



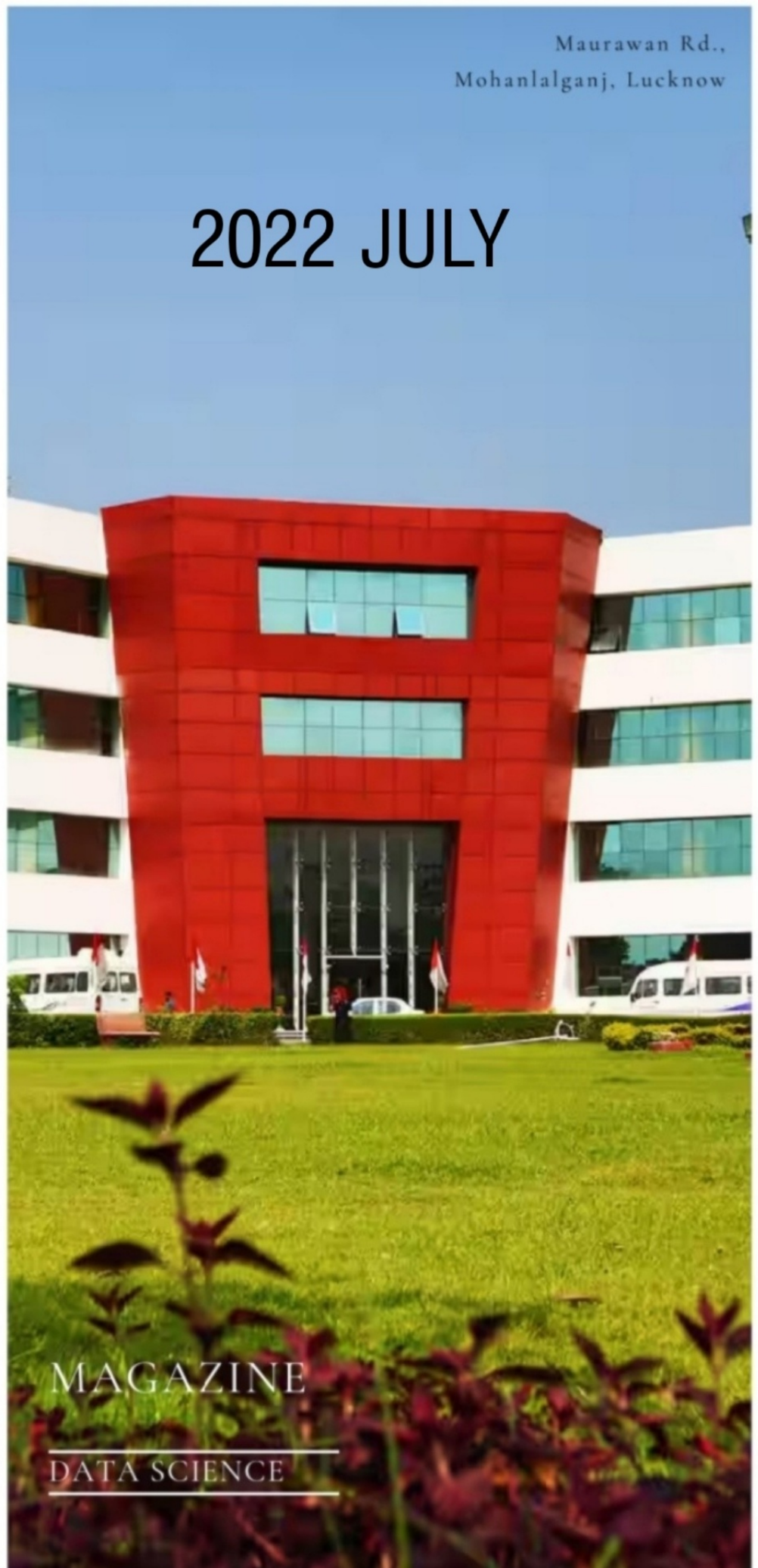
AMBALIKA

GROUP OF INSTITUTIONS

IT. DEPARTMENT

Maurawan Rd.,
Mohanlalganj, Lucknow

2022 JULY



MAGAZINE

DATA SCIENCE

MESSAGE FROM CHAIRMAN

It is an honor to welcome and introduce you to Ambalika Institute of Management & Technology. It is a dynamic trust, a confluence, an institute dedicated to shape its students into future managers and engineers par excellence and a vision for tomorrow's need.

Our curriculum not only focuses on providing expertise in theoretical aspects but also emphasizes on ensuring the right corporate and technical exposure. Our faculty comprises of experts, both from the education and corporate world who create/nurture professionals from students. A novel academic life of joy, happiness and creative knowledge awaits the student at Ambalika Institute of Management & Technology.



MESSAGE FROM DIRECTOR

I bid a warm welcome to all aspirants seeking admission at our institute and to all our new students. You are in the process of going beyond the paradigm which has fueled your younger life. You will now be taking ownership of your life, your mind, and your education as you combine academic study with the excitement of discovery in an environment of intellectual stimulation. It has always been our endeavour to provide affordable quality education while equipping our students with knowledge and skills in their chosen stream, identifying their hidden talents and providing opportunities for them to realize their full potential to innovate, achieve and excel.

It is for this very purpose that Ambalika Institute of Management and Technology obtained the coveted NBA certification in 2019 for its UG Engineering Programs: Computer Science & Engineering and Mechanical Engineering. Presently only 12 Private Colleges and 6 Govt. Technical Institutes in Uttar Pradesh have valid NBA Accreditation.

Accreditation by the National Board of Accreditation is a process of quality assurance and improvement, whereby a program in an approved Institution is critically appraised to verify that the Institution or the program continues to meet and/or exceed the Norms and Standards prescribed by the regulator from time to time.

It is a kind of recognition which indicates that a program or Institution fulfills certain rigorous international standards. The NBA accreditation process drills down to its intricate layer of the institution's programs and closes all its loops in terms of Course Outcomes (COs), Program Outcomes (POs), Program Specific Outcomes (PSOs), Program Educational Objectives (PEOs), Program Curriculum, Teaching-Learning Processes, Assessment Methodologies, the Pedagogy, Infrastructure, Delivery System, etc.



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DEPARTMENT VISION

To nurture students to the global standards in quality of education, research and development in information technology by adapting to the rapid technological advancement & infusing moral values.

DEPARTMENT MISSION

1: To produce technologically competent and ethically responsible graduates

2: To take up researches in collaboration with professional societies to make the nation as a knowledge-power

3: To nurture extra-curricular skills and ethical values in students to meet the challenges of building a strong nation

PROGRAM EDUCATIONAL OBJECTIVES

PEO 1: To prepare our students to find suitable employment commensurate with their qualification.

PEO 2: To create good entrepreneurs who may contribute to the nation building and generate job opportunities for others.

PEO 3: To develop proficiency in students for higher studies and R & D for the solution of complex problems for betterment of the society.

PEO 4: To develop students as responsible citizens with high moral and ethical values who can become asset to a vibrant nation.

PROGRAM OUTCOMES

PO 1: ENGINEERING KNOWLEDGE: APPLY THE KNOWLEDGE OF MATHEMATICS, SCIENCE, ENGINEERING FUNDAMENTALS, AND AN ENGINEERING SPECIALIZATION TO THE SOLUTION OF COMPLEX ENGINEERING PROBLEMS.

PO 2: PROBLEM ANALYSIS: IDENTIFY, FORMULATE, REVIEW RESEARCH LITERATURE, AND ANALYZE COMPLEX ENGINEERING PROBLEMS REACHING SUBSTANTIATED CONCLUSIONS USING FIRST PRINCIPLES OF MATHEMATICS, NATURAL SCIENCES, AND ENGINEERING SCIENCES.

PO 3: DESIGN/DEVELOPMENT OF SOLUTIONS: DESIGN SOLUTIONS FOR COMPLEX ENGINEERING PROBLEMS AND DESIGN SYSTEM COMPONENTS OR PROCESSES THAT MEET THE SPECIFIED NEEDS WITH APPROPRIATE CONSIDERATION FOR THE PUBLIC HEALTH AND SAFETY, AND THE CULTURAL, SOCIETAL, AND ENVIRONMENTAL CONSIDERATIONS.

PO 4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: USE RESEARCH-BASED KNOWLEDGE AND RESEARCH METHODS INCLUDING DESIGN OF EXPERIMENTS, ANALYSIS AND INTERPRETATION OF DATA, AND SYNTHESIS OF THE INFORMATION TO PROVIDE VALID CONCLUSIONS

PO 5: MODERN TOOL USAGE: CREATE, SELECT, AND APPLY APPROPRIATE TECHNIQUES, RESOURCES, AND MODERN ENGINEERING AND IT TOOLS INCLUDING PREDICTION AND MODELING TO COMPLEX ENGINEERING ACTIVITIES WITH AN UNDERSTANDING OF THE LIMITATIONS.

PO 6: THE ENGINEER AND SOCIETY: APPLY REASONING INFORMED BY THE CONTEXTUAL KNOWLEDGE TO ASSESS SOCIETAL, HEALTH, SAFETY, LEGAL AND CULTURAL ISSUES AND THE CONSEQUENT RESPONSIBILITIES RELEVANT TO THE PROFESSIONAL ENGINEERING PRACTICE.

PO 7: ENVIRONMENT AND SUSTAINABILITY: UNDERSTAND THE IMPACT OF THE PROFESSIONAL ENGINEERING SOLUTIONS IN SOCIETAL AND ENVIRONMENTAL CONTEXTS, AND DEMONSTRATE THE KNOWLEDGE OF, AND NEED FOR SUSTAINABLE DEVELOPMENT.

PO 8: ETHICS: APPLY ETHICAL PRINCIPLES AND COMMIT TO PROFESSIONAL ETHICS AND RESPONSIBILITIES AND NORMS OF THE ENGINEERING PRACTICE

PO 9: INDIVIDUAL AND TEAM WORK: FUNCTION EFFECTIVELY AS AN INDIVIDUAL, AND AS A MEMBER OR LEADER IN DIVERSE TEAMS, AND IN MULTIDISCIPLINARY SETTINGS.

PO 10: COMMUNICATION: COMMUNICATE EFFECTIVELY ON COMPLEX ENGINEERING ACTIVITIES WITH THE ENGINEERING COMMUNITY AND WITH SOCIETY AT LARGE, SUCH AS, BEING ABLE TO COMPREHEND AND WRITE EFFECTIVE REPORTS AND DESIGN DOCUMENTATION, MAKE EFFECTIVE PRESENTATIONS, AND GIVE AND RECEIVE CLEAR INSTRUCTIONS.

PO 11: PROJECT MANAGEMENT AND FINANCE: DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF THE ENGINEERING AND MANAGEMENT PRINCIPLES AND APPLY THESE TO ONE'S OWN WORK, AS A MEMBER AND LEADER IN A TEAM, TO MANAGE PROJECTS AND IN MULTIDISCIPLINARY ENVIRONMENTS.

PO 12: LIFE-LONG LEARNING: RECOGNIZE THE NEED FOR, AND HAVE THE PREPARATION AND ABILITY TO ENGAGE IN INDEPENDENT AND LIFE-LONG LEARNING IN THE BROADEST CONTEXT OF TECHNOLOGICAL CHANGE.

WHAT IS DATA SCIENCE?

DATA SCIENCE DEFINED

Data science combines multiple fields, including statistics, scientific methods, artificial intelligence (AI), and data analysis, to extract value from data. Those who practice data science are called data scientists, and they combine a range of skills to analyze data collected from the web, smartphones, customers, sensors, and other sources to derive actionable insights.



Data science encompasses preparing data for analysis, including cleansing, aggregating, and manipulating the data to perform advanced data analysis. Analytic applications and data scientists can then review the results to uncover patterns and enable business leaders to draw informed insights.



DATA SCIENCE: AN UNTAPPED RESOURCE FOR MACHINE LEARNING

DATA SCIENCE IS ONE OF THE MOST EXCITING FIELDS OUT THERE TODAY. BUT WHY IS IT SO IMPORTANT?

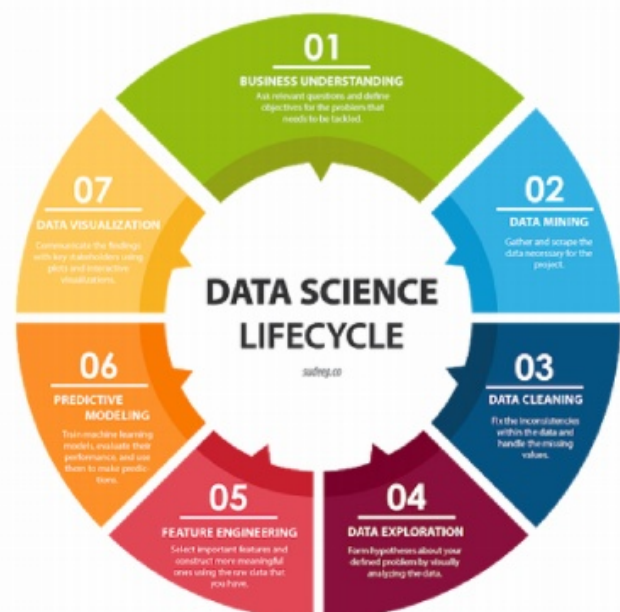
Because companies are sitting on a treasure trove of data. As modern technology has enabled the creation and storage of increasing amounts of information, data volumes have exploded. It's estimated that 90 percent of the data in the world was created in the last two years. For example, Facebook users upload 10 million photos every hour.

But this data is often just sitting in databases and data lakes, mostly untouched.

The wealth of data being collected and stored by these technologies can bring transformative benefits to organizations and societies around the world—but only if we can interpret it. That's where data science comes in.

Data science reveals trends and produces insights that businesses can use to make better decisions and create more innovative products and services. Perhaps most importantly, it enables machine learning (ML) models to learn from the vast amounts of data being fed to them, rather than mainly relying upon business analysts to see what they can discover from the data.

Data is the bedrock of innovation, but its value comes from the information data scientists can glean from it, and then act upon.



WHAT'S THE DIFFERENCE BETWEEN DATA SCIENCE, ARTIFICIAL INTELLIGENCE, AND MACHINE LEARNING?

To better understand data science—and how you can harness it—it's equally important to know other terms related to the field, such as artificial intelligence (AI) and machine learning. Often, you'll find that these terms are used interchangeably, but there are nuances.

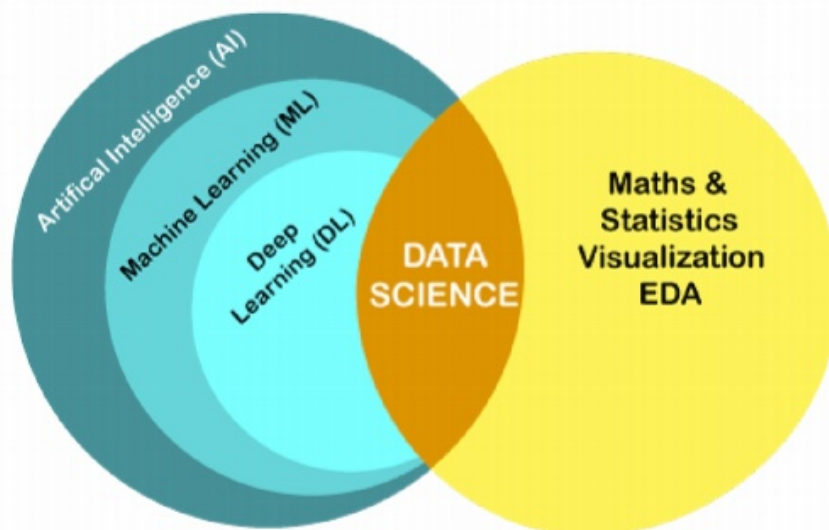
Here's a simple breakdown:

AI means getting a computer to mimic human behavior in some way.

Data science is a subset of AI, and it refers more to the overlapping areas of statistics, scientific methods, and data analysis—all of which are used to extract meaning and insights from data..

Machine learning is another subset of AI, and it consists of the techniques that enable computers to figure things out from the data and deliver AI applications. And for good measure, we'll throw in another definition.

Deep learning which is a subset of machine learning that enables computers to solve more complex problems.



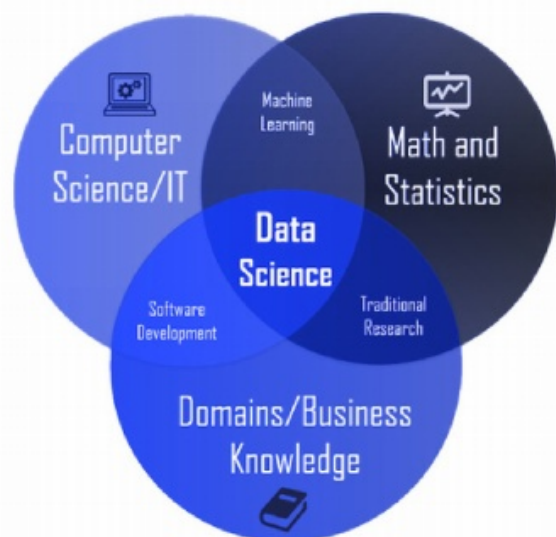
RELATIONSHIP TO STATISTICS

Many statisticians, including Nate Silver, have argued that data science is not a new field, but rather another name for statistics. Others argue that data science is distinct from statistics because it focuses on problems and techniques unique to digital data.

Vasant Dhar writes that statistics emphasizes quantitative data and description. In contrast, data science deals with quantitative and qualitative data (e.g. images) and emphasizes prediction and action.

Andrew Gelman of Columbia University has described statistics as a nonessential part of data science. Stanford professor David Donoho writes that data science is not distinguished from statistics by the size of datasets or use of computing, and that many graduate programs misleadingly advertise their analytics and statistics training as the essence of a data science program.

He describes data science as an applied field growing out of traditional statistics. In summary, data science can be therefore described as an applied branch of statistics.



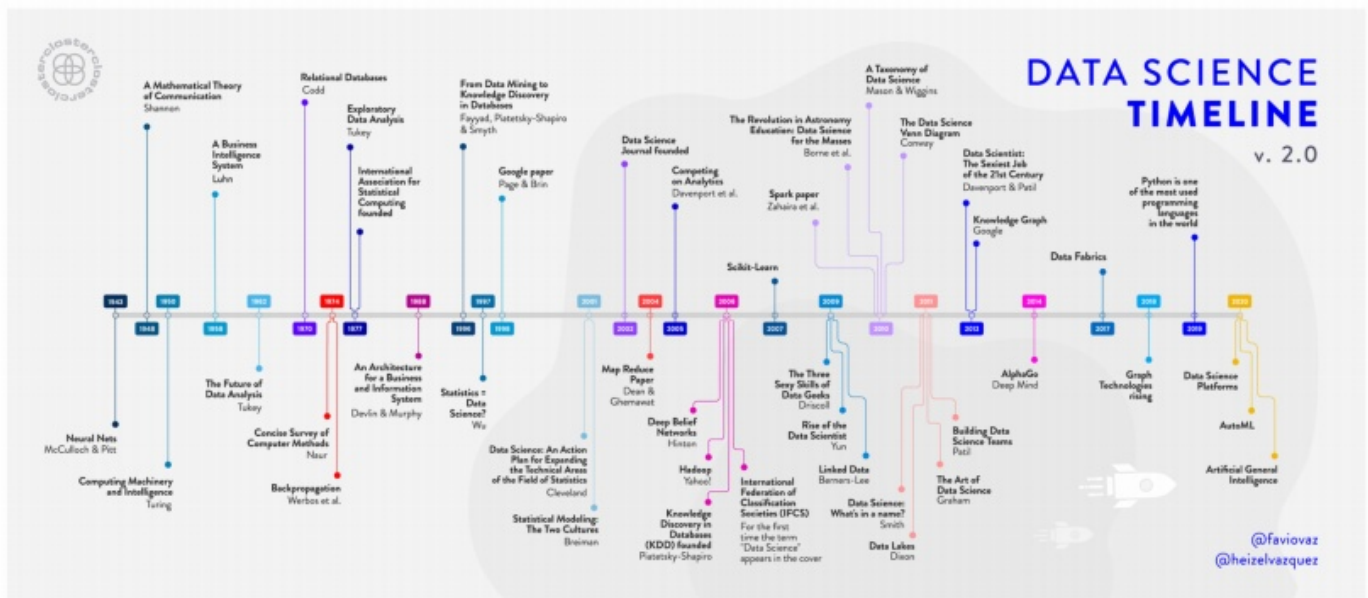
WHY DATA SCIENCE?

HERE, ARE SIGNIFICANT ADVANTAGES OF USING DATA ANALYTICS TECHNOLOGY:

Data is the oil for today's world. With the right tools, technologies, algorithms, we can use data and convert it into a distinctive business advantage.

Data Science can help you to detect fraud using advanced machine learning algorithms:

1. It helps you to prevent any significant monetary losses.
2. Allows to build intelligence ability in machines.
3. You can perform sentiment analysis to gauge customer brand loyalty.
4. It enables you to take better and faster decisions.
5. Helps you to recommend the right product to the right customer to enhance your business



EVOLUTION OF DATA SCIENCE

Data Science Deconstructed



SKILLS REQUIRED



DATA SCIENCE COMPONENTS

HOW DATA SCIENCE CHANGE THE WORLD?

The most important job of a data scientist is to be able to predict the future trends of a system accurately. In fact, they answer the questions about the future. ... Data science also helps to predict the potential of an athlete as well as using various data of athletic to build career success for the generations.

CONCLUSION

The practice of Data Science can best be described as a combination of analytical engineering and exploration. The business presents a problem we would like to solve. Rarely is the business problem directly one of our basic data mining tasks. We decompose the problem into subtasks that we think we can solve, usually starting with existing tools.

For some of these tasks we may not know how well we can solve them, so we have to mine the data and conduct evaluation to see. If that does not succeed, we may need to try something completely different. In the process we may discover knowledge that will help us to solve the problem we had set out to solve, or we may discover something unexpected that leads us to other important successes.

Neither the analytical engineering nor the exploration should be omitted when considering the application of data science methods to solve a business problem. Omitting the engineering aspect usually makes it much less likely that the results of mining data will actually solve the business problem.

Omitting the understanding of process as one of exploration and discovery often keeps an organization from putting the right management, incentives, and investments in place for the project to succeed.