

Design and Research of Integrated Platform for Practical Teaching of Data Science and Big Data Technology

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Abstract. Technology is ahead of science and data makes the technology to develop. Beijing City University is the third academy of data science and big data technology in Ministry of Education Department, which explores mode of talent training of interdisciplinary. This paper design integrated platform for practical teaching on basis of this subject connotation, which including four level training for engineering, resources of experiment and practical training and extracurricular practice base.

Introduction

Data Science and Big Data Technology is a new major that has been applied and approved in 2018. From 2014, colleges and universities applied majors in big data. The Ministry of Education approved the establishment of “Data Science and Big Data Technology” in three universities in the first batch in 2016. 32 universities were approved in 2017 and the number soared to 248 in 2018.

Connotation of Data Science and Big Data Technology

The major of data science and big data technology includes two aspects of data science and big data technology. Data science comes out of traditional statistics that lays particular stress on argumentation analysis, while data science has a bias towards exploratory analysis and integrates into data mining etc. Big data technology comes out of traditional software development that bases on traditional development platform but big data technology bases on distributed development platform and integrates into distributed computation etc. So between data science and big data technology are both connections and differences. This major is new engineering subject in which there are new technologies rooting in enterprise. New majors have very high requirements for new technologies.

Construction of Practice Teaching Integration Platform

The major of data science and big data technology attaches to computers of engineering. Beijing City University aims at cultivating applied talents. Therefore, this major pursues the teaching idea of highlighting the cultivation of engineering practical ability, implements the engineering practical teaching system, emphasizes students understanding of the data in the professional field and their ability to realize it. Based on this, it builds an integrated platform for students' practical teaching, mainly including engineering grade four Training Teaching Platform, Experimental Training Resource Platform and Training Platform of extracurricular practice base. As shown in Figure 1.

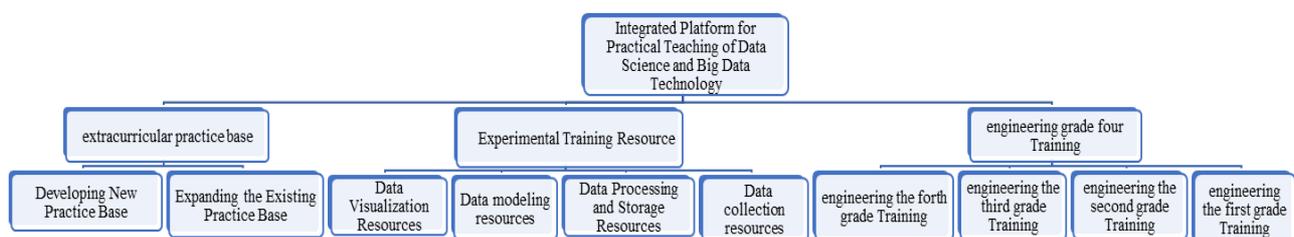


Figure 1. Integrated platform for practical teaching of data science and big data technology.

Engineering Grade Four Training Teaching Platform

Base on the construction thoughts of paradigm of new engineering talents, we proceeds from the angle of industry demand, and based on the Big Data Industry Chain, analyses and combs the concrete forms of the new formats in the field of Big Data Discipline, explores the realization path of the new formats, and analyses the possession of Big Data Discipline under the new disciplines, summarizing 35 kinds of post skills needed by enterprises, and summarizing eight kinds of post abilities. the core competencies of this major are data acquisition ability, data processing and storage ability, data modeling ability and data visualization. ability. How to enable students to acquire these abilities is the ultimate goal of professional personnel training. Here we must re-emphasize the core objectives of the training of data science and big data technology specialty, take big data as the core research object, deeply embody the idea of technology serving data, and emphasize students understanding ability of data in the professional field. The training goal of core competence of this specialty is to design a four-level practical training teaching platform based on the idea that “data is the core and technology serves data”, and to form a step-by-step and in-depth practical training system. Each school year has a practical training course. Each semester, at least two enterprise training projects are arranged. According to the process of enterprise development projects, real cases of simulation enterprises are created, and the technology mastered by students in the teaching stage is applied to the development of real cases, so as to better realize the technology with data as the core and let the mastered technology be realized. For data services, but also for future work in the company to lay a solid foundation.

The first-level engineering training is offered in the freshman college year to strengthen the ability of programming, so as to lay the foundation for the following data acquisition, data modeling and visualization.

The second-level engineering training is offered in the second year of college. The training is based on statistical principles and Python scientific computing knowledge. It integrates the knowledge of business flow management in different fields of smart city, which is explained in the course of limited selection of smart city management, and combines with practical data analysis projects to deepen and consolidate data processing, algorithm application. Ability of data modeling.

Three-level engineering training was set up in the first semester of junior high school. The purpose is to deepen the practical ability of data visualization technology application.

Engineering Level 4 practical training is offered in the second semester of junior high school. It is a comprehensive project application practice course with different directions. It combines the direction course of the previous semester and the three-level practical training courses of freshmen and sophomores, and strengthens the systematic and comprehensive application ability of professional knowledge in the three academic years.

On-line Experimental Practice Resources Construction

Laboratory practice resources are the necessary teaching resources for the major of data science and big data technology. Through the construction of experimental practice resources, the workflow of big data is realized in the platform of experimental practice resources. Therefore, according to the four core competencies of big data workflow and training, students are allocated online resources of data collection, data processing and storage, data modeling and data visualization. According to the specific abilities, different experimental projects and MOOC resources are designed to facilitate students learning. For example, on-line data collection resources include experiments of crawling HTML text content, PDF document content and word content by web crawlers. In data processing and storage online resources, SDK is used to carry out storage and management experiments, data synchronization and data development methods of DataIDE project. In the online resource of data modeling, the data analysis model of Wang Zhenghong's heroic characteristics, the data analysis model based on used car data set and the model experiment of holidays data comprehensive analysis are designed. In the data visualization online resources, experimental resources such as geospatial data set charts, multivariate variable data charts and statistical analysis charts are designed. In addition, each experimental project is equipped with corresponding resources for students.

Construction of Extracurricular Practice Base

Data Science and Big Data Technology are new majors. Developing relatively stable practice bases is the necessary guarantee for professional construction and student training. The construction of extracurricular practice base is carried out from two aspects, one is to consolidate and expand the original practice base, the other is to develop new practice base. The expansion of the original internship base is also based on its business related to big data. According to the future business development of the original cooperative internship base, further expansion is carried out. For example, a consulting company that once cooperated is a leading company in the field of domestic consulting and data analysis, and also an original practice base. With the development of big data industry, the company is also undergoing transformation and upgrading. The specialty further expands the construction project of practice base with the company, and provides the whole semester practice base for the specialty of data science and big data technology. Developing new practice bases mainly make full use of the ecological resources of Ali Cloud Computing Co., Ltd., a cooperative enterprise, choosing high-quality ecological enterprises, serving the needs of post groups in the direction of big data development and big data analysis, and constantly exploring the cooperation mode of extracurricular practice bases for new specialties.

Summary

The major of data science and big data technology is a new interdisciplinary specialty, which requires strong practical ability. Beijing City University will further improve the practical teaching system of the specialty, and create a practical platform more suitable for the development of the industry and students learning.

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