Chapter 3
Understanding Student Perceptions in Digital Education Through Deep Learning Stacking Approach

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ABSTRACT

Digital education has transformed the landscape of modern learning, offering unprecedented access to resources, flexibility, and personalized learning experiences. As universities embrace digital platforms for education delivery, it becomes crucial to understand student perceptions and feedback to enhance the overall educational experience. This study aims to analyze student feedback collected from a prominent northern Indian university, focusing on six critical aspects: teaching quality, course content, lab experiences, library facilities, and the environment of the institute. Using Natural Language Processing (NLP) techniques for data preprocessing, we performed aspect extraction and sentiment classification, employing Bi-Stacked Artificial Neural Networks (ANN) to categorize sentiments as positive, negative, or neutral. The results provide a comprehensive evaluation of the student experience, offering valuable insights into the strengths and areas for improvement within the institution.

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INTRODUCTION

Digital education refers to the integration of digital tools, resources, and technologies into the learning process to enhance the educational experience. It encompasses a wide range of approaches, from online learning platforms and virtual classrooms to the use of digital devices and multimedia content in traditional teaching settings. Digital education has gained significant prominence in recent years, driven by advancements in technology, the increasing availability of high-speed internet, and the need for more flexible and accessible learning environments. It has revolutionized how education is delivered, making it possible for students to access learning materials, participate in discussions, and collaborate with peers from virtually anywhere in the world.

One of the most significant benefits of digital education is its ability to offer personalized learning experiences. Through adaptive learning technologies, students can progress at their own pace, receiving tailored content and resources suited to their individual needs and learning styles. Moreover, digital education breaks down geographical and temporal barriers, allowing learners to access educational opportunities from anywhere and at any time, making learning more flexible. This is particularly beneficial for students in remote or underserved areas, who may not have access to traditional educational infrastructure. Additionally, digital education often incorporates interactive elements such as multimedia, gamification, and real-time assessments, which can enhance student engagement and motivation.

Despite its many advantages, digital education also presents several challenges. A significant issue is the digital divide, where unequal access to technology and the internet creates disparities in educational opportunities. Students from lower-income households or rural areas may not have the necessary devices or reliable internet connections to fully participate in digital learning. Furthermore, the shift to online education requires both teachers and students to develop digital literacy skills, which can be a barrier for those unfamiliar with technology. In the future, digital education is expected to continue evolving with advancements such as artificial intelligence, virtual reality, and more sophisticated learning management systems, which will further transform the way education is delivered and experienced. However, addressing the challenges of equity and access will be critical to ensuring that digital education benefits all learners.

In digital education, learning strategies are key to ensuring that students can effectively engage with online content and develop the necessary skills to thrive in a virtual learning environment. One primary strategy is blended learning, which combines face-to-face instruction with online elements. This approach allows for a more flexible learning experience, where students can benefit from the structure of traditional classroom settings while also having access to online resources that