A Real Time, Automated Application Module for Better Process Management
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Abstract—Today everything around us is automated. Manual and paper work has been replaced by automation. Automation decreases errors and helps in increasing efficiency in every field. It takes help of database retrieval and intranet facility. As the resources are increasing, there is a need to access them efficiently without wasting much time, there automation’s need arises. In this paper, automation has been introduced for four sections which are canteen, library, lost and found department and projector cable issuing department that exists in different colleges and universities.

Keywords—Automation, Relational Database, Database retrieval, Intranet facility, Web-Opac

I. INTRODUCTION

Automation is defined as to allow a system to work on its own or automatically. Automation can be done in any field. The biggest advantages from it are that it saves energy, material and labor. The thing that matters the most while using automation is that it is just the replacement of paper work and all the functionalities that we used to get from manual working, should be obtained here also. It should also ensure high degree of accuracy from the results obtained. We will automate the university systems that include canteen, lost and found department, library system and projector cable issuing. Billing in canteen is done manually. Automated billing was started in hospitals first and now has reached almost everywhere. Considering the library system, automation has arrived there already, it started with US and now India is in the same league. The lost and found department though is very simple to implement but if something can be done through the use of technology, it would be easier for the students to collect information about the entities that are lost. The projector cable issue, not found everywhere, is discussed in detail in the paper. Here technology involved in automation can make this system even simpler. But it is not that easy. It involves further technologies to achieve successful results. It depends if we would be using Intranet or Internet for it. If we design the software for a single university, Intranet would be preferred. If two or more branches of the same university are there, and the implementation is for every branch, Internet would be used. It depends on the necessity of the user. Also, the other question that arises is which database model would be used to retrieve the data but foremost what is database retrieval? First the user must know what is database and database management systems is all about which we will be discussing in succeeding section. A database is an organized collection of data. Database management systems are specially designed applications that interact the user, other applications, and the databases. There are three types of data models namely: the network model, the hierarchical model, or the relational model. Hierarchical model is based on parent child relationship i.e. basically 1:N relationship(one to many). The schema has only one root. Hierarchical model can be considered as a specific case of network model. Network model is more generalized form of model which is used to store their data in a graph, so one child can have many parents as well as one parent can have many children. The model is also known as CODASYL (Conference on Data Systems Languages). Relational model is now days the most popular model. In this type, grouping of data is done on the basis of some relations which are organized in tables. Earlier file system had many drawbacks because of which DBMS came to existence. Let us have a look at the advantages of it.

A. Data Description Language
It describes that portion of database which allows us to create, alter and destroy database objects. Database objects includes schema which is the structure of the table, tables, aliases etc.

B. Data Storage Support
DBMS implicit methods defined for storage of data as well as any relevant information such as pointers, indexes etc to support various data structures.

C. Data Manipulation Language
It describes that portion which allows you to manipulate or control your data. It includes retrieving data, inserting rows, changing data in a table or deleting rows in a table.
D. Concurrent User Support
Many users can access the same database at the same time. One of the good features of database systems. It addresses the problem of concurrent write by the method of locking.

E. Database Security
Security is also very important because of unauthorized users accessing the database. In order to provide security, DBMS uses schemes such as encryption, authentication, authorization and views. Encryption is when DBMS converts the data to an indiscernible format. No unauthorized person trying to access this information will be able to read it. Authentication is a technique which can be achieved by several ways one of the most common being asking for username and passwords. In this war the database administrator can know who is accessing the tables, whether he/she is authorised to or not.

F. Database Integrity Support
Inconsistent data problem is the most common due to concurrent access of users. There are a set of rules defined by DBMS in order to achieve integrity such as key constraints, data type, legal values and format. So these were the answers to the questions that come across while creating a database.

II. CURRENT V/S PROPOSED SCENARIO
As discussed above, relational model is the most popular model which is being used in many universities. When the student gets itself registered during the time of admission, all his details are stored and maintained in a database. The student can access the account, through the credentials (which are name and roll number), given to the student during the time of admission. Our automation involves accessing of this database in order to add any relevant information about the student

A. Automation With Database
Our paper identifies a way in which each and every student is recognized only on the basis of I-card. Whatever transactions made, any dues, any issuing or returning of books, any buying of eatables in the canteen (anywhere in University ) will be notified only by the card. The idea aims at solving the following problems:

-reduce the chaos over loose money, change, any payment in canteen.
-To save time by reducing manual work and making it fully automated.
-To make everything in University more systematic and organized.

This is done with the help of Bar code Reader. It is an electronic gadget that reads the printed barcode. It has a lens, light sensor and a light source. It has a decoder circuitry that analyses the barcode’s image data as sensed by the sensor and the barcode’s contents is sent to the output port of scanner.

![Barcode Reader](image)

Figure 1: Barcode Reader

Here, the barcode reader reads the barcode printed on the student’s I-card and gives roll number as output which serves as the login id to the student’s account. Now we discuss each module individually to reflect what we suggest through automation to be implemented in universities.

B. Canteen Automation
Usually, 200 students gather together in cafeteria resulting in unsystematic delivery of eatables, which further leads to chaos over balance and loose money. The need of automation arises here. But automation alone can’t solve the problem. We need database storage and retrieval for achieving the goal. The goal is to create a system in which billing is not manual. This will be established with a barcode reader. The canteen owner scans the I-card with the barcode reader and as written earlier, the roll number will be returned as output which acts as the login id for the student’s account. Whatever payment is due, it will be written to the student’s account. It means an entry to the database is made here. So everything is done with the same I-card. We here want to reduce manual way of giving
money that would at least lead to payment of every item we purchase. This could be advantageous in a sense that a smooth process of queuing up and less gathering of people near the kitchen. The two main problems solved here are loose money chaos created and queuing issue. This process could really help us in faster supply of eatables in the kitchen.

### TABLE 1: Current v/s proposed system for canteen

<table>
<thead>
<tr>
<th>Current Status in Universities</th>
<th>Desired Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>People gather in large number, chaos created</td>
<td>Barcode scanner used, scans the I-card</td>
</tr>
<tr>
<td>Manual billing system and no queues maintained</td>
<td>The student’s account will be opened, item purchased will be added there</td>
</tr>
</tbody>
</table>

**C. Library Automation**

Library automation has already been introduced in most university through Web-Opac. It is an online portal for students in which they login through their roll numbers. It gives us the option of re-issuing of books online and to get any information of books available in library. But when a student tries to get his book issued by online web opac, student cannot avail the service if he/she is having fine on the book, for that he/she has to manually go there. But nowadays students tend to forget the date of return due to pressure of studies. Sometimes a student is also unable to return the book on time. So, this feature will be added to already existing library automated system that a student can re-issue a book online even if he/she possesses fine on it. The amount of fine he possesses is added to the student’s account. Also a constant reminder in the form of email is sent to the student so that he/she does not forget. This prevents long queues in front of the return counter of library. Also, payment becomes automated. The student needs to clear his dues in a months' or some stipulated time as per the university rules. It also reminds student frequently of last date.

![Image of United Nations online catalog](image-url)

**Figure 2: Web-Opac example**

### TABLE 2: Current v/s proposed system for library

<table>
<thead>
<tr>
<th>Current Status in Universities</th>
<th>Desired Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Already automated</td>
<td>A book can be issued online even if there is a fine on book</td>
</tr>
<tr>
<td>Web-Opac introduced and when there is a fine on book, the book can’t be issued online</td>
<td>A constant reminder of books for the student</td>
</tr>
</tbody>
</table>
D. Lost And Found Automation

Lost items are never taken care of seriously. We often loose our important things like our documents, library books. Every time we have to go to the concerned authorities to inquire if they have found anything related to what we are searching for. Generally, Universities have some provision made for lost items like things lost, are deposited in the security room. It gets piled up there and if no one comes to take it, it goes unclaimed. Entry is made for each and every item in registers maintained for students. Designing a s/w which would maintain a database containing the lost items with its descriptions would reduce the paper work and makes it more systematic. Student logins through the id and password and checks for his/her lost item by entering details like item name, colour, size, brand, etc. If a match is there, mail sent to student which contains details of collecting it from the desired place and time. This makes fewer worries of students, as inquiry can be made online. Everything becomes easy & no register records are required.

<table>
<thead>
<tr>
<th>Current Status in Universities</th>
<th>Desired Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Things lost are deposited in the security room</td>
<td>Student logins through the id and password</td>
</tr>
<tr>
<td>Registers are maintained for students</td>
<td>Our s/w would ask for details like, item name, colour, size, brand And if match is there, mail sent to student for collecting it</td>
</tr>
</tbody>
</table>

E. Projector Cable

Nowadays, education system involves the use of presentations more frequently as compared to books. So for implementing this, we require projectors and projector cables. Projectors are generally installed in every lecture hall but the cables are to be issued every time a student requires it. If any student requires projector cables to be issued, he has to submit his I-card until he returns the same which results in overhead of collection of I-card. Here also if we introduce automation with the help of database, the process becomes very easy. The authority that has all the cables with it, scans the I-card with the help of barcode reader. The database of student opens up. When a student takes the cable from the teacher, barcode reader login the student account and an issue entry would be made for a particular time span. No need of submitting the I-card arises. Also a great advantage of this system is, whenever the student logins his account, a constant reminder of returning the cable flashes, so that he realizes that he has to return the cable back. Also if the university wants, it can issue a fine if the cable is not returned within few hours or a day. The fine’s entry will be again made to the student’s database. So automation and database helps in making this system even more organized and easy.

<table>
<thead>
<tr>
<th>Current Status in Universities</th>
<th>Desired Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student goes to the in-charge, deposits I-card</td>
<td>Barcode reader scans the I-card</td>
</tr>
<tr>
<td>Get it back when returns the cable And overhead of I-card</td>
<td>Entry made in student’s account</td>
</tr>
</tbody>
</table>

III. REQUIREMENTS

Front end used: Java
Back end: SQL

- Hardware Requirements:
  - PC with 5GB hard-disk and 512 MB RAM
- Software Requirements:
  1. Windows 7/8/95/98/XP with MS-office
  2. MS-SQL server/Oracle
  3. Apache

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IV. BLOCK DIAGRAMS

We have drawn four Use Case diagrams of each module. The use case diagrams shows the different users in a system and how they interact with the system and amongst themselves.

Figure 3: Use Case Diagram for Canteen

Figure 4: Use Case Diagram for Lost and Found
Figure 5: Use Case Diagram for Library

Figure 6: Use Case Diagram for Projector Cable
V. FUTURE USE
Automation is nowadays widely used these days and can be applied in almost every field. It can make the work much easier and improves efficiency. Most importantly, it reduces the paper work. Although we have tried to solve all the major issues, security has not received much attention. There are many threats such as I-card theft which creates a problem for the student. This can be resolved by adding a bit to the barcode when a new I-card is designed for the stolen one and the previous one should be declared invalid. In this way, if someone tries or misuses the older I-card, it does not work as it is invalidated. Also lost and found department might also face problem in case the item lost is more than of the same kind and the student gets the wrong item.

VI. CONCLUSION
We want to conclude that automation must be implemented anywhere possible. It is not there to find errors in manual system but to provide ease to both the parties, which are the one who serves and the one who is being served. Automation and database together can bring great changes. It is already established in some countries. There are other fields also where this can be applied but to give a general idea, we have discussed only the four cases. One aim that should be achieved with automation is that the purpose must be fulfilled, that we earlier used to do manually. If the goal is achieved successfully without much compromise, then there is no point of not establishing it.

REFERENCES
http://pages.cs.wisc.edu/~dbbook/