Data Analysis Courses and University Education

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Abstract. At first this paper talked about the history of data analysis, and the courses evolution process, and then, pointed out in today's enterprises, the urgent need to recruit "Data Analyst", but this kind of talent in employment market is shortage, this fact cannot be ignored. This is the necessity and urgency of setting "data analysis" course in the university. The next fact is, today's data science to infiltrate to other disciplines, to promote them has to evolve, expand and even alienation. This is the data analysis courses in science and engineering colleges must to popular the inevitability of. In this paper, it also analyze the classification of the series course, the opening of the key courses, and put forward their own opinions and suggestions, which have a certain reference value for the teaching and research work in university.

Introduction

The world's leading management consulting firm McKinsey issued a detailed report, is expected to 2018, big data or data workers jobs demand surge, the data are between 140000 to 190000, and know how to use big data to make decisions of analysts and managers jobs gap will reach 1500000! [1] In the Internet era, there are huge amounts of data happened in every day, data processing becomes more and more complex, many large companies have to recruit a higher degree of master in seeking to supplement their own strength. Among of them, most strong demand for large data processing industry, including: pharmaceutical industry, computer software, Internet, research, IT technology services, biotechnology. In fact, the big data workers can be cast into a wide range of areas, from the Department of defense, Internet start-up companies and financial institutions, everywhere need big data projects to do innovation drive. Data analysis or data processing is also very lucrative positions, in Silicon Valley, the entry level of data scientists have been the income of 6 digits (U.S. dollars).

So what exactly is the big data, or more popular point to say what is the data science, we discuss it from the data analysis related courses.

Before the Reform of the Data Analysis Course

Data analysis courses should be attributed to the information and Computing Science. This course has been sixty or seventy years of history. [2] Related courses should belong of the information and computing science courses. In our country university, information and computing science teaching and researching major is including the two aspects of information...
science and computing mathematics. Direction one is mainly in computer science, mathematics is supplemented. The second direction is mainly in mathematics, computer science is supplemented. Information and computing science Information formerly known as "Computing Mathematics", in 1987 renamed the “computational mathematics and its application software", the Education Ministry in 1998 changed its name to "information and computational science", is based on the information technology as the background, mathematics and information, calculation, computer science and technology professional management combining science. The professional training of students with good math, can use computer skillfully, initially have engaged in scientific research in a certain direction in the field of computer science and information, to solve practical problems, the relevant computer software design and development capabilities. Before 2013, its professional status is the stability, no one think of its huge changes will happen in after time.

Before the reform of the course, but also no one think it is not comprehensive, because these courses, including the mathematics curriculum, but also contains the necessary computer related courses. The main courses include: mathematical analysis, advanced algebra and analytic geometry, probability and statistics, mathematical model, discrete mathematics, fuzzy mathematics, real variable function, complex function, differential equations, physics, information processing, information encoding and information security, cryptography, computer, intelligent tutorial computer science foundation, numerical calculation method, data mining, optimization theory, operational research, the principle component of the computer, computer network, computer graphics, c/c++ language, Java language, assembly language, algorithm and data structure, database technology, software system, operating system etc. [3]

Now of the Data Analysis Course

In recent years, there has been a great change in the content of the course of data analysis.

Data Analysis and Curriculum in the United States

To study in the United States, in particular, to apply for a master's degree students in the professional aspects will be carefully considered. Data professional is more popular in recent years to be considered professional. More than twenty-three famous American universities, have enrollment plan now, [4] many universities in the United States opened data analysis courses. [5]

The Existence of Chinese Data Analysis Courses

In our country, the colleges and universities with set up "data analysis" professional, in the Internet is even very difficulty search to their name. [6] that is because of there are some historical reasons. Before 2013, the name of information and computing science is most popular professional name, no one wish to change its name, after 2013, the new professional name, such as "cloud computing" or "data science", the new vocabulary replaced them gradually.

Evolution of Chinese Data Analysis Courses

2014 that year, South China University of Technology had been authorized and opened the Cloud Computing and Big Data professional, this professional settings, making this in Southern China area has a very high visibility of the University, of a more well-known at that time. In later two years, the Chinese Education Ministry approved the declare of Data Science and Big
Data Analysis, this new professional, authorized to three universities, that are Peking University, Central South University and foreign economic and trade university. Another report is: there are eight universities opened the Cloud Computing and Data Science majors, and settled in the Ali Cloud University cooperation program AUCP. They are Beihang University, Zhejiang University, Fudan University, Shanghai Jiao Tong University, Xi'an Jiao Tong University, Nanjing University, Wuhan University, South China University of Technology. The fact that our universities set up Data Science and related specialty also shows that, at present in the Chinese scientific community, Data Science has a clear orientation in the classification of subjects. [7]

Data Science and Data Analysis

Definition of Data Science Disciplines
At present, there is not lack of strict definition of data science, [8] however; the academic community has a clear understanding of its meaning. [9]

Current Data Analysis and Its Related Professional Research Direction
In the field of data science, we can divide today's data analyze curriculum into "big data processing and data mining" and "small data analysis and data statistics" these two research directions. Of course, the name "small data" is from "big data" and come, maybe people have objections to the name, in fact, the word "big data". As long as people on the "small data" meaning understand it, do not care about the terms used to describe it.

Curriculum Setting of "Big Data Processing and Data Mining" Research Direction
In the following nine types of courses, to make appropriate choices, these classes are: Statistical Analysis, Visualization Tools, Big Data Processing Framework, Data Base, Data Warehouse or Business Intelligence, Data Mining Tools, Artificial Intelligence, Mining Algorithm, Programming Language.

Curriculum Setting of "Small Data Analysis and Data Statistics" Research Direction
The main courses include: mathematical analysis, advanced algebra and analytic geometry, probability and statistics, mathematical model, discrete mathematics, fuzzy mathematics, real variable function, complex function, differential equations, physics, information processing, information encoding and information security, cryptography, computer, intelligent tutorial computer science foundation, numerical calculation method, data mining, optimization theory, operational research, the principle component of the computer, computer network, computer graphics, c/c++ language, Java language, assembly language, algorithm and data structure, database technology, software system, operating system etc. [3]

Summary
It should be said that the university education and teaching reform in the era of big data, are related to the various majors in the university. What we need to point out is that we should pay more attention to the general education and teaching reform in the course of professional courses reform. In Data Science in Colleges and universities has established its status today, this
is very necessary, the reform including teaching methods, the teaching content and teaching objects, teaching aims, teaching achievements inspection standard and inspection method of specific work.

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