

Research on Mobile Educational Administration System Based on Apriori Algorithms

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Keywords: Data Mining, Mobile Educational Administration System, Association Rules Analysis

Abstract: In this paper, by applying the Apriori algorithm to the analysis of students' academic situation, students' evaluation of teaching, teaching analysis and the analysis of reasonable curriculum settings in the mobile educational administration system, a great amount of valuable and useful information and association rules is obtained from the massive teaching data. These method of association rules is applied to the mobile educational administration system. This knowledge has important guiding significance for schools and teachers to better grasp students' learning situation and arrange courses reasonably.

1. Introduction

In recent years, with the expansion of College enrollment, the size of the school and the number of students are increasing, and the rapid growth of educational administration management and teaching data have put forward higher requirements for educational administration management system and educational administration management. The traditional educational administration work is to input paper information manually. By transferring data to the server through the terminal manually, the potential of information technology is not really brought into play. Through the mobile educational administration system, students and teachers can input and modify relevant information by themselves, freeing educational administrators from the impatient input work and participating in discovery and mining. The rules hidden in a large number of teaching data can be used to provide decision-making basis for teaching decision-makers, so as to improve the quality of teaching.

2. Research on Mobile Educational Administration System Based on Apriori Algorithms

2.1 Mobile Platform Classification

There exists great differences between the mobile educational administration system and the traditional educational administration system. The latter relies on the campus network, PC and WEB, thus constituting the physical structure of the whole educational administration system. While the former is an Internet-based system with intelligent terminals (smart phones, PAD, etc.) as the carrier. In the mobile educational administration system, the mobile platform is mainly embodied in the intelligent terminal. The intelligent terminal is now divided into IOS and Android platforms. The technical routes and architectures of the two platforms are quite different. In the following paragraphs they will be introduced one by one:

The IOS is a UNIX-based mobile operating system developed by Apple whose main corresponding products are the iPhones, iPods, ipads, MacBooks and so on. The main development languages are C, C++, Objective-C (OC), Swift, and the main development tools are Xcode.

Android is an open source mobile operating system based on Linux developed by Google. Its main development language is Java. Unlike IOS, Android allows any mobile manufacturer to join in. Many manufacturers have launched derivatives based on the original Android system to provide users with a variety of choices. The technical characteristics of the two systems are compared as follows:

Table 1 Technical comparison between Android and IOS

	Android	IOS
User experience	Bright personality, strong compatibility and better user experience	Beautiful design, smooth operation, excellent user experience
system stability	More stable	Stable
Flash operation	Support	Not Support
file management	Similar to Windows system, in line with the user's habits	Not open file management permissions
Development platform	Windows/Linux/Mac OSX	Mac OSX
Sealing property	open system	Closed system
development language	Java/C/C++	Objective C/C++

The architecture of IOS platform is divided into Cocoa Touch layer, Media layer, Core Services layer and Core OS layer. The Cocoa Touch layer provides basic system support for users. It is an object-oriented framework and can also be considered as a collection of software components. Media layer is the media layer, which provides technical support for graphics, images, audio and video functions to increase users' access to better multimedia user experience on mobile devices. Core Services layer is the foundation of many other parts of the system, and all applications provide reliable basic system services. The Core OS layer contains many underlying technical support, such as security modules that need to be displayed and processed, or some frameworks on the Core OS layer to communicate with hardware.

The Android platform framework is divided into four layers: Application: All application development languages are JAVA languages, consisting of one or more activities, which are similar to processes on OS systems, but activities are more flexible than OS processes and can be switched between multiple states. Application Framework: Each application has its own functional blocks. To help developers develop programs quickly, the application reuse mechanism also provides users with convenient replacement program components. System runtime: including the bottom C library, multimedia library, browser and Android runtime. Linux Kernel: Android's core system services depend on the Linux Kernel. It has a strong security system and memory management system. It supports privilege management and is an open source project.

2.2 Analysis and Application of Apriori Algorithms

Apriori algorithm is an algorithm based on mining frequent itemsets of Boolean Association rules. It is essentially a recursive algorithm based on the idea of two-stage frequency set. Its association rules belong to single-dimensional, single-level and Boolean Association rules. [1]

The basic idea of Apriori algorithm is as follows:

(1) Find out all the frequency sets: if there is a set, it is not a frequent set, then all its itemsets are not frequent sets, so to eliminate these sets, leave the frequent set, and generate strong association rules from the frequency set, these strong association rules must meet the minimum support and minimum credibility.

(2) Depending on confidence, find the relevant rules: for all the frequent sets found, continue mining, for the rules satisfying the confidence greater than the given minimum confidence can be retained.

(3) All frequency sets are generated by recursive method.

In the data mining stage, this paper uses the classical Apriori algorithm. Information such as students' test scores, affiliated departments and course selection will be used in the analysis of association rules. According to the examination results of students, the intrinsic relationship among courses is analyzed by data mining method. In order to improve the accuracy of data mining, the interest threshold is used in the original association rules. Interest threshold can be considered as a supplement to credibility and support to avoid unnecessary misleading. [2]

For example, 18% of the students in the data sheet have excellent results in "JAVA

Programming" and "Data Structure", while 60% of the students with excellent results in "Data Structure" have excellent results in "JAVA Programming". From these two supports and credibility, it can be concluded that strengthening the study of "Data Structure" is helpful to improve the performance of JAVA Programming. However, the actual situation is that 55% of the students who choose Data Structure instead of JAVA Programming are still excellent. That is to say, the rules based on the data of the two courses are misleading, which is not conducive to the decision-making of teaching managers. From a practical point of view, students' academic performance depends not only on the learning of JAVA. Whether or not the JAVA Programming Course is taught before the Data Structure Course also depends on the interest of the students themselves. To a large extent, this factor also has an impact on the students' performance. Based on this consideration, the above rules should be filtered out. Therefore, when specifying rules, the concept of interest threshold is introduced to solve this problem. [3]

The degree of interest in defining rule R [4] is:

$$IR=(CR-SRH)/\max(CR,SRH)$$

CR is the reliability of rule R and SRH is the information to support rule R. In the process of data mining, the threshold of support, credibility and interest is inversely proportional to the number of rules obtained. The higher the threshold, the easier it is to analyze the relationship table of support, credibility and interest and the number of rules. The change of three thresholds has a great impact on the number of rules generated. After S represents the threshold of interest, with the increasing of interest threshold, S represents the threshold of support. Rule information obtained by association rules is getting less and less, that is to say, some useless rules and wrong rules are removed, which can reduce the number of times that data mining acquires appropriate and effective rules because of rule mismatch and retrospective, thus improving the efficiency and accuracy of data mining.

The experimental results analyze the information obtained by data mining technology, and present it through visualization tools in a way that is more convenient for users to understand and observe. After introducing the interest threshold, it is found that Data Structure is positively related to Compilation, Algorithmic Analysis and Design and JAVA Design. The two rules should be retained. Students are recommended to choose the two courses at the same time. The two courses of Data Structure and Database Basis are not very relevant and should be removed as useless rules. Experiments have proved that data mining can indeed provide reference for students when they choose courses, and can recommend which course to take first to lay the foundation for another course, with twice the result with half the effort.[5]

3. Conclusions

This paper describes in detail the classical association rule algorithm - Apriori algorithm in data mining. By finding frequent sets, we can find all the favorable rules and get the guidance. The association algorithm of data mining is applied to the mobile educational administration management system. A large amount of historical educational administration teaching data is analyzed by data mining. In the course recommendation module, the Apriori algorithm with increased interest is used to get more suitable recommended courses, which provides data basis for teaching management.

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