Information Retrieval System for University's Student Data

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Abstract

This paper described the information retrieval for university student data information systems and problems which arise in the development of such system. The problems could be solved by using knowledge markup technologies. University student data information system is retrieving the total data of students who have registered. Among them, the number of pass, fail and drop-out students during one academic year. This paper aims to retrieve useful information from student database to classify the student of pass, fail, and drop-out students within their study period by the information retrieval system. Admin user (decision maker) can analyze the relating issues that should be taken into consideration in the field of decision processes by using the data of information retrieval system.

Keywards: University student data information systems and problems, pass, fail, drop-out, one academic year

Introduction

The information retrieval system of university's student data has been focus on measuring system effectiveness: the ability of an information retrieval system to discriminate documents that are relevant or not relevant for a given user query. The system has been determined by the information retrieval environment on the development of retrieval algorithms, together with the organization of large information retrieval evaluation events. Efficiency of an information retrieval system has also been assessed, e.g. measuring how much memory/disk space is required to store the index of the result. Measuring the effectiveness and efficiency of an information retrieval system has commonly been conducted in a laboratory setting.

University student data deal with information about student registration, classroom management, facility management, extra curriculum activities, teachers, scholarship, hostel facility and transportation. High dependence of university student data on already achieved information results produce requirements for student data from which the admin user can retrieve student information in an efficient way. Information overloading, exponential rise of amount of information makes it difficult for students to find relevant information. To solve these problems, University Students Information System (USIS) is being developed.

The specific objectives of this paper include;

1. To store the student's registration data of university.
2. To create the university student's database.
3. To retrieve the information of student data for admin user timely.
4. To create a system for easy to use friendly user interface.
5. To decide the specific decision for admin staff in time.

Query Processing

Query processing refers to the range of activities involved in extracting data from a database. The activities include translation of queries in high level database languages into expressions that can be used at the physical level of the file system, a variety of query-optimizing transformations, and actual evaluation of queries. A database query is the vehicle for instructing a DBMS to update or retrieve specific data to/from the physically stored

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medium. The actual updating and retrieval of data is performed through various "low level" operations. Examples of such operations for a relational DBMS can be relational algebra operations such as project, join, select, Cartesian product, etc. While the DBMS is designed to process these low level operations efficiently, it can be quite the burden to a user to submit requests to the DBMS in these formats. There are three phases that a query passes through during the DBMS' processing of that query: parsing and translation, optimization and evaluation. The first step in processing a query submitted to a DBMS is to convert the query into a form usable by the query processing engine. High level query languages such as SQL represent a query as a string, or sequence, of characters. Certain sequences of characters represent various types of tokens such as keywords, operators, operands, literal strings, etc. Like all languages, there are rules (syntax and grammar) that govern how the tokens can be combined into understandable (i.e. valid) statements [1].

Query Algorithms

Queries are ultimately reduced to a number of file scan operations on the underlying physical file structures. For each relational operation, there can exist several different access paths to the particular records needed. The query execution engine can have a multitude of specialized algorithms designed to process particular relational operation and access path combinations. [1]

A Selection Algorithm: The Select operation must search through the data files for records meeting the selection criteria. Following are some examples of simple (one attribute) selection algorithms. [1]

1. **Linear search**: Every record from the file is read and compared to the selection criteria. The execution cost for searching on a non-key attribute is br, where br is the number of blocks in the file representing relation r. On a key attribute, the average cost is br /2, with a worst case of br. [1]

2. **Binary search**: A binary search, on equality, performed on a primary key attribute has a worst-case cost of $\lceil \log (br) \rceil$. This can be considerably more efficient than the linear search, for a large number of records. [1]

3. **Search using a primary index on equality**: With a B+ -tree index, an equality comparison on a key attribute will have a worse case cost of the height of the tree plus one to retrieve the record from the data file. An equality comparison on a non-key attribute will be the same except that multiple records may meet the condition, in which case, we add the number of blocks containing the records to the cost. [1]

4. **Search using a primary index on comparison**: When the comparison operators (, ≥) are used to retrieve multiple records from a file sorted by the search attribute, the first record satisfying the condition is located and the total blocks before (, ≥) is added to the cost of locating the first enter record. [1]

5. **Search using a secondary index on equality**: Retrieve one record with an equality comparison on a key attribute; or retrieve a set of records on a non-key attribute. For a single record, the cost will be equal to the cost of locating the search key in the index file plus one for retrieving the data record. For multiple records, the cost will be equal to the cost of locating the search key in the index file plus one block access for each data retrieval record, since the data file is not ordered on the search attribute [1] [2].

This paper is related to the information retrieval of Dagon University student data management by using University Students Information System (USIS) framework. This framework made up the schematic view of data flow for the university shown in figure (1).

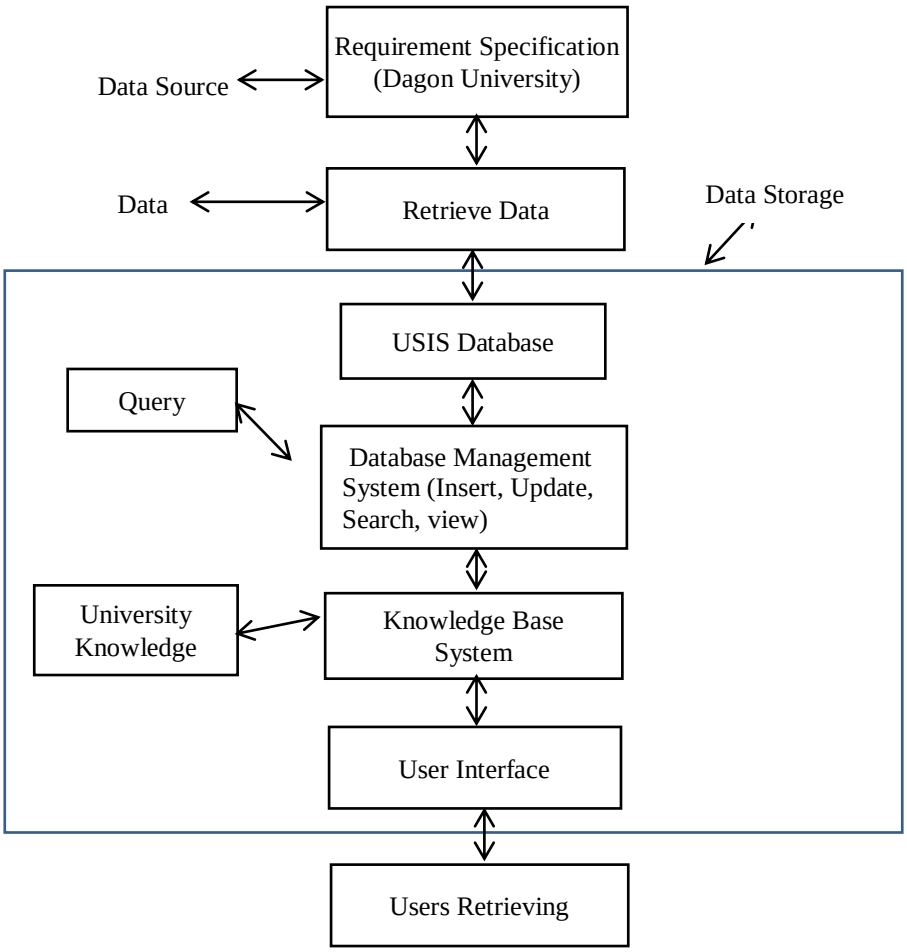

Figure 1. Flow chart of university student information system

Result and Discussion

In this past, system for University Students Information System (USIS) is shown within two study periods (from 2014-2015 to 2017-2018 and from 2015-2016 to 2018-2019). The proposed method generates the input query consists of number of objects or databases or data sets. Each data set has its own schema and number of tables or relational objects where the original information is stored. Each relational object has number of properties or attributes which constructs the rows of a table. For any simple execution of a small query, the query execution module has to possess the schema of the relational object and has to identify which object is necessary to perform the execution of input query.

The problem domain of this system is query (Retrieve) the total data of students through first year to final within graduated year who are resigned, transferred and passes away. User can retrieve the total student data of pass students, fail students, resigned student, pass away students, transferred students and graduated students within their graduated year. User can retrieve the university students in line with major, name, student ID, father's name, address, etc. This system has two sites, admin site and students' site. In the student site, students who want to enroll the university can register. In admin site of this system, admin staff can enter user name and password correctly for student data security. Decision person or admin user can find, update, search and calculate by data of intake and academic year. The main effective of this system is retrieving the student data of drop-out students to register to

first year to final year of their graduate year. Admin user can retrieve the transferred student, resigned student, pass away etc. In this system there are admin site and student site. Student can fill the register form only in data input part. Firstly, students have to register to the university with register form, students click the submit button after filling the register form. Total registered student's data of Dagon University in 2014-2015 are shown in Figure 2 for arts students and total registered student's data of Dagon University in 2014-2015are shown in Figure 3 for science students by their specialization.

University Students Information System (USIS) analyzes the following types of result:

1. Decision makers can analyze the total registered students to university.
2. Admin users can retrieve the student's data of undergraduate and postgraduate.
3. Decision person can check the registration and graduate student by department.
4. Admin user can view the missing student who are resign, transferred, pass away student in university.
5. Admin users can analyze the detail departmental student with undergraduate or postgraduate students by yearly.

The USIS system examines the 2014-2015 and 2015-2016 intakes students of Dagon University. As the statistical information, intake students of 2014-2015 are received their concerning degree at 2017-2018 academic year, 2015-2016 students are obtained their concerning degree at 2018-2019 shown in Figure 4 and 5.

As the program, the result is shown in Table 1 for 2014-2015 intake students' data and Table 2 for 2015-2016 intake data of Dagon University. In these tables show the total students, examinee, pass the exam students, fail students, honours/ qualify students and drop-out students.

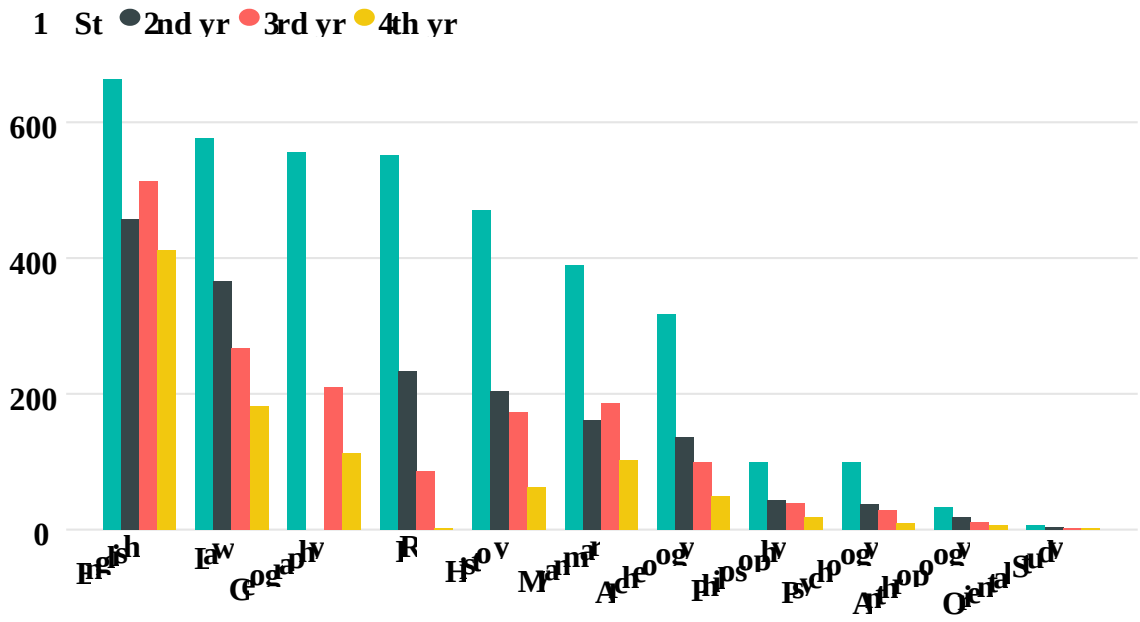

Figure 2. Total enrollment of Arts students in Dagon University

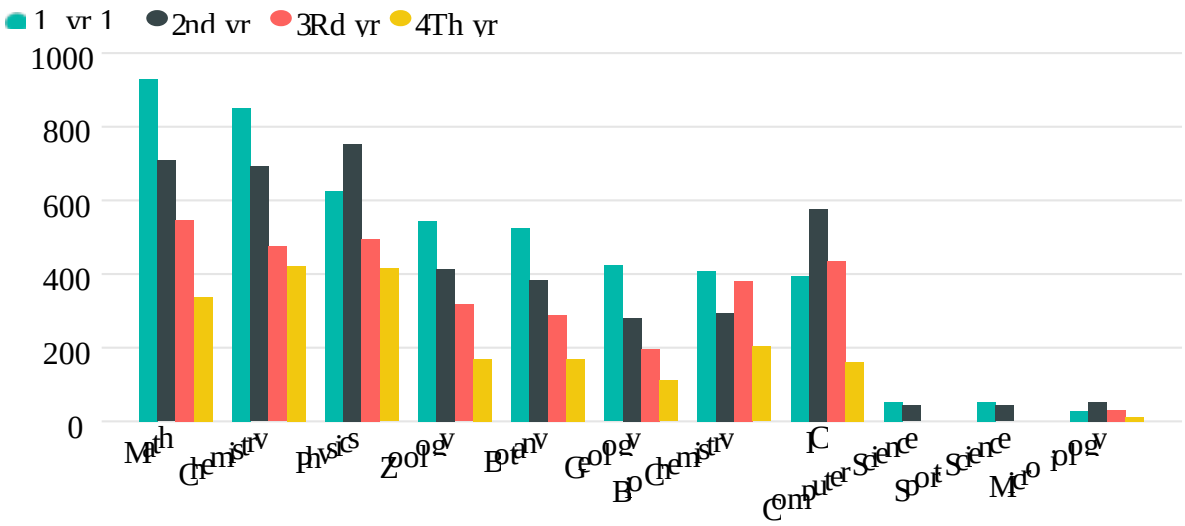

Figure 3. Total enrollment of Science students in Dagon University

Table 1. 2014-2015 Intake student condition of pass/fail and missing condition

2014-2015 to 2017-2018 Period of Attending the University Student Condition							
Year	Registered Students	Examinee Students	Pass Students	Fail Students	Honours/ Qualify	Missing Students	Missing Percent (%)
2014-15	8146	6802	5768	1034		1344	16.49
2015-16	6196	5458	4365	1093		738	11.91
2016-17	5309	5286	4210	1076	404	23	0.43
2017-18	4920	4895	3598	1297	393	25	0.50
	Total Missing					2130	29.35

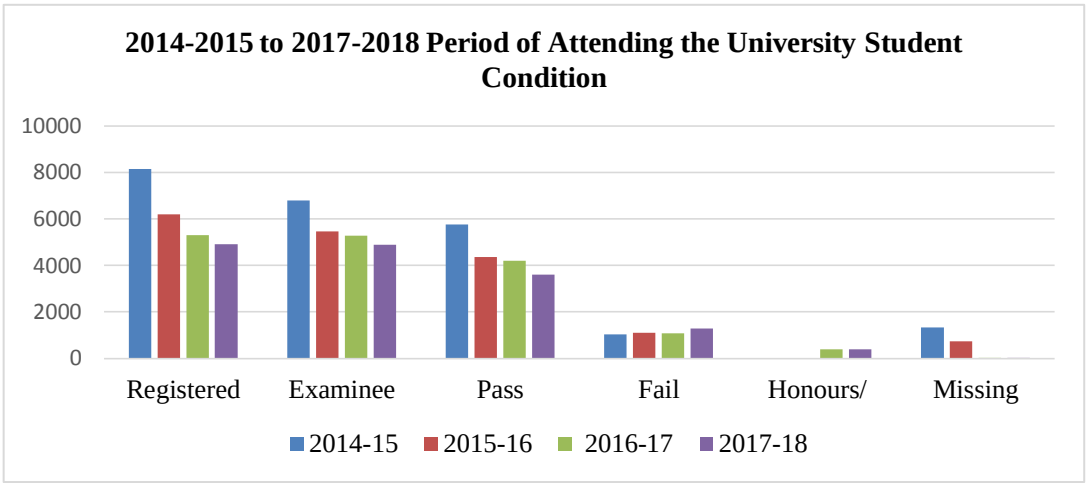

Figure 4. 2014-2015 to 2017-2018 period of attending the university student

Table 2. 2015-16 to 2018-19 period of attending the university student condition

Year	Registered	Examinee	Pass	Fail	Honours/ Qualify	Missing	Missing %
2015-16	8345	6996	5432	1564		1349	16.17
2016-17	5975	5200	5209	716		775	12.97
2017-18	5075	4467	3775	692	546	608	11.98
2018-19	4154	3943	3385	558	491	211	5.08
Total missing						2943	46.20

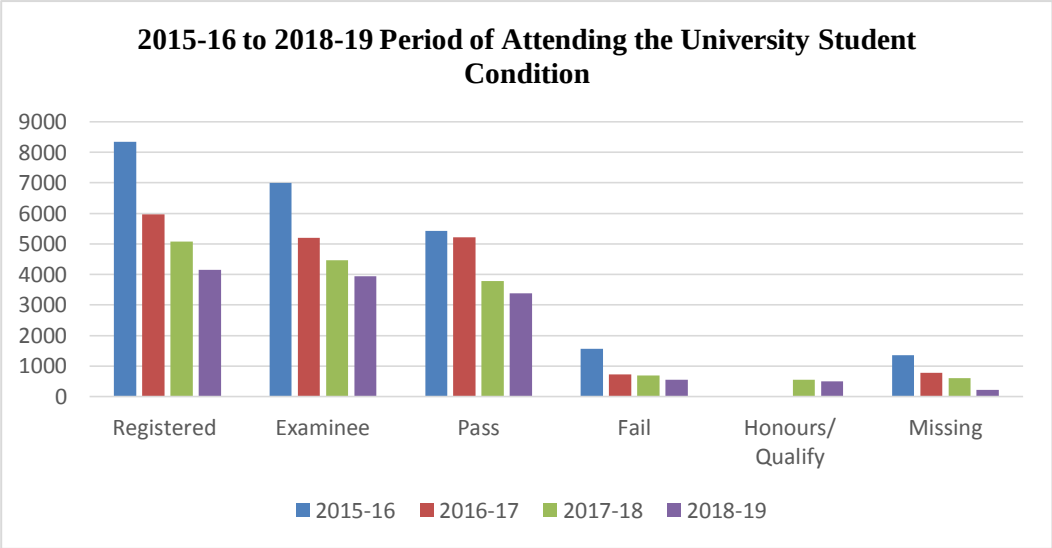

Figure 5. 2015-16 to 2018-19 Period of Attending the University Students

Missing students, who are resigned, transferred, and pass away of these two years' data are shown in Table 1 and 2. In this research of among these two study periods of graduate, (8146) students are registered students and (2130) students are missing students in 2014-2015 to 2017-2018 study periods in university. In 2015-2016 to 2018-2019 periods of attending the university students, 8349 students are registered and 2943 students are drop-out students.

The USIS system design and development is to create the academic decision makers with a tool for organized information access, enable assessment of academic statistical data for evaluation of part of the academic decision. These facts can be achieved and the following objectives are available:

- This system is a computerized software unlike most current systems, which necessitate manual data extraction and evaluation,
- Create the student database for adaptation to other universities.
- Design, implementation and analysis of a software system suitable for general university environments.
- Implementation of intelligent user interfaces for easy navigation and gathering of required information from the databases,
- Demonstration of powerful techniques for achieving the aims of the project.

As the result of the program, decision makers of university can analyze the relating issues that should be taken into consideration in the field of decision processes. There is students' enrollment, ranking of university, infrastructure, extra curriculum activities, health facility, faculty management, scholarship program, career guidance, hostel facility, transportation, and library and parking facility.

Conclusion

This research analyses the information retrieval by using the University Students Information System (USIS). This system has been developed by using Microsoft visual studio 2015, SQL server database and Power BI software are used to implement this proposed system. This paper focuses on the problem of information retrieval system that offers reliable decision to support to the process of student from study periods to graduate by using result tables and graphs of Dagon University student's data. This paper focused in various ways such as registration, pass, fail, and drop-out students for decision of university decision makers in university. Decision makers of university environment can specify the result percentage of registered students, pass students and missing student for their related university. USIS system provides support for decision making in a higher education environment.

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