

# Research on Curriculum Optimization for Big Data Major Based on Digital Intelligence Technologies

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## Abstract

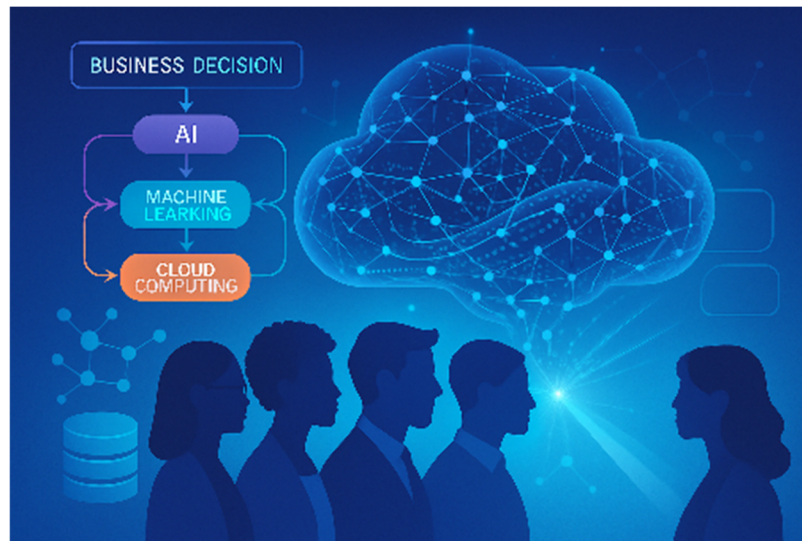
In recent years, the rapid advancement of big data technology has led to a significant surge in the demand for professionals who specialize in this field within society. As a result, educational institutions are facing the critical challenge of how to effectively adapt and update their curriculum systems for big data majors to keep pace with the swiftly evolving market requirements. This paper seeks to delve into this issue by examining the current state and existing challenges within the realm of big data education. Furthermore, it aims to integrate the latest trends in artificial intelligence, machine learning, and cloud computing to propose a comprehensive set of strategies for curriculum optimization. The primary objective of these strategies is to equip big data professionals with enhanced practical skills, robust innovative capabilities, and a competitive edge in the job market, thereby ensuring they are well-prepared to meet the demands of an ever-changing industry landscape.

## Keywords

Big Data Major; Curriculum Optimization; Digital Intelligence Technologies; Educational Strategies.

## 1. Introduction

In today's digital age, big data has emerged as a vital asset for numerous industries, profoundly reshaping the operational landscapes and decision-making frameworks of companies across the board [1]. The advent of technologies that allow for the processing and analysis of massive datasets has sparked a significant surge in the demand for professionals well-versed in the intricacies of big data [2]. As shown in Figure 1, Artificial Intelligence (AI), Machine Learning (ML), and Cloud Computing have become indispensable components in the realm of big data processing, facilitating the efficient analysis of data and the extraction of meaningful insights [3][4]. Nevertheless, the swift evolution of these technologies introduces a set of challenges for the education sector, particularly in the field of big data. This paper aims to address these challenges by proposing an optimization of the curriculum system specifically tailored for big data majors, ensuring that it remains aligned with the rapid technological advancements and the shifting demands of the job market [5]. By incorporating digital intelligence technologies directly into the big data curriculum, students can develop enhanced practical skills and innovative thinking, thereby bolstering their employability and competitive edge in the workforce [6].



**Figure 1.** The Application of Big Data and Digital Intelligence Technologies in Business Decision

## 2. Analysis of the Current Status and Challenges in Big Data Education

In the contemporary era, the field of big data education is grappling with a multitude of intricate challenges [7]. The conventional frameworks of curriculum design, pedagogical strategies, and mechanisms for sharing educational resources may no longer be adequate to satisfy the burgeoning demands of the industry. This misalignment often leads to an inability to equip students with the essential competencies required for their future professional endeavors [8][9]. A comparative analysis of the courses offered by various universities uncovers substantial disparities in terms of course content and instructional methodologies, which further widens the chasm between educational offerings and the needs of the industry. Additionally, many educational initiatives encounter obstacles when attempting to incorporate the most recent digital intelligence technologies into their academic programs, thereby hindering students' ability to become proficient with the industry's most advanced technologies and tools [10].

Furthermore, surveys conducted on the employment status of graduates highlight a significant disparity between the skills that students acquire through their education and those that employers deem necessary [11]. The crux of the matter revolves around how to effectively cultivate big data professionals who are adept at applying digital intelligence technologies to address practical, real-world challenges [2]. The utilization of intelligent technologies extends beyond mere data analysis and processing; it can also be harnessed to assess course learning capabilities, thereby aiding educators in gaining a deeper understanding of students' learning processes and enabling them to refine their teaching methodologies and course content accordingly [6].

Consequently, big data education necessitates far-reaching reforms to keep pace with the rapidly evolving technological landscape and the shifting demands of the industry. Educational institutions must revise and update their curriculum frameworks, embrace more adaptable and innovative teaching approaches, and ensure that students are equipped with the latest digital intelligence technologies. Simultaneously, educators should proactively seek partnerships with industry stakeholders to guarantee that the course content is congruent with the actual requirements of the workplace. Through these concerted efforts, big data education can produce a workforce that genuinely meets market demands and bridges the skills gap between academic preparation and professional employment.

### 3. Development Trends and Applications of Digital Intelligence Technologies

As we witness the relentless and swift progression of technology, digital intelligence technologies are undergoing a period of rapid expansion and have found extensive application in the realm of processing vast datasets [12]. The incorporation of AI algorithms has brought about a transformative shift in the execution of data analysis tasks, enabling them to be conducted automatically, which has markedly elevated the precision of predictive outcomes [13]. The advent of machine learning technologies has empowered systems to engage in self-learning from extensive data repositories and to refine their operational efficiency over time, resulting in more streamlined and productive outcomes [14]. The widespread implementation of cloud computing technology has furnished scalable and cost-efficient infrastructure support for the storage and processing of large datasets, making these processes more accessible and affordable than ever before [15]. The profound integration of these technologies is propelling innovation across various domains, such as finance, healthcare, and education, thereby fostering significant advancements and enhancements in these fields [16][17][18].

Looking ahead, the trajectory of digital intelligence technologies will concentrate on bolstering automation capabilities, enhancing system interpretability, and expanding technology accessibility [19]. Specifically, bolstered automation implies that systems will be capable of executing complex tasks with greater efficiency and precision, diminishing reliance on human intervention and facilitating more streamlined and efficient processes. Enhanced interpretability assists users in gaining a better understanding of the system's decision-making process, thereby fostering trust and transparency in the technology. Increased accessibility ensures that a broader user base can easily utilize these sophisticated technologies, irrespective of whether they are situated in resource-rich or resource-poor regions, thus making technology more inclusive and equitable.

Furthermore, the burgeoning of Industry 4.0 technology is also propelling the evolution of the education sector, rendering the acquisition and dissemination of educational resources more efficient and equitable [20]. Through the comprehensive application of these technologies, the education system can better align with future societal demands and cultivate a greater number of individuals equipped with the skills to leverage digital intelligence technologies. This will result in a more adept workforce, better prepared to confront the challenges of the future.

### 4. Curriculum Optimization Strategies and Objectives

To ensure that big data education remains relevant and effective, curriculum optimization has become a crucial aspect that cannot be overlooked [21]. As technology continues to progress at an unprecedented pace, educational content must undergo continuous review and updates to adapt to these rapid changes [22]. Graduates of big data majors need to master a range of core competencies, including data analysis, machine learning, cloud computing, and communication skills [23]. The main objective of curriculum optimization is to enhance students' practical skills, strengthen their innovative abilities, and improve their competitiveness in the job market [24]. To achieve these goals, curriculum optimization strategies should include introducing more practical projects, incorporating real-world cases, and promoting interdisciplinary cooperation [25].

In order to meet the evolving demands of the big data industry, it is essential for educational institutions to regularly assess and refine their curricula. This ensures that the knowledge and skills imparted to students are aligned with the latest technological advancements and industry requirements. Specifically, course content should cover the following key areas:

**Artificial Intelligence and Machine Learning:** Courses should teach students how to use AI and machine learning technologies for data mining, pattern recognition, and predictive analysis. This will help students learn how to extract valuable information from vast amounts of data and use this information for decision support. By mastering these techniques, students will be able to uncover insights that can drive business growth and innovation.

**Cloud Computing and Big Data Platforms:** Courses should familiarize students with various big data processing frameworks, such as Hadoop and Spark, and how to deploy and manage big data applications on cloud platforms. This will provide students with the necessary skills to deploy and maintain big data solutions in modern business environments. Understanding cloud computing is crucial as it enables scalable and flexible data storage and processing, which are essential for handling large datasets.

**Data Visualization and Communication:** Courses should develop students' ability to transform complex data into easily understandable visual charts and reports. Additionally, courses should emphasize how to effectively communicate data analysis results to others, ensuring students can clearly convey technical information to non-technical audiences. Visualization tools and techniques play a vital role in making data accessible and actionable for stakeholders, thereby facilitating informed decision-making.

**Industry Case Studies:** Courses should introduce real-world big data applications from various industries, including finance, healthcare, and e-commerce, allowing students to understand how big data technologies are applied in different business scenarios. This will help students understand how big data technologies solve real-world problems and inspire their innovative thinking. By analyzing case studies, students can gain insights into the practical challenges and solutions in the industry, preparing them for real-world scenarios.

Through these curriculum optimization strategies, students will acquire comprehensive knowledge and skills, laying a solid foundation for their future careers in the big data field. By focusing on practical skills, innovative abilities, and interdisciplinary cooperation, educational institutions can ensure that their graduates are well-equipped to meet the demands of the dynamic big data industry.

## 5. Conclusion and Future Outlook

The optimization of curricula is of paramount importance when it comes to the realm of big data education. As digital intelligence technologies evolve at an unprecedented pace, it is crucial for big data programs to adapt accordingly in order to cultivate high-quality talents who are well-equipped to meet the future demands of the job market. In the forthcoming years, the trajectory of big data education is expected to place a heightened emphasis on several key areas. One such area is the creation of personalized learning paths, which cater to the unique needs and strengths of individual students, thereby maximizing their potential and ensuring they receive a tailored educational experience. Another critical focus will be on bolstering the development of team collaboration skills, recognizing that the ability to work effectively within a team is indispensable in the modern workplace. Furthermore, ethical considerations will take on a more significant role in big data education, as the responsible use of data becomes increasingly important in a world where data privacy and security are paramount concerns. As digital intelligence technologies persist in their relentless progression, it is imperative that big data education keeps pace with these advancements. This ensures that graduates are not only well-versed in the latest technologies but are also capable of taking the lead in this ever-evolving and transformative field. Digital transformation has emerged as a pivotal trend for enterprises seeking to achieve high-quality development, and the optimization of education is essential in nurturing future talents who will be at the forefront of driving this transformation.

Therefore, the continuous refinement and adaptation of big data curricula are essential to prepare students to become the innovators and leaders of tomorrow in this dynamic landscape.

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