, theoretical, computational, and now data-driven) and asserted that "everything about science is changing because of the impact of information technology" and the data deluge. After the 1985 lecture at the Chinese Academy of Sciences in Beijing, in 1997 C. Data scientists often work with unstructured data such as text or images and use machine learning algorithms to build predictive models and make data-driven decisions. For example, a data analyst might analyze sales data to identify trends in customer behavior and make recommendations for marketing strategies. The field encompasses preparing data for analysis, formulating data science problems, analyzing data, developing data-driven solutions, and presenting findings to inform high-level decisions in a broad range of application domains. "Data science" became more widely used in the next few years: in 2002, the Committee on Data for Science and Technology launched the Data Science Journal. Big data is a related marketing term. During the 1990s, popular terms for the process of finding patterns in datasets (which were increasingly large) included "knowledge discovery" and "data mining". Data scientists are often responsible for collecting and cleaning data, selecting appropriate analytical techniques, and deploying models in real-world scenarios. In 1996, the International Federation of Classification Societies became the first conference to specifically feature data science as a topic. A data scientist is a professional who creates programming code and combines it with statistical knowledge to create insights from data. Both fields require a solid foundation in statistics, programming, and data visualization, as well as the ability to communicate findings effectively to both technical and non-technical audiences. In a 2001 paper, he advocated an expansion of statistics beyond theory into technical areas; because this would significantly change the field, it warranted a new name. In 1962, John Tukey described a field he called "data analysis", which resembles modern data science. A data scientist is a professional who creates programming code and combines it with statistical knowledge to create insights from data. While both fields involve working with data, data science is more of an interdisciplinary field that involves the application of statistical, computational, and machine learning methods to extract insights from data and make predictions, while data analysis is more focused on the examination and interpretation of data to identify patterns and trends. In 1962, John Tukey described a field he called "data analysis", which resembles modern data science. Big data is a related marketing term. Despite these differences, data science and data analysis are closely related fields and often require similar skill sets. Data science also integrates domain knowledge from the underlying application domain (e.g., natural sciences, information technology, and medicine). Data analysts typically use statistical methods to test these hypotheses and draw conclusions from the data.