

ERP Product for AIT as SaaS and Backend Design

A PROJECT REPORT

Submitted by

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In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

In

COMPUTER ENGINEERING



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NR. VASANTNAGAR TOWNSHIP, GOTA - OGNAJ ROAD

Gujarat Technological University, Ahmedabad
Winter- 2016

AHMEDABAD INSTITUTE OF
TECHNOLOGY
CE - IT DEPARTMENT

2016



CERTIFICATE

Date:

This is to certify that the project entitled "**ERP Product for AIT as SaaS And Backend Design**" has been carried out by **Darshit Jasani** (130020107026), **Miloni Patel** (130020107065) and **Harshrajsinh Rathod** (130020107086) under my guidance in fulfillment of the degree of Bachelor of Engineering in COMPUTER ENGINEERING (7thSemester) of Gujarat Technological University, Ahmedabad during the academic year 2016-17.

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Unique	The website provides of applicable info that users need	-
Unique	Hence making the search and surf process simpler	-
Unique	The purpose was to offer info to the users anyplace	-
Unique	We are working towards developing a product that runs on the PHP platform.	-
Unique	Primary goal of the project is to develop a reliable Website that provides	-
Unique	information to the user instead of taking the user all the way to where	-
Unique	With the advancements in the developing tools and the likelihood of connecting more users	-
Unique	on the PHP platform that will act as a single channel of communication between	-
Unique	in order to stay up to date with their child's progress sometimes the	-

Create a FREE account to continue.

You don't need to wait till the website buffers. The website provides of applicable info that users need. We are working towards developing a product that runs on the PHP platform, and combines multiple entities into one. Hence making the search and surf process simpler. Primary goal of the project is to develop a reliable Website that provides an easy, uncluttered and fast access to any information you need. Talking from a user perspective, it is much better to bring the necessary information to the user instead of taking the user all the way to where the information resides. That is the central idea of our Website Need for New System With the advancements in the developing tools and the likelihood of connecting more users every day, the universities started creating their own websites. The purpose was to offer info to the users anywhere. One such example

is an implementation of ERP (Enterprise Resource Planning) tool on the PHP platform that will act as a single channel of communication between the students, teachers, administrative staff and even parents/guardians with minimal amount of interaction. Objective of the New System eliminating the need of tedious handwritten record keeping process data availability for the administrative personal right on their phone straightforward and breezy access to information for students about admissions, syllabus, news, and lot of other stuff keeping the parents / guardians posted about the progress of their children in a simpler, unfussy way completion of monetary transactions with the least

amount of hassle Identification and solution of user wishes, concerns, problems, and values smooth and intuitive use experience students have to face difficulties while searching for information online parents of the students who reside in other cities have to personally visit the college in order to stay up to date with their child's progress sometimes the students are reluctant in asking about their doubts t



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Final Project Report	Completed

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“No duty is more urgent than that of returning thanks”.

As they say, man’s quest for knowledge never ends and in that quest, we have experienced that the theoretical and practical knowledge are essential and complimentary to each other. This type of project most certainly cannot be a one-man show. While we are feeling a great degree of satisfaction at the completion of Phase 1 of the project, this satisfaction would be ephemeral if we fail to thank and acknowledge the people who have been involved, directly or indirectly, with the project.

At this moment of our substantial growth, we cannot find enough words to express our gratitude towards those who were constantly involved with us during the project. We talk about numerous people without whose help this project would be stuck in its nascent stages.

We give the whole credit of our project to our HOD, mentor and guide, Prof. Dr. Satyadev Vyas, for his guidance whenever we met any difficulty while performing the task. His heartily interest in reviews, corrections and belief in us is one of the major reasons why we have been able to complete the first phase of the project without any difficulty.

We, the trio, would also like to thank the staff members of our department. Those subtle advices they had for us eased our way considerably going into the project. We also want to express our thanks to all the colleagues and classmates for their inputs at different times. The three of us are thankful to all of our family members who were a source of inspiration to us. Lastly, but not the least, we would like to thank Ahmedabad Institute of Technology for allowing us to design, create and pursue this project.

Darshit Jasani

Miloni Patel

Harshrajsinh Rathod

ABSTRACT

The domain name “ERP implementation for AIT on Android” stands for an Android mobile application for the institute that extends the features of an Enterprise Resource Planning tool. The app is designed for students and their guardians, faculties, and administrative staff of the institution. The primary focus for the app is on simplicity and faster web content delivery on the mobile phones of the user. With offline availability of majority of modules, the response time will be quicker and the waiting time will be lesser. As a student, one is able to view results, notices, alerts, announcements, archives of old papers, exam schedules, event information and what not. A parent would be able to stay up-to-date with their child’s progress with certain built-in features of app which deliver the message to the guardians regularly. The faculties will be able to communicate with the students better. And the administrative staff of the institute will have information at hand, all the time. The list of features and function will keep increasing and improving as the usage of the app becomes frequent.

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CHAPTER 1

INTRODUCTION

1. Introduction

1.1 Introduction to System

Let's face it, we live in a not-so-patient society. We know what we want and we want it now. Most of us can't count the times when we have sat waiting for our computers to take over one minute to boot up and have found our patience tested. Websites havetaken the "wait" out of mobile. In fact, initially when Websites started becoming functional and popular among consumers.

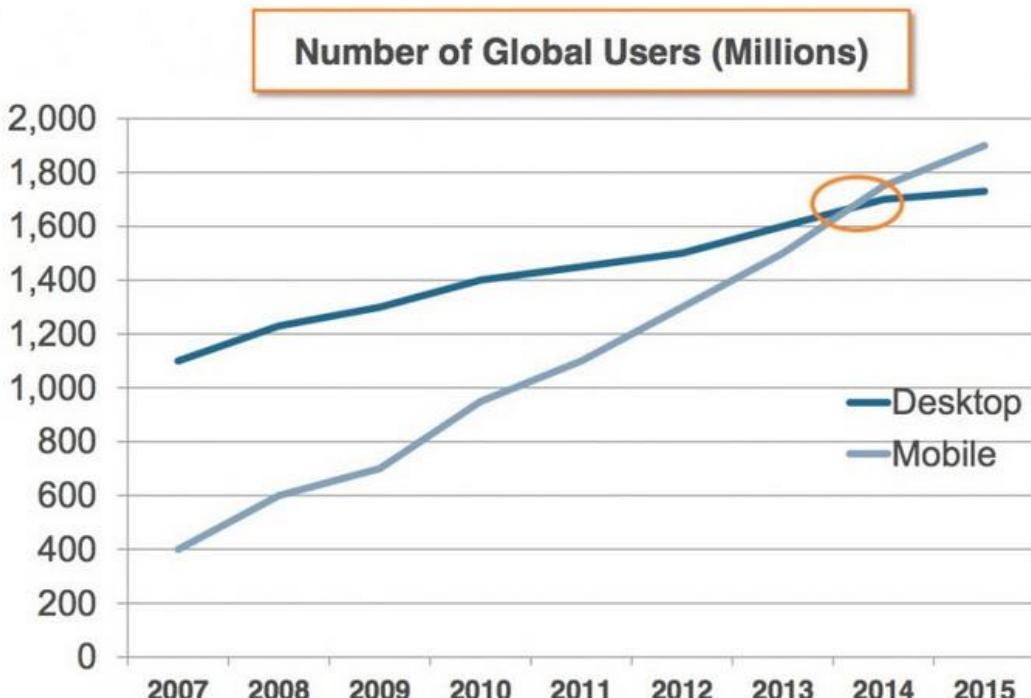


Figure 1.1 Study About Number of Global Mobile Users

It's the year 2016. You don't need to wait till the website buffers. The website provides of relevant information that users need.

We are working towards developing a product that runs on the PHP platform, and combines multiple entities into one. Hence making the search and surf process simpler. Primary goal of the project is to develop a reliable Website that provides an easy, uncluttered and fast access to any information you need. Talking from a user perspective, it is much better to bring the necessary information to the user instead of taking the user all the way to where the information resides. That is the central idea of our Website which

not only delivers the info to the users, but does so without any annoying ads, popups or other hindrances.

1.2.1 Need for New System

With the advancements in the developing tools and the possibilities of reaching more and more users every day, the schools and colleges and universities started creating their own websites. The purpose of these websites was to provide information to the users anywhere.

In a recent survey conducted by “Educause - Centre for Applied Research”, students of various universities were interviewed on their preferences of Website usage. Some of the statistics are as shown below:

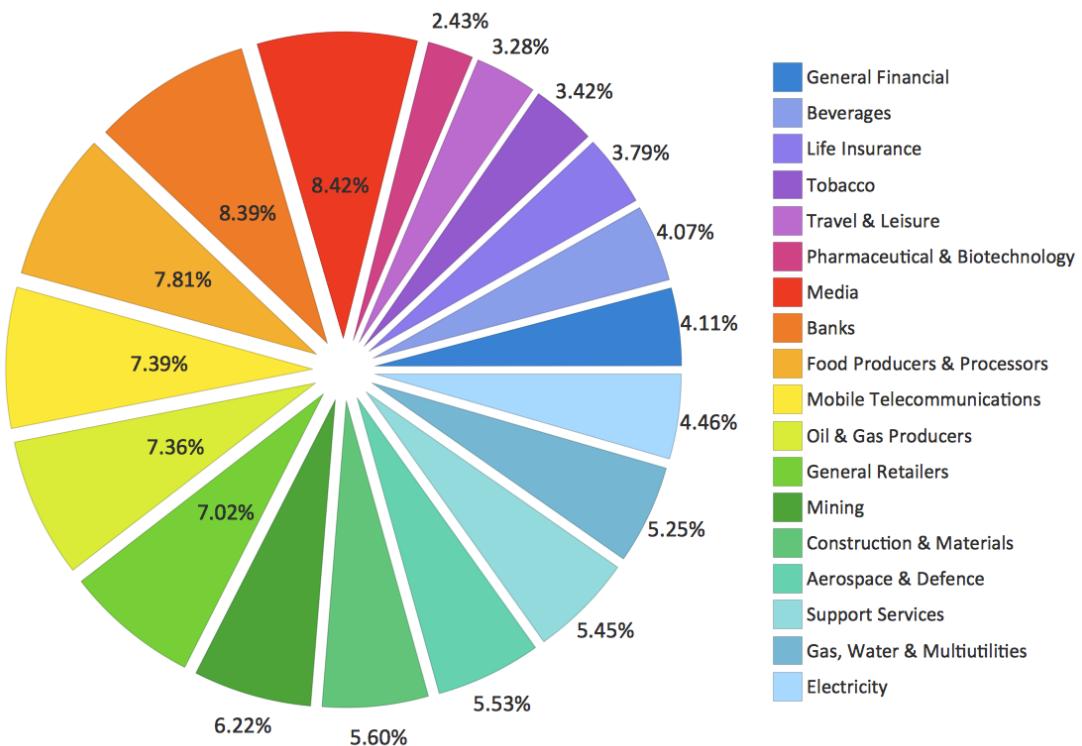


Figure 1.2 Mobile Use Statistic

Websites have become an integral part of our daily lives. We use them at college's computer labs, at home and everywhere in between to stay connected to the world around us.

The future of learning is website, whether it is a simple delivery technology or something that enables a new method of instruction not yet possible. This is the future that many of us, as students, see. Therefore, a different solution has to be looked at, one that is responsive — that will adapt to whatever mobile device is trying to access it and size itself accordingly. One such example is an implementation of ERP (Enterprise Resource Planning) tool on the PHP platform that will act as a single channel of communication between the students, teachers, administrative staff and even parents/guardians with minimal amount of interaction.

1.2.2 Objective of the New System

- eliminating the need of tedious handwritten record keeping process
- data availability for the administrative personal right on their phone
- straightforward and breezy access to information for students about admissions, syllabus, news, and lot of other stuff
- keeping the parents / guardians posted about the progress of their children in a simpler, uncomplicated way
- completion of monetary transactions with the least amount of hassle
- Identification and solution of user wishes, concerns, problems, and values
- smooth and intuitive use experience

1.2.3 Problem Definition

- students have to face difficulties while searching for information online
- parents of the students who reside in other cities have to personally visit the college in order to stay up to date with their child's progress
- sometimes the students are reluctant in asking about their doubts to the teachers / respective faculties
- parents, in rural areas, who are not literate enough to complete the fee payment procedures themselves have to depend on third parties to do the job for them
- in emergency situations, when some vital messages are to be passed to the students in very less time, admin staff has to end up calling every student
- the students are not aware of their lack of attendance in particular subjects
- the managerial staff have to search through a pile of paper when some specific information about some particular student is needed
- ailing students, who are unable to come to college, are neither able to know about the latest happening of the college nor about the upcoming exam schedules.

1.2.4 The Core Components

There are certain functions and components that, one can say, are the heart of the whole system. The system is used primarily for these tasks. Availability of Timeline, Result Updates, Attendance, Courses and Assignments at a single click is the major function of our ERP implementation. The primary principal services of our project are explained here in brief:

Timeline:

The timeline gives regular updates about everyday lectures to the students. Student can easily get the details about previous lectures and important links related to topics covered (shared by the faculties) from the timeline.

So even if the student misses a couple of lectures due to ailments, he/she can get stay informed about the topics covered in previous lecture through the timeline.

It Contains:

- Information About Subject
- Topics covered in previous lecture
- Description about the topic
- Important links regarding the topic

Syllabus:

Students can easily get the syllabus using the website. No need to select your branch, semester or anything else. No need to search for it in places.

The syllabus module does everything for the user. The user just needs to sit back, relax and click on what subject syllabus he/she needs.

Keeping availability and speed in mind, the module also offers to save the data on the storage drive if the user wishes. This enables the user to access the files without the need of Internet.

Attendance:

It further gets categorized in 3 parts:

Faculties can take the attendance using the website.

Students and parents can view the attendance as a whole or the attendance of particular subject and also various statistics regarding their attendance

System can automatically generate the notification and alert messages regarding the student's attendance. Alert messages are sent to respective student as well as their guardian every day.

Fee Payment:

Payment of various fees (tuition fees, exam fees etc.) can be done from the website itself using secure channel. Fee receipt gets generated post a successful transaction. Using this e-receipt student can also get the printed fee receipt from the administration department.

Assignments:

The students don't need to jot down the assignments questions manually in the classroom. They can easily get the assignments of their respective class via the website itself. Once again, selecting your branch and class and divisions are out of the equation, all the user needs to do is click on the subject name.

Exam Schedule:

The moment the exam schedule is finalized and posted on the noticeboard, the students receive it in the site as well. Along with the exams schedule, the syllabus for the exam is also posted in order to save time. These include the following exams:

- Mid Semester Exam - Remedial Exams - Internal Viva

Result:

After successful completion of exams, the result is the next thing that concerns the student the most. Users don't need to go and check the result manually unless they want to see their answer sheets. Whenever result is generated, students and parents get notified and they can view the results from anywhere, anytime they want to.

Alumni-in-Admissions/Enrollment Assistance:

Alumni and parent volunteers make a significant impact in recruiting and enrolling new students to institution. Alumni stories and their successes are excellent measures of the quality of a holder of this particular website. The information and perspective alumni can give can make a big difference in the selection process for prospective students. Alumni chapters will be asked to partner with the Office of Enrollment by helping recruit a highly qualified group of students.

Service:

In the words of AIT, the goal of the college is to develop “men and women for others.” It is in this spirit that this institute alumni chapters are strongly encouraged to engage in meaningful endeavors that benefits the host community.

1.2.5 Project Profile

Project Profile	
Project Title	Enterprise Resource Planning tool implementation for AIT
Project Duration	10 Months
Development Tool	Sublime
Front End	PHP, Javascript, Bootstrap
Back End	pHP, MySQL
Other Tools	Wamp, GIT, GIMP, Adobe Illustrator, Microsoft Visio
Developed On	Windows 7,8,10
Developed for	PHP
Device Support	Any standard device with Browser Support
Internal Guide	Prof. Dr. Satyadev Vyas

1.2.6 Advantages and Limitations

Advantages:

- No need to register, login and we're good to go
- Faster web content delivery
- Quicker response time
- Easy, Understandable and Less Complex UI
- Improved end user quality of experience
- Supports older devices
- Smoother performance on older devices
- Support Go Green! initiative, saves valuable campus resources

Disadvantages:

- Steady internet connection required for data fetching.
- User must know how to use computer and must have basic knowledge of English language.

1.2.7 Proposed Timeline Chart

<u>Task</u>	<u>From Date</u>	<u>To Date</u>
Functionality	1 July 2016	10 July 2016
Functional Description	11 July 2016	19 July 2016
System Requirements and Analysis Study	20 July 2016	1 August 2016
System Design	2 August 2016	15 August 2016
Data Dictionary	16 August 2016	23 August 2016
UML Diagram	24 August 2016	1 September 2016
Functional Diagram	2 September 2016	14 September 2016
Report Preparation	15 September 2016	1 October 2016
Learning PHP	2 October 2016	1 November 2016

CHAPTER 2

REQUIREMENT

ANALYSIS

2. Requirement Analysis

2.1 Requirement Determinations

2.1.1 Functional Requirements

Incorrect login activity should be detected by the system, and the user with proper credentials should be able to login correctly

Person with Admin rights should be in complete control and be able to perform every type of operation (from basic CRUD operations to the most complex ones) on the database

Faculty must have read/write permission for the daily input of mandatory material and data

Student and Parents should only be able to read the information that is being fetched from the database

2.1.2 Non-Functional Requirements

Easy, Understandable and Straightforward UI

Set up the target database to latest improved website (yet supporting the older ones)

Expose site development to the rigorous quality controls and processes early on in the website lifecycle

The key factor is the simplicity, which the user experiences, once he/she uses the site.

2.1.2.1 Performance Requirements

The only way in which the system will meet its performance targets is for them to be specified clearly and unambiguously. While loose or incorrectly defined performance specifications can lead to disputes. Hence, our focus will be on developing a system that is robust and delivers on what it promises. Seamless integration with the available hardware is yet another factor that will be taken into account during the development process.

2.1.3 Security Requirements

Planning for Data Caching Vulnerabilities:

Browsers are fundamentally different from standard laptops and desktops in that they store short-term information as long as possible (caching) to increase speed. This makes browsers more susceptible to security breaches because hackers can access cached information easily. Keeping that in mind we will try another solution to data caching vulnerabilities by programming the cache to automatically be wiped every time the browser reboots or something similar to that.

Rigorous Security Testing

As the app developer, we are the last line of defence. If we don't ensure the security of the site, we put all the users of the site at risk. We will make sure we never rush to release the site before we have properly tested it. Considering that no site is safe from the attacks of viruses and malwares, we will test every inlet for security issues, including the camera, GPS, sensors, and even the platform itself.

Using Strong Encryption

Technology is constantly improving, and as a result, encryption algorithms become obsolete and easier to crack. Sensitive user information is at risk if we use weak encryption or decide not to use it at all. We will attempt to keep improvising with the encryption algorithms in order to keep the data safe and intact.

Implementing Secure Communications to Servers

While logging in or fetching some data, we will have to connect back to a server. Therefore, we must make sure the transit is safe. We will be mainly attempting to achieve this through encryption and SSL certificates.

2.2 Proposed System and Target Users

There are similar applications available: many of them having very less functionalities, some of them having a lot of bugs, lot of them not being managed anymore, quite a few of them being limited to newer versions of website, a number of them with cluttered and complex UI, and a very infinitesimal number delivering what is promised.

There are very less number of sites which implement the Enterprise Resource Planning tool to the online website and none of them exist for our college.

The domain name is "Enterprise Resource Planning tool implementation for college as SaaS and Backend design"

As the name mentions, the system runs on various browsers, which makes the website availability a necessity. The planned website will support about 98% website users by making the site compatible to all browsers.

The students will be able to use the website for staying up-to-date with the happenings in the college, viewing results, finding out syllabus, receiving subject specific assignments, analysing attendance and many more things that one can think of.

The faculties will not only be able to post assignments and marks, they will also be able to notify particular class for a class test, to take attendance in the class right from the site and phone, post details about the topics conducted in the lectures, share useful links with the students and much more.

The guardians/parents of the student will be able to keep track of their child's progress in studies and also will be able to keep an eye on the attendance of the student in the college. There are a lot more things that the app will enable the users to do.

Therefore, to summarize, it is fair to say that the lives of the users will becomes a little easier with the development of the site.

Primarily it may seem that the site is limited to the students and for the students, but the targeted users of the website are as following:

- Current Students
- Prospective Students
- Faculties

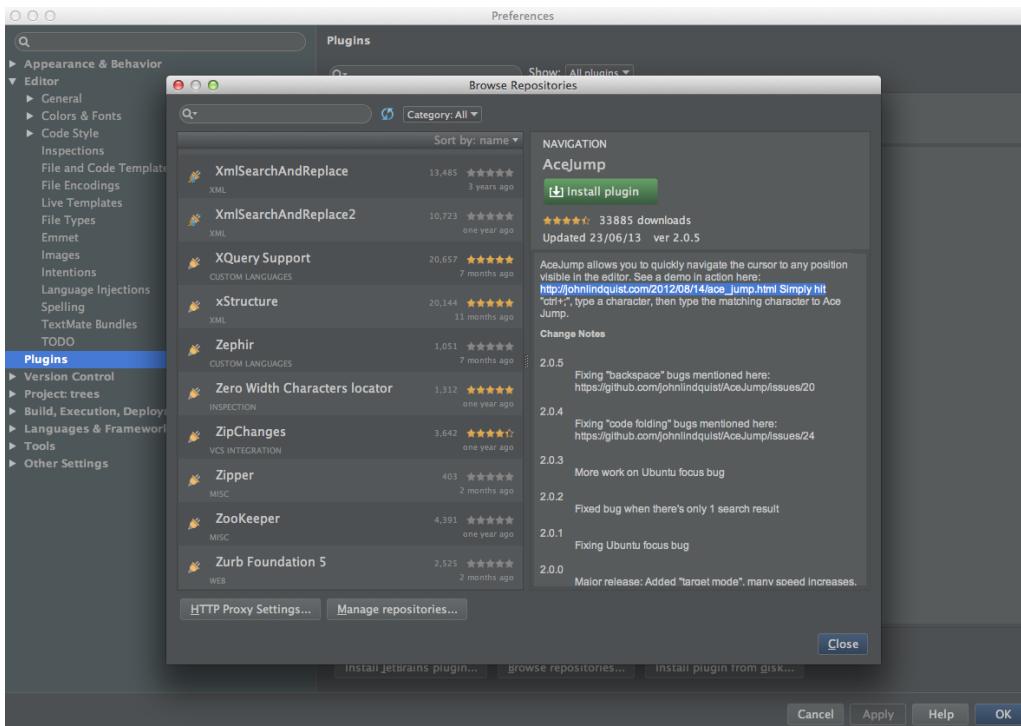
- Principal / HODs
- Administrative Staff
- Parents / Guardians

2.3 Tools and Technology Used

Sublime Text 3:

Sublime text 3 is an amazing piece of software. To start, it is a clean, functional, and fast code editor. Not only does it have incredible built in features (multi-edit and vim mode), but it has support for plugins, snippets, and many other things.

Sublime Text 3:



JavaScript:

JavaScript is a cross-platform, object-oriented scripting language. It is a small and lightweight language. Inside a host environment (for example, a web browser), JavaScript can be connected to the objects of its environment to provide programmatic control over them.

MySQL:

MySQL is an open-source relational database management system (RDBMS). The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. For proprietary use, several paid editions are available, and offer additional functionality. MySQL is a very powerful program in its own right. It handles a large subset of the

functionality of the most expensive and powerful database packages. MySQL is very friendly to PHP, the most appreciated language for web development.

PHP:

PHP is a server-side scripting language designed primarily for web development but is also used as a general-purpose programming language. PHP code may be embedded into HTML code, or it can be used in combination with various web template systems, web content management systems and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page.

BootStrap:

Bootstrap is the most popular HTML, CSS and JS framework for developing responsive, mobile first projects on web.

GIT:

Git is a version control system that is used for software development and other version control tasks. As a distributed revision control system it is aimed at speed, data integrity, and support for distributed, non-linear workflows. As with most other distributed version control systems, and unlike most client–server systems, every Git directory on every computer is a full-fledged repository with complete history and full version-tracking capabilities, independent of network access or a central server. Like the Linux kernel, Git is free software.

GIMP:

GIMP (GNU Image Manipulation Program) is a free and open-source raster graphics editor used for image retouching and editing, free-form drawing, resizing, cropping, photo-montages, converting between different image formats, and more specialized tasks. Because it is distributed freely, it is widely used as a stand-in alternative for Adobe Photoshop.

WampServer:

WampServer refers to a software stack for the Microsoft Windows operating system, created by Romain Bourdon and consisting of the Apache web server, OpenSSL for SSL support, MySQL database and PHP programming language.

2.4 Project Estimation

Software development effort estimation is the process of predicting the most realistic amount of effort (expressed in terms of person-hours or money) required to develop or maintain software based on incomplete, uncertain and noisy input. Effort estimates may be used as input to project plans, iteration plans, budgets, investment analyses, pricing processes and bidding rounds.

There are many ways of categorizing estimation approaches. For example, the top level categories are the following:

Expert estimation: The quantification step, i.e., the step where the estimate is produced based on judgmental processes.

Formal estimation model: The quantification step is based on mechanical processes, e.g., the use of a formula derived from historical data.

Combination-based estimation: The quantification step is based on a judgmental and mechanical combination of estimates from different sources.

Effort Estimation:

At the start of the project, we spent some time in calculating the amount of effort that has to be put in, the number of work hours that we need in order to complete the project within a certain interval of time. The number of people working on the project are three. So, if the work is done as three hours/day for four days/week...

$$\begin{aligned} &= \text{No. of people} * \text{Total weeks} * \text{Total working hours} * \text{Total working days} \\ &= 3 * 36 * 3 * 4 \\ &= 1296 \text{ person - hours (Total Effort)} \end{aligned}$$

Hence, the monthly estimation would become,

$$\begin{aligned}
 &= \text{no. of people} * \text{total weeks in a month} * \text{total working days in a week} * \text{total working hours} \\
 &= 3 * 4 * 4 * 3 \\
 &= 144 \text{ person - hours (Per Month)}
 \end{aligned}$$

This means that the project should finish within the specified time period.

2.4.1 Economic Feasibility

Economic feasibility is the cost and logistical outlook for a project or endeavour.

- Is the organization having the suitable budget to develop the proposed system?

Basically we are developing an PHP platform project which requires no extra cost materials. The development kit is also freeware, open-for-all. Hardware improvement costs are not included at this stage.

- How much profit can be earned from the system by an organization?

Profit can be earned by offering advertisement.

- Would it be cost-effective to develop the system or it is worthwhile to remain with current system?

Yes, definitely as its requires only human effort and a good cooperation between administrative department and software engineer, and does not include any other cost. Also the software system is highly adaptive to the current system.

2.4.2 IMPLEMENTATION AND SCHEDULE FEASIBILITY:

Under the study of Implementation feasibility, I had got to draw the finger to the certain issues, like:

- Is it possible to install the software within the given environment?

The software is visually, functionally as well as operationally made to adjust in the given environment, making it user friendly.

- Will organization management and users support for the installation of the software?

Modern world is highly digitalized thereby creating the need to make a system that can provide ease in tedious searching. This increasing demand for such system making the organization management and users to support for such innovation.

- Will proposed system cause any harm to the operations of the organization?

The system is well designed to secure privacy of each and every user as well as of the administrative department, and indeed will not be causing any harm to the operation of the organization

2.4.3 OPERATIONAL FEASIBILITY:

Operational feasibility measures how the solution will work in the organization and how will end-user & management feels about system?

Why this S/W is operationally feasible? I describe some of the reasons here below:

- Notification system enables to make user alert about the specific information or any event.
- Easy to understand and use. With the User who has a little knowledge of smart phone can also use this application.
- User can access the resources under specific environment as it requires internet connection thereby enabling the user to know up-to-date information.
- The system's hierarchy model helps the user to find out the desired information.

For an organization, the module system helps to segregate the information and making their task easier to update the information as per the user's need.

2.4.4 TECHNICAL FEASIBILITY:

Why this ERP is technically feasible? I describe some of the reasons here below.

- It requires browser for website.
- Needs proper RAM for smooth working.
- Provides updated information regarding the users.

2.5 Data Dictionary

Table No. : 2.1

Table Name : Login_Master

Description : login credentials storage

Column Name	Data Type	Size	Constraint	Description
user_id	Varchar	10	Primary Key	Id of the user
user_name	Varchar	30	Not Null	Name of the user
Password	Varchar	30	Not Null	Password of user
user_type	Varchar	10	Not Null	Type of the user
user_status	Varchar	10	Not Null	Status of user

Table No. : 2.2

Table Name : Student_Master

Description : details about student

Column Name	Data type	Size	Constraint	Description
enrollment_no	Number	12	Primary key	Enrollment No of Student
user_id	Int	-	Foreign Key (Login_Master)	User Id of Student
Name	Varchar	30	Not Null	Name of Student
local_address	Varchar	50	-	Local Address of Student
permanent_address	Varchar	50	Not Null	Permanent Address of student
phone(landline)	Varchar	11	-	Landline No. of student
mobile1	Varchar	10	Not Null	Mobile No. of student
mobile2	Varchar	10	-	Mobile No. of student
admit_date	Date	-	-	Admission Date of student
Email	Varchar	40	-	Email Id of student
Branch	Int	-	Foreign Key (Branch_Master)	Branch of student
Dob	Date	-	-	Birth Date of student
Bloodgrp	Varchar	3	-	Blood Group of Student
Division	Varchar	2	-	Division of student
Semester	Int	2	-	Semester of student
adm_type	Varchar	13	-	Admission Type of student
Gender	Boolean	-	-	Gender of student
Pic	Varchar	255	-	Photograph of student
student_status	Varchar	10	-	Status of student

Table No. : 2.3

Table Name : Faculty_Master

Description : details about faculty

Column Name	Data type	Size	Constraint	Description
faculty_id	Varchar	10	Primary key	Id of faculty
user_id	Int	-	Foreign Key (Login_Master)	User Id of faculty
Name	Varchar	30	Not Null	Name of faculty
Address	Varchar	50	Not Null	Address of faculty
Landline	Varchar	13	-	Landline No. of faculty
mobile1	Number	10	Not Null	Mobile No. of faculty
mobile2	Number	10	-	Mobile No. of faculty
Email	Varchar	40	-	Email Address of faculty
qualification	Int	-	Foreign Key (Qualification_Master)	Qualification of faculty
experience	Varchar	10	-	Experience of faculty
join_date	Date	50	-	Joining date of faculty
designation	Varchar	20	-	Designation of faculty
Branch	Int	-	Foreign Key (Branch_Master)	Branch of faculty
Mrgstatus	Varchar	10	-	Marital Status of faculty
Photo	Varchar	255	-	Photograph of faculty
Gender	Boolean	-	-	Gender of faculty
Bloodgrp	Varchar	3	-	Blood Group of faculty

Table No. : 2.4

Table Name : Branch_Master

Description : details about branch

Column Name	Data type	Size	Constraint	Description
branch_id	Varchar	3	Primary key	Branch Id
branch_code	Varchar	2	Not Null	Branch Code
branch_name	Varchar	30	Not Null	Branch Name

Table No. : 2.5

Table Name : Subject_Master

Description : details about subject

Column Name	Data type	Size	Constraint	Description
sub_id	Int	-	Primary Key	Subject id
sub_code	Varchar	10	-	Subject Code
sub_name	Varchar	40	Not Null	Subject Name
sub_acr	Varchar	5	-	Subject Acronym
sub_type	Int	-	Foreign Key (Subject_Type)	Type of subject
branch	Int	-	Foreign Key (Branch_Master)	Subject Associated with which branch
credit	Int	-	-	Subject Credit
semester	Int	-	Foreign Key (Semester_Master)	Subject belongs to which semester

Table No. : 2.6

Table Name : Subject_Type

Description : defines subject type

Column Name	Data type	Size	Constraint	Description
sub_type_id	Int	1	Primary key	Subject Type Id
sub_type	Varchar	10	Not Null	Type of Subject (Primary or Elective)

Table No. : 2.7

Table Name : Semester_Master

Description : details about semester

Column Name	Data type	Size	Constraint	Description
sem_id	Int	1	Primary key	Semester Id
semester	Number	2	Not Null	Semester number

Table No. : 2.8

Table Name : Subject_Semester

Description : semester wise subject storage

Column Name	Data type	Size	Constraint	Description
sub_sem_id	Int	-	Primary Key	Id of subject
semester	Int		Foreign Key (Semester_Master)	Semester Number
subject_code	Int	-	Foreign Key (Subject_Master)	Subject Code
sub_name	Varchar	50	Not Null	Name of Subject
sub_acr	Varchar	10	-	Subject Acronym
sub_credit	Int	2	Not Null	Subject Credit
Stream_Code	Int	2	Foreign Key (Branch_Master)	Subject Belongs to which branch
Sub_Type	Int	1	Foreign Key (Subject_Type)	Subject Type (Elective or Primary)

Table No. : 2.9

Table Name : Batch_Table

Description : details about batches of every branch

Column Name	Data type	Size	Constraint	Description
batch_id	Int	-	Primary key	Batch Id
batch_name	Varchar	25	Not Null	Batch Name
total_student	Int	-	Not Null	Total Number of students in batch
start_date	Date	-	-	Starting date of curriculum for batch
end_date	Date	-	-	Ending date of curriculum for batch

Table No. : 2.10

Table Name : Attendance_Master

Description : details about student attendance

Column Name	Data type	Size	Constraint	Description
attendance_id	Int	-	Primary key	Attendance Id
lec_date	Date	-	Not Null	Lecture Date
sub_code	Int	-	Foreign Key (Subject_Master)	Subject Code
enrollment_no	Int	-	Foreign Key (Student_Master)	Students Enrollment Number
attendance	Boolean	-	Not Null	Attendance (Present or Absent)
semester	Int	-	Foreign Key (Semester_Master)	Student Belongs to which semester

Table No. : 2.11

Table Name : Exam_Master

Description : details about exam and types

Column Name	Data type	Size	Constraint	Description
exam_id	Int	-	Primary key	Exam Id
exam_category	Varchar	15	Not Null	Category of exam
exam_sub	Int	-	Foreign Key (Subject_Master)	Exam of which subject
exam_date	Date	-	-	Date of exam
exam_time	Time	-	-	Time of exam
total_marks	Int	-	-	Total Marks of exam
semester	Int	-	Foreign Key (Semester_Master)	Exam for which semester
batch	Varchar	25	-	Batch Name

Table No. : 2.12

Table Name : Student_Result_Table

Description : details about student result

Column Name	Data type	Size	Constraint	Description
stud_result_id	Int	-	Primary key	Result id
enrollment_no	Int	-	Foreign Key (Student_Master)	Enrollment No of student
exam_category	Int	-	Foreign Key (Exam_Master)	Exam belongs to which category
exam_sub	Int	-	Foreign Key (Subject_Master)	Exam for which subject
exam_date	Date	-	Not Null	Date of Exam
total_marks	Int	-	Not Null	Total Marks of exam
obtained_marks	Int	-	Not Null	Marks obtained by student
attendance	Boolean	-	-	Attendance of student
semester	Int	-	Foreign Key (Semester_Master)	Students belongs to which semester
batch	Varchar	25	-	Students belong to which batch

Table No. : 2.13

Table Name : Guardian_Master

Description : details about guardians/parents

Column Name	Data type	Size	Constraint	Description
guardian_id	Int	-	Primary key	Id of Guardian
enrollment_no	Int	-	Foreign Key (Student_Master)	Enrollment No of student
fname	Varchar	20	Not Null	Father's Name
f_mobile	Number	10	Not Null	Father's Mobile Number
f_email	Varchar	40	-	Father's Email Address
f_occupation	Varchar	50	-	Father's Occupation
f_education	Varchar	50	-	Father's Education
mother_name	Varchar	20	Not Null	Mother's Name
m_mobile	Number	10	Not Null	Mother's Mobile No
m_email	Varchar	40	-	Mother's Email Id
m_occupation	Varchar	50	-	Mother's Occupation
m_education	Varchar	50	-	Mother's Education

Table No. : 2.14

Table Name : Student_Detail_HSE

Description : student HSE details

Column Name	Data type	Size	Constraint	Description
stud_12_id	Int	-	Primary Key	Id
enrollment_no	Number	12	Foreign Key (Student_Master)	Enrollment Number of Student
last_exam_board	Varchar	20	-	Previous Examination board
last_school_name	Varchar	50	-	Previous School Name
last_exam	Varchar	30	Not Null	Previous Exam Given
last_percentage	Varchar	20	Not Null	Percentage obtain in 12 th
passing_year	Date	-	-	Passing year of 12 th

Table No. : 2.15

Table Name : Student_Detail_Diploma

Description : student Diploma details

Column Name	Data type	Size	Constraint	Description
stud_d2d_id	Int	-	Primary Key	Id
enrollment_no	Number	12	Foreign Key (Student_Master)	Enrollment Number of Student
last_university	Varchar	20	-	Previous University
last_college_name	Varchar	50	-	Previous college name
last_exam	Varchar	30	Not Null	Previous Exam Given
last_cgpi	Varchar	20	Not Null	CGPI of Diploma
passing_year	Varchar	5	-	Diploma Passing year

Table No. : 2.16

Table Name : College_Master

Description : details about college

Column Name	Data type	Size	Constraint	Description
college_id	Int	-	Primary Key	College id
college_name	Varchar	40	Not Null	Name of college
college_address	Varchar	50	Not Null	Address of the college
contact1	Varchar	13	Not Null	Contact Number
contact2	Varchar	10	Not Null	Contact Number
college_email	Varchar	50	Not Null	Email Address of college

Table No. : 2.17

Table Name : Faculty_Salary_Detail

Description : details about salary of faculty

Column Name	Data type	Size	Constraint	Description
faculty_sal_id	Int	-	Primary Key	Faculty salary id
faculty_id	Int	-	Foreign Key (Faculty_Master)	Faculty id
Name	Varchar	30	Not Null	Name of faculty
designation	Varchar	20	Not Null	Designation of faculty
salary	Int	-	Not Null	Salary of Faculty
salary_status	Boolean	-	-	Salary Status (Paid or Unpaid)
paid_date	Date	-	-	Salary Payment Date

Table No. : 2.18

Table Name : Fee_Details

Description : details about fee

Column Name	Data type	Size	Constraint	Description
fee_id	Int	-	Primary Key	Fee id
bill_id	Number	10	Not Null	Bill Number
enrollment_no	Int	-	Foreign Key (Student_Master)	Enrollment Number of student
branch	Int	-	Foreign Key (Branch_Master)	Branch of the student
Semester	Int	-	Foreign Key (Semester_Master)	Semester of the student
payment_mode	Varchar	10	Not Null	Payment Method
check_no	Varchar	20	-	Check Number
payment_date	Date	-	-	Date of fee payment
payment_status	Varchar	10	Not Null	Payment Status (completed or pending)

Table No. : 2.19

Table Name : Department_Master

Description : details about various departments

Column Name	Data type	Size	Constraint	Description
dept_id	Int	-	Primary Key	Department id
dept_name	Varchar	20	Not Null	Department Name
dept_desc	Text	-	-	Department Description

Table No. : 2.20

Table Name : Qualification_Master

Description : details about qualification

Column Name	Data type	Size	Constraint	Description
qual_id	Int	-	Primary Key	Qualification Id
qual_name	Varchar	50	Not Null	Qualification Name
qual_desc	Text	-	-	Qualification Description

Table No. : 2.21

Table Name : Staff_Master

Description : details about other staff of college

Column Name	Data type	Size	Constraint	Description
staff_id	Int	-	Primary key	Staff id
Name	Varchar	30	Not Null	Name of staff member
address	Varchar	50	Not Null	Address of staff member
landline	Varchar	13	-	Landline number of staff member
mobile1	Number	10	Not Null	Mobile number of staff member
mobile2	Number	10	-	Mobile number of staff member
email	Varchar	40	-	Email Address of staff member
qualification	Int	-	Foreign Key (Qualification_Master)	Qualification of staff member
experience	Varchar	10	-	Experience of staff member
join_date	Date	50	-	Joining date of staff member
designation	Varchar	20	-	Designation of staff member
Dept	Int	-	Foreign Key (Department_Master)	Department to which staff member belongs
mrgstatus	Varchar	10	-	Marital status of staff member
photo	Varchar	255	-	Photo of staff member
gender	Boolean	-	-	Gender of staff member
bloodgrp	Varchar	3	-	Blood Group of staff member

Table No. : 2.22

Table Name : Staff_Salary_Detail

Description : details about staff salary

Column Name	Data type	Size	Constraint	Description
staff_sal_id	Int	-	Primary Key	Staff salary id
staff_id	Int	-	Foreign Key (Staff_Master)	Staff Member id
Name	Varchar	30	Not Null	Name of staff member
designation	Varchar	20	Not Null	Designation of staff member
salary	Int	-	Not Null	Salary of staff member
salary_status	Boolean	-	-	Salary status of staff member (paid or unpaid)
paid_date	Date	-	-	Payment date
Dept	Int	-	Foreign Key (Department_Master)	Department of staff member

Table No. : 2.23

Table Name : Timeline_Master

Description : details about timeline

Column Name	Data type	Size	Constraint	Description
timeline_id	Int	-	Primary Key	Timeline id
subject	Int		Foreign Key (Subject_Master)	Subject Name
topic	Varchar	20	Not Null	Topic Name
topic_detail	Text	-	Not Null	Topic Details
weblink	Text	-	-	Link for that topic
branch	Int	-	Foreign Key (Branch_Master)	Belongs to which branch
batch	Int	-	Foreign Key (Batch_Master)	Belongs to which batch

Table No. : 2.24

Table Name : Feedback_Table

Description : details about feedback given by students

Column Name	Data type	Size	Constraint	Description
feedback_id	Int	-	Primary Key	Feedback Id
feedback_msg	Text	-	-	Feedback Details
user_id	Int	-	Foreign Key (Login_Master)	User Id

Table No. : 2.25

Table Name : Complaint_Table

Description : details about complaint by students/faculty

Column Name	Data type	Size	Constraint	Description
complain_id	Int	-	Primary Key	Complain id
complain_subject	Varchar	50	-	Complain About
complain_detail	Text	-	-	Complain Details
user_id	Int	-	Foreign Key (Login_Master)	User Id

Table No. : 2.26

Table Name : Circular_Table

Description : details about circular

Column Name	Data type	Size	Constraint	Description
circular_id	Int	-	Primary Key	Circular Id
circular_subject	Varchar	50	-	Circular Subject
circular_detail	Text	-	-	Circular Details
semester	Int	-	Foreign Key (Semester_Master)	Semester Details
branch	Int	-	Foreign Key (Branch_Master)	Branch Details

Table No. : 2.27

Table Name : Event_Master

Description : details about upcoming/recently gone events

Column Name	Data type	Size	Constraint	Description
event_id	Int	-	Primary Key	Event Id
event_name	Varchar	50	-	Name of the event
event_detail	Text	-	-	Event Details
event_from_date	Date	-	-	Starting Date of the Event
event_to_date	Date	-	-	Ending Date of the Event
event_time	Time	-	-	Event Timing
event_venue	Varchar	50	-	Venue of the Event

CHAPTER 3

SYSTEM DESIGN

3. System Design

3.1 Use Case Diagram

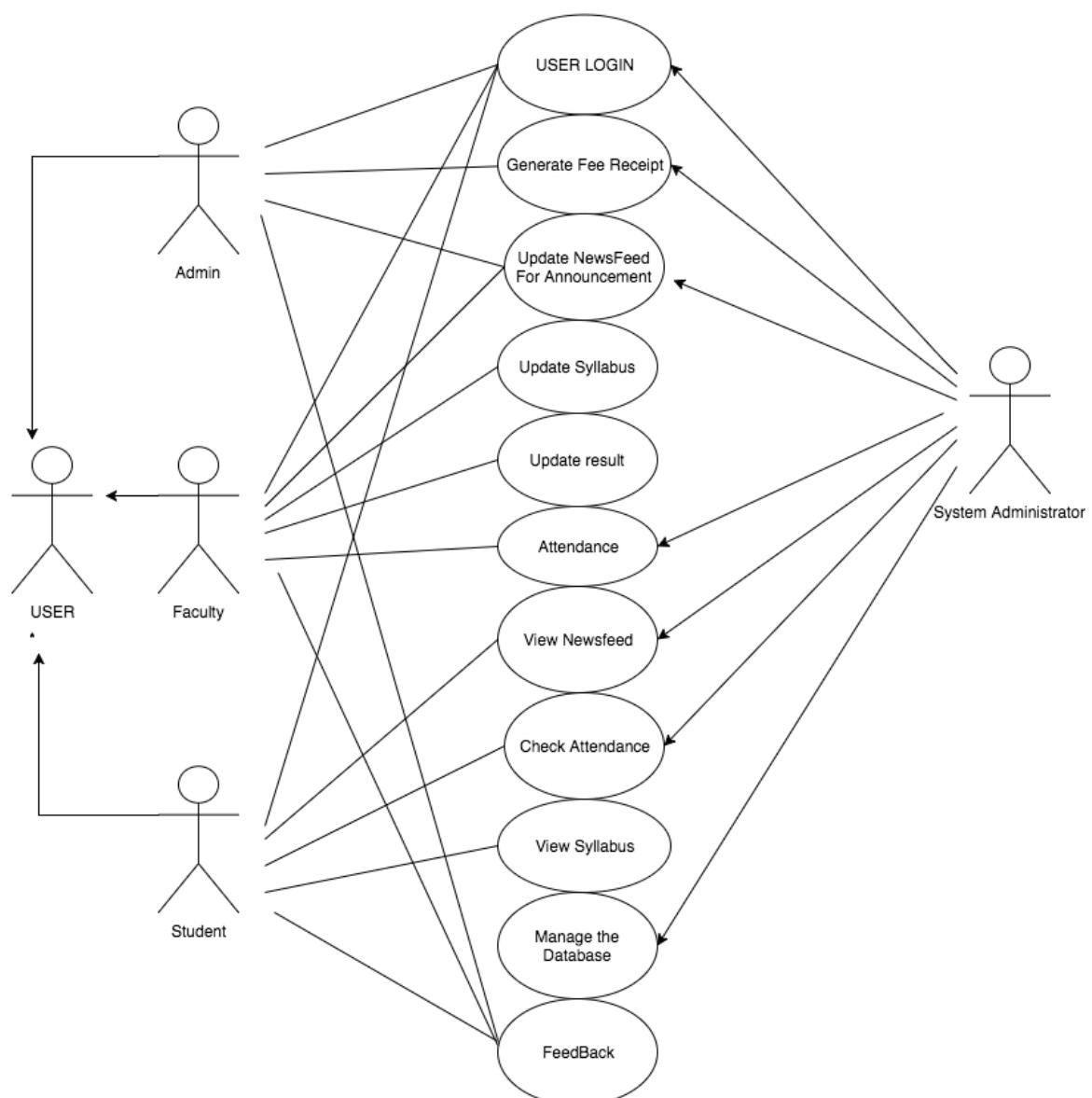


Fig 3.1 Use case Diagram

3.2 Activity Diagram

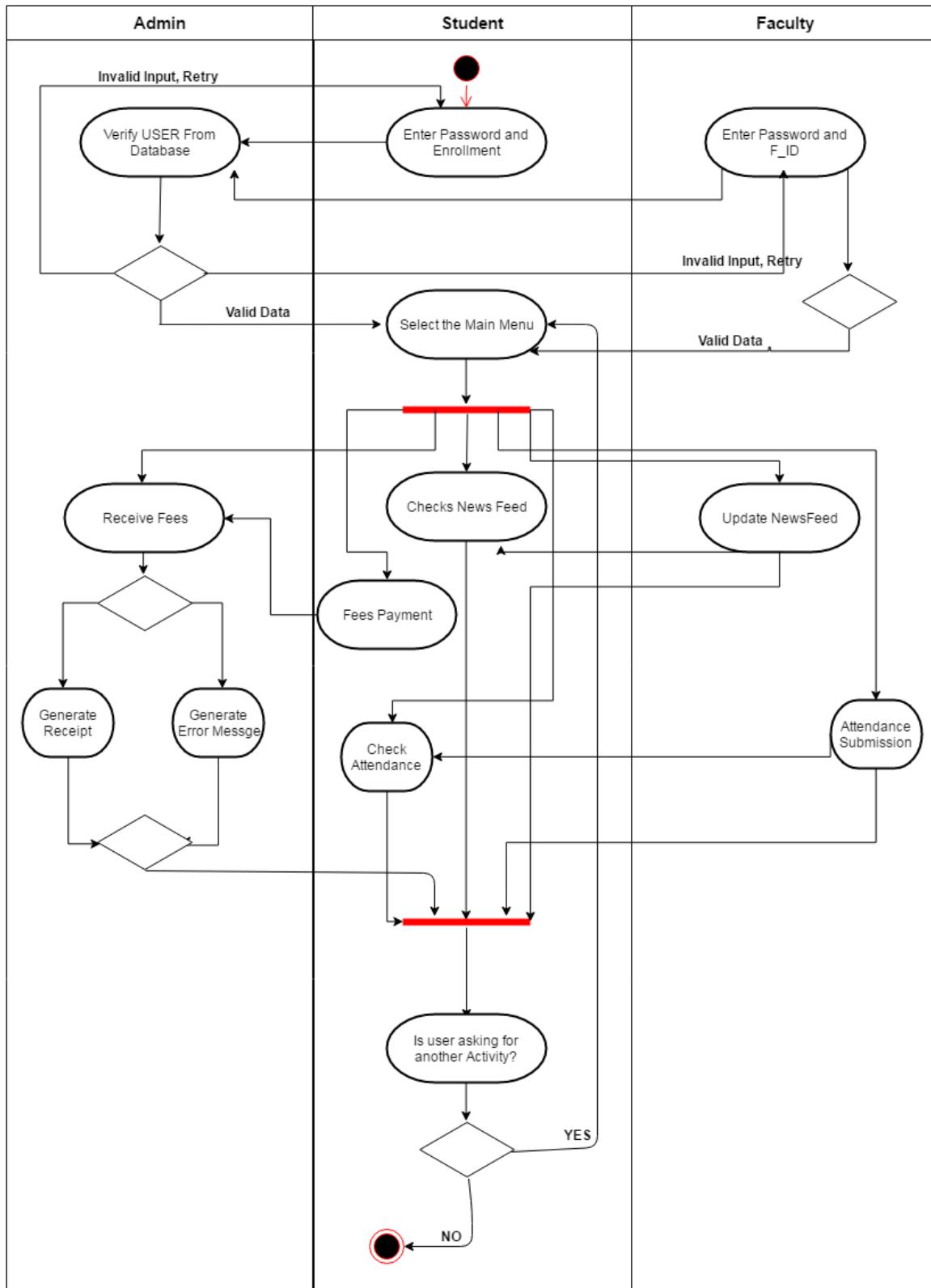


Fig 3.2 Activity Diagram

3.3 Context Diagram

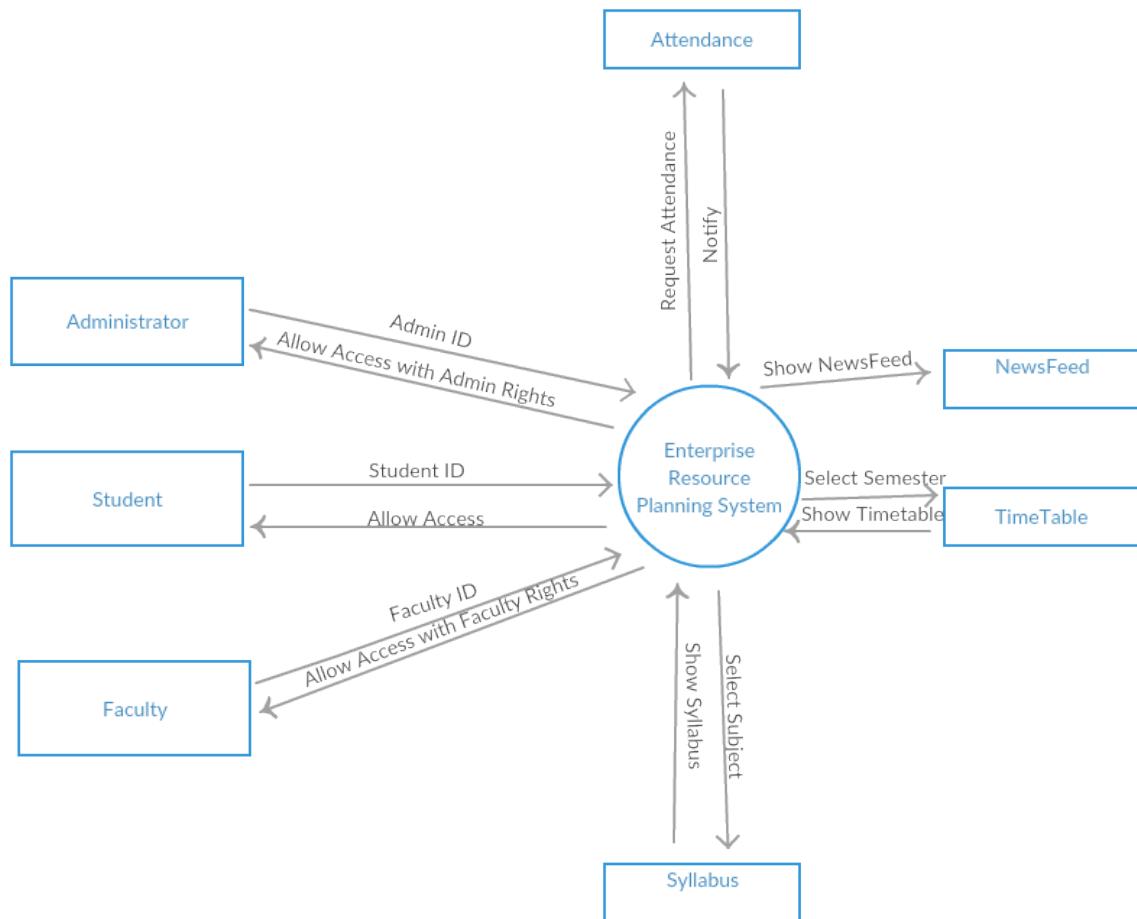


Fig 3.3 Context Diagram

3.4 Sequence Diagram

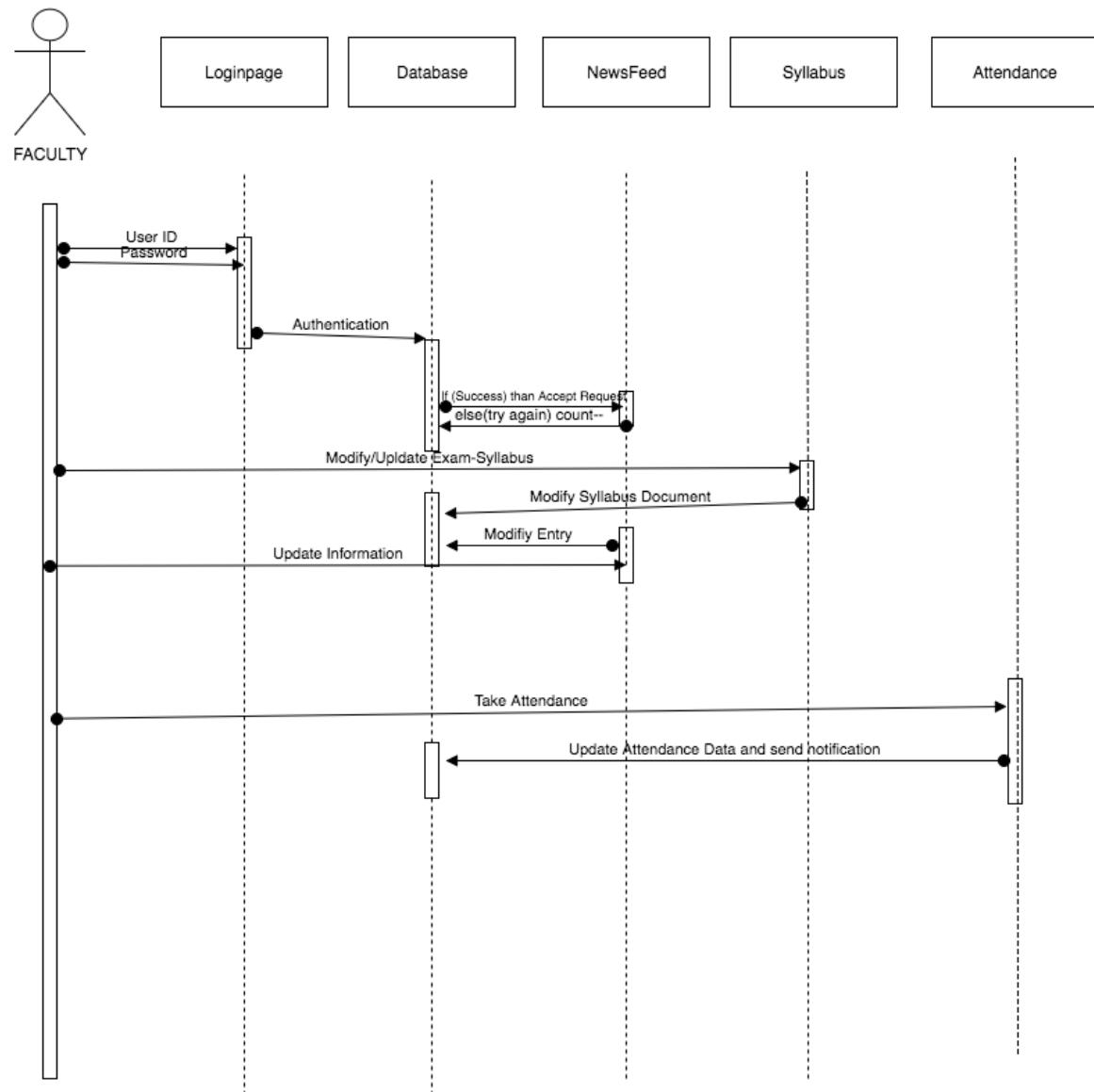


Fig 3.4 Sequence Diagram

3.5 Collaboration Diagram

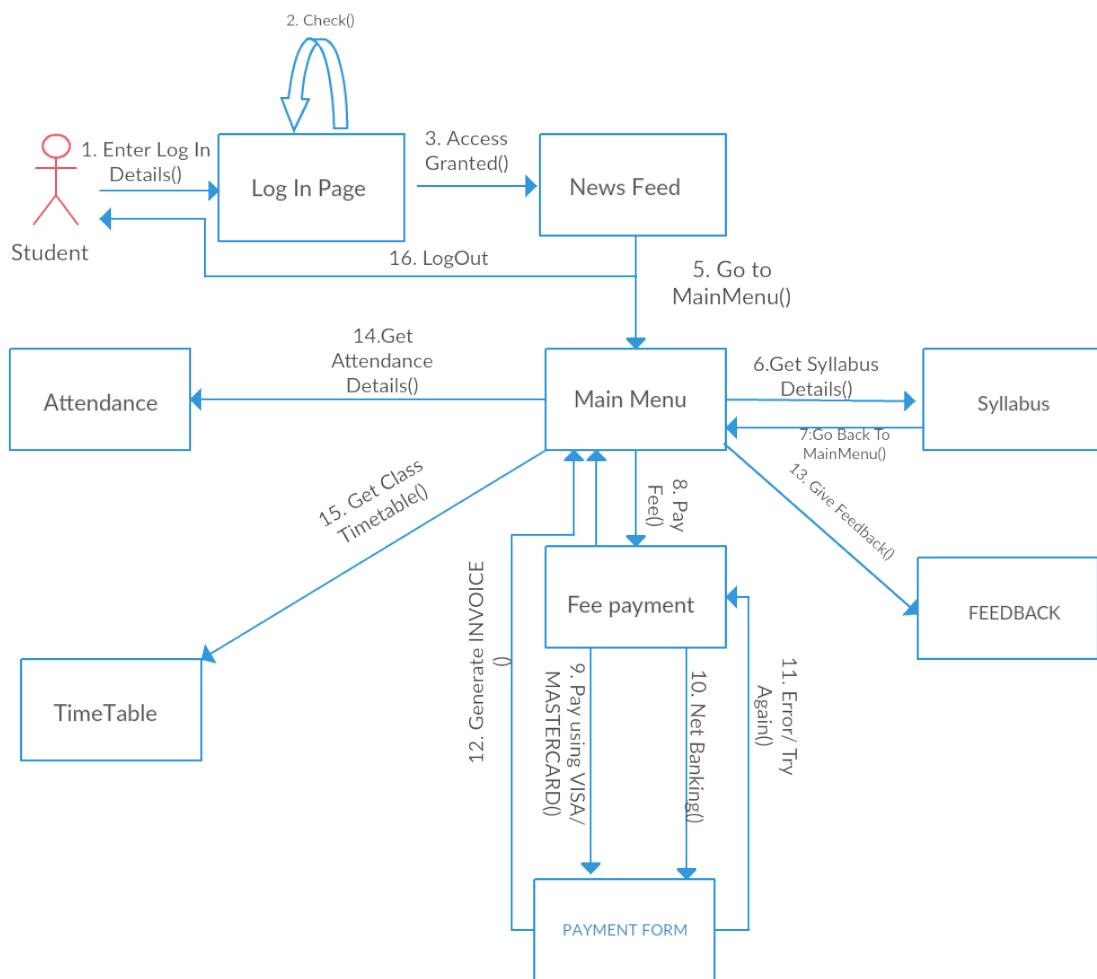


Fig 3.5 Collaboration Diagram

CHAPTER 4

PROPOSED ENHANCEMENTS

4. Proposed Enhancements

It is absolutely absurd to concede that a product is perfect, complete or finished in the computer world. The evolution constantly takes place no matter what we do. “There’s always a way to do it better - find it..!” – the simple quote from Thomas Alva Edison seems very appropriate for the invariably advancing world of programming.

We always have to keep in mind the features that can be added in order to raise the level of the website and the methods that can be improved upon to make the website, as a whole, a lot faster than it currently is.

After a certain interval of time, post the app release, we are planning to introduce certain enhancements like:

- Event registration
- Placement information
- Individual achievements section
- Volunteer registration
- Video lecture portal
- Fees payment
- Fees report
- Transportation vehicle management and tracking
- Forums
- Leave management
- UI and UX improvements according to user reviews
- Security advancements with time

CHAPTER 5

CONCLUSION

5. Conclusion

The principal intent of our project is to reduce the amount of human work and largely automate the whole process of institution management. We are also aiming to provide a single channel of communication between the students, parents, faculties and the administrative staff of the particular institution. Simultaneously, the project also will focus on the amount of work the user has to do in order to get things done, with minimal amount of interaction the application will do what the user wants it to do. While providing most of the functionalities online, we will also make sure that the application does not take up the whole space in the user website. By doing so, the overall burden on the four expected users will be optimised.

All and all the project, on paper, seems to be a very promising one. Once released, it will, hopefully, end up bringing a substantial amount of change in the work system of the institution. We, as a team, will work steadfastly and with tenacity to bring the whole project to life and attempt to make the user lives a lot more simplified.

CHAPTER 6

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APPENDIX 1

PERIODIC PROGRESS REPORT

Enrollment No :	130020107026	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Jasani Darshit Shirishbhai	Department :	Computer Engineering
Mobile No :	9409605990	Discipline :	BE
Email :	darshitjasani@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : -

Periodic Progress Report : First PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

We have researched the current users of existing website of college and analysed the difficulties the users are facing. And also asked about their needs. And took their suggestion for betterment of website. And we are working on the problems and resolving their problems on daily basis by testing and editing.

2. What challenge you have faced ?

The main challenges we have that we have to combine all the suggestion and deliver it in only one place. Which is quite challenging. The other difficulties may be the unclear suggestion from users. which makes undesired results than expected.

3. What support you need ?

The basic support we need is a guidance from the faculties and the respected HODS So we can work on our projects in proper way. The support from user is also necessary because the project we want to deliver is mainly for them

4. Which literature you have referred ?

We have done research on our subject and existing websites. Which are user friendly and also researched on google. This all will help us for delivering a better project.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107026	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Jasani Darshit Shirishbhai	Department :	Computer Engineering
Mobile No :	9409605990	Discipline :	BE
Email :	darshitjasani@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : 30 days, 23 hours

Periodic Progress Report : Second PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

we have talked with faculties, students and admin department to understand the features and functions that they required for our project. we have also started learning database for our project.

2. What challenge you have faced ?

The biggest challenge is that how to combine all the data that we have gathered and put it in a particular manner so that user can easily use the product. the other difficulty may be the unclear suggestion from user,which makes undesired outcome then expected.

3. What support you need ?

The support we need is guidance from our respected faculty and HODS for knowing different functionality and features that we can use in our project. so we can do far better progress in our project abd the support from user is neccessary because the project we want to deliver is mainly for them.

4. Which literature you have referred ?

tutorials videos of udemy, thenewboston, bucky roberts, w3schools and some other websites, we have also referred other colleges websites for better understanding. we also referred existing reports on the ERP system.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107026	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Jasani Darshit Shirishbhai	Department :	Computer Engineering
Mobile No :	9409605990	Discipline :	BE
Email :	darshitjasani@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : 9 days, 7 hours

Periodic Progress Report : Third PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

we have done with our canvases. And we have started learning database, javascript, jQurey, bootstrap.

2. What challenge you have faced ?

the challenge is that how to combine all the data that we gathered and put it on particular manner so user can easily navigate the product and unclear suggestion from user, which makes undesired outcome than expected.

3. What support you need ?

the support we need is guidance from our respected faculty for knowing features that we can use in our project and the guidance of database so we can work on database quite easily. and support from the user is must needed.

4. Which literature you have referred ?

tutorials videos of udemy, TheNewBoston, bucky roberts, w3schools and some other websites. we have also referred other colleges website for better understanding. we also referred existing reports on the ERP system.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107026	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Jasani Darshit Shirishbhai	Department :	Computer Engineering
Mobile No :	9409605990	Discipline :	BE
Email :	darshitjasani@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : 1 days, 0 hours

Periodic Progress Report : Forth PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

we have start creating a database. we have start learning javascript, jQurey, bootstrap, php.

2. What challenge you have faced ?

the challenge is that how to combine all the data that we gathered and put it on particular manner so user can easily navigate the product and unclear suggestion from user, which makes undesired outcome than expected.

3. What support you need ?

the support we need is guidance from our respected faculty for knowing features that we can use in our project and the guidance of database so we can work on database quite easily. and support from the user is must needed.

4. Which literature you have referred ?

tutorials videos of udemy, TheNewBoston, bucky roberts,w3schools and some other websites. we have also referred other colleges website for better understanding. we also referred existing reports on the ERP system.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107065	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Patel Miloni	Department :	Computer Engineering
Mobile No :	9924769331	Discipline :	BE
Email :	patel_miloni@yahoo.in	Semester :	Semester 7

PPR Details

Time Interval : 0 days, 0 hours

Periodic Progress Report : First PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

we have done some basic research regarding our project. mainly we gathered the information and modules related to our project. we worked on basic front end of this. and we also talked to some people who are facing various problems regarding this matter.

2. What challenge you have faced ?

we are facing some technical problems. and the biggest challenge is to collect all the information related to our project because we are having various modules in it.

3. What support you need ?

we mainly need support in creating the database, as to recall everything of sql and related to database.we need perfect data of backend to make it quite easier.

4. Which literature you have referred ?

we have referred the books and material of our main subjects like java, php, .net, dbms. we are also taking help of google , searching on wikipedia, as well as some reference books , videos on youtube etc. this is how we are collecting material of our project and moving ahead step by step.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107065	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Patel Miloni	Department :	Computer Engineering
Mobile No :	9924769331	Discipline :	BE
Email :	patel_miloni@yahoo.in	Semester :	Semester 7

PPR Details

Time Interval : 0 days, 0 hours

Periodic Progress Report : Second PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

after the field research we worked on the functionalities of our project. We started working on the website and created rough tables of database so that we can easily move forward.

2. What challenge you have faced ?

we are facing some problems in the website and mainly in the database because the database which will be used in our project contains so many fields. we also interacted with faculties and HOD's of different departments and they put many questions and difficulties that we have to face during our project.

3. What support you need ?

we mainly need support in creating database because it contains so many fields that we may do some mistake. so we also need support of faculties in this matter a little guidance regarding the database.

4. Which literature you have referred ?

we have referred the books and material of our main subjects like java, php, .net, dbms, html etc. we are watching videos from youtube to get knowledge of making database or making website or the designing part. we also read many articles from wikipedia to increase our knowledge.

Comments

Comment by Internal Guide :

First and Second PPR are same. Need to some work done between two PPRs

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107065	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Patel Miloni	Department :	Computer Engineering
Mobile No :	9924769331	Discipline :	BE
Email :	patel_miloni@yahoo.in	Semester :	Semester 7

PPR Details

Time Interval : 29 days, 20 hours

Periodic Progress Report : Third PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

After creating the list of features needed for the enterprise resource planning implementation on android, we have started working on data dictionary. This data dictionary will contain number of modules we will need, as well as database tables.

2. What challenge you have faced ?

After sorting the required functions into two categories of elementary and auxilliary, the next challenge we have faced is the creation of data dictionary. The formulation of data dictionary has proved to be fairly challenging.

3. What support you need ?

At this stage we are facing the challenges of creating data dictionary so that database related issues can be avoided. We need some support from the mentors to over come the problems we are facing while creating this data dictionary mainly the issues related to the modules.

4. Which literature you have referred ?

The dominant sources of information far so have been google and wikipedia. We have also tried to find a few existing reports on ERP systems and their components. We are also taking help of certain articles from various research papers. This things helped us a lot in our project.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107065	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Patel Miloni	Department :	Computer Engineering
Mobile No :	9924769331	Discipline :	BE
Email :	patel_miloni@yahoo.in	Semester :	Semester 7

PPR Details

Time Interval : 0 days, 0 hours

Periodic Progress Report : Forth PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

After field research, we made a list of website modules and functionalities that we need to put in this website and we are uploading the list as needed. we have acquired some of those modules and improving this website day by day.

2. What challenge you have faced ?

Usual errors, bugs, integration problems, website designing problems, layout problem, fragmentation problem, implementation problem, database connectivity problem ,etc.

3. What support you need ?

Guidance for prioritizing website functionalities and useful features.

4. Which literature you have referred ?

Stack overflow forums. Tutorial videos and forums of the well known universities.we also took suggestions of our college faculties HOD's of different departments. we also discussed with the other well experienced persons in website designing.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107086	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Rathod Harshrajsinh Vijaysinh	Department :	Computer Engineering
Mobile No :	9662127111	Discipline :	BE
Email :	harshrajsinh96@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : -

Periodic Progress Report : First PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

We have examined the existing users of the current website and asked them about what problems they are facing currently and also took suggestions and according to that we started focusing more on that particular problems and created the very first front end for the demo only and we are testing and editing day by day to make it better.

2. What challenge you have faced ?

The main thing challenging for us is to combine all the suggestions collected from users and serve it in only one place, which is quite difficult. The other challenges may be the vague suggestions from users, which makes complicated results than expected.

3. What support you need ?

The main role for this project is for the users which leads us for the suggestions that they want and to make the website better. So the main support we need is a sounding response from suggester, team support as well as a better guidance from our project mentor.

4. Which literature you have referred ?

We have referred many existing websites which are user friendly plus the books we have studied in the past semesters. This all will eventually help us for delivering a better project.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107086	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Rathod Harshrajsinh Vijaysinh	Department :	Computer Engineering
Mobile No :	9662127111	Discipline :	BE
Email :	harshrajsinh96@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : 31 days, 18 hours

Periodic Progress Report : Second PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

We have reviewed the current users of the existing website and asked for what problems they are facing at times and took suggestions as well. According to that, we started focusing more on that suggestions and listed the all possible solutions to make it better.

2. What challenge you have faced ?

The main thing problematic for us was to list out key fields of database as it is too much important for a smoother flow of website, which is quite difficult because the missing fields will create ambiguous site. The other challenges may be the vague suggestions from users, which makes complicated results than expected.

3. What support you need ?

The main role for this project is for the users which will lead us to the suggestions that they want and to make the website better. So the main support we need is a sounding response from suggesters, team support and a better guidance from our project guide as well.

4. Which literature you have referred ?

We have referred many existing websites which are user-friendly and some online available videos which helped a lot to understand the whole thing plus the books we have studied in the past semesters. This all will eventually help us for delivering a

better project.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107086	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Rathod Harshrajsinh Vijaysinh	Department :	Computer Engineering
Mobile No :	9662127111	Discipline :	BE
Email :	harshrajsinh96@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : 3 days, 11 hours

Periodic Progress Report : Third PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

After surveying, we knew all the requirements of all type of users and according to that, we started to discuss the basic database dictionaries which we have to create and at the same time referring some good sites for an aesthetic look at the front end side as well.

2. What challenge you have faced ?

There is no major issue while doing so but, at some points after reaching at that point, when we come to know that something will be added then it was quite difficult for us as we have to skim from the starting itself. So we can say it was a little bit challenging work for us.

3. What support you need ?

The support we need whole is now proper suggestions so that there is no wasting of time in recreating the same thing. The guidance from a knowledgeable person is also mandatory while doing the same.

4. Which literature you have referred ?

After viewing the online videos for the project work, currently we are studying or you can consider analysing the best teacher, Google for all the queries as we can find tons of solutions there and also ask questions or doubts on some of the sites.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

Enrollment No :	130020107086	College :	Ahmedabad Institute Of Technology, Gota, Ahmedabad
Student Name :	Rathod Harshrajsinh Vijaysinh	Department :	Computer Engineering
Mobile No :	9662127111	Discipline :	BE
Email :	harshrajsinh96@gmail.com	Semester :	Semester 7

PPR Details

Time Interval : 0 days, 5 hours

Periodic Progress Report : Forth PPR

Project ERP Product For AIT As Saas And Backend Design

:

Status : Reviewed (Freeze)

1. What Progress you have made in the Project ?

We are doing work on our own requirements like if I am a user of this, then what will I ask for my ease and according to that we found most of the new entries or innovations are come to know for a better development.

2. What challenge you have faced ?

The most challenging thing is to discuss how to create a secure and strong database as it is much essential for this purpose. We are struggling because of the different opinions of the team members and some of the free advisers which make us confused at the end.

3. What support you need ?

The main support we need now is setting our purpose and goals by users and a good information architecture or the details how to make so that we can aptly apply our skills in this project and all this will be done with the help of our mentor who had given the best guidance since the starting.

4. Which literature you have referred ?

At recent, we are just looking for the better evaluations of our project so that it will helpful for the users and hence we are referring the best developers of the websites and meet them for further guidance. As per my opinion, this will affect more than any other literature work.

Comments

Comment by Internal Guide :

None

Comment by External Guide :

None

Comment by HOD :

None

Comment by Principal :

None

Comment by University Admin :

None

APPENDIX 2

PATENT SEARCH & ANALYSIS REPORT



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 23/09/2016

Dear Jasani Darshit Shirishbhai,

Studied Patent Number for generation of PSAR : 16BE7_130020107026_1

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : ERP ,College,Student Management
3. Search String Used : Enterprise Resource Planning And College or Student Management
4. Number of Results/Hits getting : 134

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Patent Related to Student Retention Management
- 6 (a) : IPC class of the studied patent : G06Q 50/00, G06Q 10/00, G06Q10/06
7. Title of Invention : Workflow Method and System for Student Retention Management
8. Patent No. : US20120233084A1
9. Application Number : US13045257
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20120233084A1/>
10. Date of Filing/Application (DD/MM/YYYY) : 10/03/2011
11. Priority Date (DD/MM/YYYY) : 10/03/2011
12. Publication/Journal Number : US 2012/0233084 A1
13. Publication Date (DD/MM/YYYY) : 13/09/2012
14. First Filled Country : Albania

15. Also Published as

Sr.No	Country Where Filed	Application No./Patent No.
1	United States	US 2012/0233084 A1

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
1	Elias Sardonis	Cambridge, MA US
2	Melanie Strodtman	Lebanon, OH US
3	Robert Stober	Hull, MA US

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	Jenzabar Inc	Boston MA US

18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

This is by far the largest category of research. It is being generated mainly by individual colleges as they attempt to identify the reasons for dropout and exam failure in order to develop improvement strategies. Because it is usually intended for internal consumption and use, the work is largely unknown and unseen outside the originating institutions.

20. Specific Problem Solved / Objective of Invention

A retention management system identifies, analyzes, and evaluates student information collected by the enterprise resource planning systems and learning management systems. The retention management system applies an algorithm to collected information and locates students that are struggling before they are lost to attrition. The retention management system also provides tools to allow personnel at the academic institution to communicate with students, implement plans to correct current problems with student, and to predict and prevent future problems.

21. Brief about Invention

In the accompanying drawings, reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale; emphasis has instead been placed upon illustrating the principles of the invention. Of the drawings:

FIG. 1(<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00000.TIF/1.png>) is a block diagram showing academic enterprise systems and illustrating the relationships between the users, the application server, the management systems, and stored data.

FIG. 2 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00001.TIF/1.png>)is a flow chart illustrating the operations performed by the retention management system (RMS).

FIG. 3 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00002.TIF/1.png>)is a flow chart that illustrates the steps for a user to manually create an early alert, intervention, or assign a follow-up.

FIG. 4 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00003.TIF/1.png>)shows an exemplary main screen that is presented to a user after they access the RMS.

FIG. 5 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00004.TIF/1.png>)shows a screen presenting an example of risk factors associated with a retention model.

FIG. 6 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00006.TIF/1.png>)shows the retention action tab screen.

FIG. 7A (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00007.TIF/1.png>) shows the early alerts tab screen.

FIG. 7B (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00008.TIF/1.png>)shows the interventions tab screen.

FIG. 7C (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00009.TIF/1.png>) shows the

Page 2

followup

assignments tab screen.

FIG. 8 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00010.TIF/1.png>) shows an example of an early alert screen.

FIG. 9 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00011.TIF/1.png>) shows the student list tab screen.

FIG. 10 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00012.TIF/1.png>) shows the student profile tab screen.

FIG. 11 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00013.TIF/1.png>) shows the model results tab screen.

FIG. 12 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00014.TIF/1.png>) shows the student relationships tab screen.

FIG. 13 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00015.TIF/1.png>) shows the course schedule tab screen.

FIG. 14A (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00016.TIF/1.png>) illustrates an example of an early alert submission form.

FIG. 14B (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00017.TIF/1.png>) illustrates an example of an intervention submission form.

FIG. 14C (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00018.TIF/1.png>) illustrates an example a follow-up assignment submission form.

FIG. 15 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00019.TIF/1.png>) is a flowchart illustrating the steps for automatically generating alerts.

FIG. 16 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00020.TIF/1.png>) shows screen providing an example of how to configure an automatically generated alert.

FIG. 17 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00021.TIF/1.png>) shows screen illustrating an example an alert message associated with an automatically generated alert.

FIG. 18 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00022.TIF/1.png>) shows a screen illustrating an example of an automatically generated alert.

FIG. 19 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00023.TIF/1.png>) shows the early warning configuration screen.

FIG. 20 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00024.TIF/1.png>) shows screen illustrating how different members of the university are granted different access levels to the retention management system based on their role within the university.

FIG. 21 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00025.TIF/1.png>) shows screen illustrating an example of how concern types are configured.

FIG. 22 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00026.TIF/1.png>) shows screen illustrating an example of how notifications are configured for different people.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

22. Key learning Points

Academic enterprise systems are used to manage student and business information at colleges, universities, high schools, and other academic institutions. The systems are used to manage student information such as enrollment, class registration, courses information, grades and financial aid information as well as business information such as payroll, room scheduling, professor course assignments, billing, and budgeting, to list a few examples.

Learning management systems are examples of academic enterprise systems and are sometimes referred to as content management systems, learning content management systems, managed learning environments, learning support systems, or online learning centers. Regardless of the name, the purpose is to provide web-based tools and strategies to supplement or replace traditional classroom learning and student management tools. The systems allow the institution's personnel, including administrators, faculty, and advisers, to update grades, assign online quizzes, track attendance, and create and monitor course groups. Likewise, the learning management systems can populate student and faculty accounts with courses, schedules, course descriptions, class lists, contact information and provide 24-hour access to course documents, announcements, links, syllabus, discussions, and online chat for students and the institution's personnel.

Similarly, business information is managed by academic enterprise resource planning (ERP) systems. The enterprise systems manage business information such as payroll, invoices, billing, budgeting, and other similar business functions required to keep an academic institution operational.

Academic institutions are always concerned with student attrition. When a student withdraws from an academic institution there is certainly a loss of revenue to the institution, but more importantly, it suggests a failure. As a result, personnel at many institutions are dedicated to engaging at-risk students in hopes of reducing attrition. In fact, retention systems have been developed to identify at-risk students. Systems are available that access student grades in order to identify the students that are at-risk.

23. Summary of Invention

Many of the existing retention systems exist separate from the learning management and academic ERP systems that are common to academic institutions. This impairs their performance since they do not have access to all student data that might be relevant to identifying at-risk students. Moreover, it impairs the usability of the retention systems from the standpoint of the institutional personnel since they must learn and then access a new and separate system.

The present invention is directed to a retention management system. The retention management system analyzes the information collected by the enterprises resource planning systems and learning management systems and identifies critical factors that lead to the loss of students. The

retention management system is able to evaluate students based on academic, financial, and social risk factors to determine which students are
Page 3

most in danger of attrition. The system is also able to manage the workflow associated with engaging at risk students and then tracking their progress.

In general, according to one aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create alerts concerning retention issues for students and displaying the alerts to institutional personnel including types of the alerts and student names for the student for whom the alerts were created.

In embodiment, the types of the alerts include academic, financial and social types. More specific examples include academic grades and academic attendance.

The alerts are preferably displayed along with dates of creation, users submitting the alerts and relationships of the users to the students.

In the preferred embodiment, users can assign follow-ups for the alerts including designating assignee to perform the follow-ups. A status of the follow-ups are tracked as being pending or completed. Preferably, users can also add interventions with the students including specifying types of interventions performed.

In operation, users can select students and then display alerts associated with the students and also possibly follow-ups and interventions associated with the students.

In general, according to another aspect, the invention features a system for student retention management. The system comprises a user interface that enables users to create alerts concerning retention issues for students and a retention management system that displays the alerts to institutional personnel including types of the alerts and student names for the student for whom the alerts were created.

In general, according to still another aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create interventions concerning retention issues for students and displaying the interventions to institutional personnel including specifying contact with the student for whom the interventions were created.

In general, according to still another aspect, the invention features a system for student retention management for managing interventions concerning retention issues for students.

In general, according to still another aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create follow-ups concerning retention issues for students and displaying the follow-ups to institutional personnel including personnel designated to perform the follow-ups. This can also be characterized in terms of a system.

In general according to still another aspect, the invention features a method of generating alert messages in an academic retention management system. The method comprises retrieving and displaying student information, enabling selection of students, enabling the population of alert forms with information related to retention concerns with respect to the selected students, and submitting the alert forms to the retention management system to create corresponding alerts.

The above and other features of the invention including various novel details of construction and combinations of parts, and other advantages, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular method and device embodying the invention are shown by way of illustration and not as a limitation of the invention. The principles and features of this invention may be employed in various and numerous embodiment without departing from the scope of the invention.

24. Number of Claims : 32

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

A User can also add deadlines to the followups. Alert Generation can also be made automatic so each time user has not to worry about generating alerts. and also the principles and features of this invention may be employed in various and numerous embodiments



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 30/09/2016

Dear Jasani Darshit Shirishbhai,

Studied Patent Number for generation of PSAR : 16BE7_130020107026_2

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Espacenet (EPO Patent database)
Web link of database : <http://worldwide.espacenet.com/advancedSearch>
2. Keywords Used for Search : Academic ERP database, database security using proxy, ERP database security
3. Search String Used : Method or System for Securing Academic ERP Database with proxy
4. Number of Results/Hits getting : 2545

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : extension of security beyond the traditional role-based data security model
- 6 (a) : IPC class of the studied patent : H04L9/32, G06F17/30
7. Title of Invention : Method and System for Securing Academic ERP Database using Datasource Proxy
8. Patent No. : US20120047162 A1
9. Application Number : US20100860219
- 9 (a) : Web link of the studied patent : <https://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=2012047162A1&KC=A1&FT=D>
10. Date of Filing/Application (DD/MM/YYYY) : 20/08/2010
11. Priority Date (DD/MM/YYYY) : 20/08/2010
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1		

16. Inventor/s Details.

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17. Applicant/Assignee Details.

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18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

Academic enterprise resource planning (ERP) systems are used to manage backoffice information at universities, colleges, and other academic institutions. The types of data managed by these systems generally fall into two categories: student information and business information.

The student information in the academic ERP systems is often managed by a number of components. The admissions components of ERP systems are used to manage student admissions, from identifying and recruiting candidates to automating the admissions processes by tracking prospects, importing student data, and analyzing and generating candidate information reports. They are used to manage admissions communications, organize candidate information, schedule recruiting visits and interviews, manage recruitment data, and track students from admissions to registration. Financial aid components of the ERP systems often have the ability to generate financial aid packages and awards, process disbursements and adjustments, process work-study funds, track academic progress, enable authorized administrators to view financial aid data, and facilitate compliance with federal guidelines. Registration components of the systems manage enrollment data and course registration, generate catalogs, determine space availability, course conflicts, course pre-requisites, and non-course pre-requisites. Additional components are often available that cover student life such as student activities, residence assignment, violations and sanctions, advising, and alumni development and advancement activities.

The business information in the academic ERP systems is often managed by a number of other components. Accounts payable components typically provide vendor profiles and generate annual vendor reports, invoices and purchase orders. General ledger components cover automated billing, manage payment plans and manage in-house loans. The components also automate the budgeting process, enable the management of fixed assets, and cover payroll and personnel and other human resource (HR) functions.

20. Specific Problem Solved / Objective of Invention

A secured academic ERP system comprises an ERP database storing data for an academic institution, an application server for authenticating users and generating requests to access the ERP database for the users, a security system that accesses a user permissions table that maps

the users to permitted organizations within an academic institution and modifying the requests to limit the requests to the permitted organizations for the users making the requests, and a data source for receiving the modified requests and passing those requests to the ERP database. This system extends security beyond the traditional role-based data security model to support the finer granularity security at the level of the content. This is achieved without the need for a new database architecture or the use of separate databases for different organizations

21. Brief about Invention

Of the drawings:

FIG. 1 is a block diagram illustrating a hierarchy of organizations within an academic institution and how permissions for users is limited among those organizations according to the present invention;

FIG. 2 is a block diagram showing an academic ERP system and a content level security system for implementing user permissions within the ERP database; and

FIG. 3 is a flow diagram illustrating the operation of the content level security system according to an embodiment of the present invention.

FIG. 1 illustrates the hierarchical organization of an academic institution and the content level security provided by the present system.

In the example, there are three levels of organizational hierarchy. The three organization types are: institute, divisions, and departments. In the typical example, the institute 50 is the academic institution such as a college or university. In the current implementation, there is only one top level organization. Then, there are one or more divisions 52, 54 within the institution 50. The parent organization, top level type is the institute 50, which is identified as Org. ID1 in an organization table 70; when creating a new division, the top level organization will be automatically assigned to the parent organization. Examples of divisions are colleges or schools within the institution.

Each of the divisions (Org. ID 2, 3) 52, 54 has one or more departments. For example, division 52 has three departments (Org. ID 4, 5, 6) 56, 58, 60. Division 54 similarly has three departments (Org. ID 7, 8, 9) 62, 64, 66. The organization type department is the third level organization. The parent organization type will be one of divisions. Examples of departments are departments for foreign languages and English literature in a college of arts and sciences division.

In the current embodiment, the hierarchy of the organization 50 is stored in the organization table 70. The organization table 70 uses a recursive design, so the entire organizational hierarchy of the institution 50 is defined in one table. This means each row has a parent id referencing another row in the same table.

According to the preferred embodiment, different users then have different access to data associated with each of these divisions and departments within the divisions. For example, user1 has access only to data associated with the department (Org. ID 4) 56; and user2 has access only to data associated with department (Org. ID 6) 60. Other users such as user4 has access to the data associated with division (Org. ID 2) 52 inclusive of its three departments; user6 has access to all of the data associated with division (Org. ID 3) 54 including its departments. Finally, some users, user5, have access to all the data of the institution (Org. ID 1) 50.

22. Key learning Points

Key learning points would include the following:

- i) security implementation - the methods used in the patents for the security of the database and the data stored inside it are fairly strong and innovative which introduces prospective learners to a whole new side of database security.
- ii) database distribution - it plays an equally important part when it comes to the security of the data. If the data is not divided properly, then the specific security of the data becomes useless.

23. Summary of Invention

Many academic institutions, especially larger universities, can have complex organization hierarchies. A single institution may have multiple divisions, such as separate colleges and/or schools. For example a university may have a college of arts and sciences, a college of engineering, and different schools for business, education and nursing, to list a few examples. Graduate schools may also be included such as medicine, law and graduate arts and sciences.

Especially in these larger academic institutions, the traditional role-based data security model may not provide adequate security segmentation among the various organizations, such as divisions and the departments within those divisions. Departmental level administrators should have access to records that are specific to that department or possibly the division, but not the entire institution, on one hand.

Page 3

In general, according to one aspect, the invention features a method for securing an academic ERP database. The method comprises intercepting requests to access the ERP database and accessing a user permissions table that maps users to permitted organizations within an academic institution. The requests are modified to limit the requests to the permitted organizations based on the permissions of the users making the requests and the modified requests are passed to the ERP database. Example organizations within the academic institution include divisions and departments within the divisions.

In general according to another aspect, the invention features a secured academic ERP system. The system comprises an ERP database storing data for an academic institution and an application server for authenticating users and generating requests to access the ERP database for the users. A security system accesses a user permissions table that maps the users to permitted organizations within an academic institution and modifies the requests to limit the requests to the permitted organizations for the users making the requests. A data source receives the modified requests and passes those requests to the ERP database.

24. Number of Claims : 25

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

While the patent provides a very strong and a pretty reliable method for securing the database in the ERP, we have to keep in mind that the software world and the technological world is a constantly evolving one. Hence what seems to be technically impenetrable today, might end up being just another common security measure after 10-15 years



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 30/09/2016

Dear Jasani Darshit Shirishbhai,

Studied Patent Number for generation of PSAR : 16BE7_130020107026_3

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : Database,Website,SaaS
3. Search String Used : Create database using SQL for SaaS website
4. Number of Results/Hits getting : 2345

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Related to database management
- 6 (a) : IPC class of the studied patent : G06F 17/30545 , G06F 17/30 20060101 G06F 017/30
7. Title of Invention : Database system and method of optimizing cross database query
8. Patent No. : US20110106789A1
9. Application Number : US12916412
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20110106789A1/en?q=database&q=sql&q=website&q=saas&page=2>
10. Date of Filing/Application (DD/MM/YYYY) : 30/10/2009
11. Priority Date (DD/MM/YYYY) : 30/10/2009
12. Publication/Journal Number : 20110106789 A1
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14. First Filled Country : Albania : United States

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1		

16. Inventor/s Details.

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17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
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18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

A database system comprising: a plurality of databases, at least two of the plurality of databases are stored with one or more data collections composed of tables with the same structure, a federated view of the data collection is created, by at least one computer processor, on each of the at least two databases; and a request routing layer for routing, in response to a query request crossing the data collections

20. Specific Problem Solved / Objective of Invention

A computer-implemented method of optimizing cross-database query in a database system comprising a plurality of databases, at least two of the plurality of databases are stored with one or more data collections composed of tables with the same structure, the method comprising the steps of: a federated view creating step for creating a federated view of the data collections on each of the at least two databases; and a routing step for routing

21. Brief about Invention

The figures form a part of the specification and are used to describe the embodiments of the invention and explain the principle of the invention together with the literal statement.

FIG. 1 shows an exemplary SaaS database system using the scaling out mechanism;

FIG. 2 shows several example cases requiring cross-tenant access;

FIG. 3 shows examples of tables stored in a database;

FIG. 4 is a schematic view showing a SaaS database system according to the first embodiment of the present invention;

FIG. 5 shows a flowchart of process for building a federated view on each database in the SaaS database system according to the embodiment of the present invention;

FIG. 6 is a schematic view showing a SaaS database system according to the second embodiment of the present invention;

FIG. 7 is a weighted directed graph illustrating an example of tracking result obtained by the request tracker 600;

FIG. 8 is a flowchart showing a method of optimizing cross-database query according to the first embodiment of the present invention

22. Key learning Points

Since the data required for satisfying a cross-tenant query request of one tenant generally include the data in the tenant data of the tenant itself, the data traffic between databases can be reduced by routing using Routing Rule 1. When the tenant data involved in a cross-tenant query request are located in one database, data transmission between databases can even be avoided. For example, data transmission is avoided by routing a request T3 (T3, T4) to the database B. Herein, the request T3 (T3, T4) schematically represents a query request from the tenant T3 that involves the tenants T3 and T4.

With regard to a request T3 (T1, T2, T3), the request will be routed to the database B if Routing Rule 1 is adopted. However, T1 and T2 are located in the database A, data transmission can still be generated between the databases A and B if the query is performed using the database B. In this case, data traffic between databases can be further reduced by using Routing Rule 2. In particular, the sizes a, b and c of T1, T2 and T3 can be obtained from the underlying database by using database command or other mechanism, which, for example, may be the number of

records in the tables involved in the current query, in T1, T2 and T3. Then, the data amount (a+b) involved in the database A and the data amount c involved in the database B are compared. If the former is relatively larger, the request T3 (T1, T2, T3) is routed to the database A; and if the latter is relatively larger, the request T3 (T1, T2, T3) is routed to the database B. The cross-tenant query request can be routed to the database that has most of data required for satisfying the request by using Routing Rule 2, thereby reducing data traffic between databases. The forgoing only illustrates several possible routing rules for routing a cross-tenant query request, and does not intend to enumerate all of the routing rules. Those skilled in the art can understand that many known methods can be applied to SQL routing. The purpose of the above Routing Rules 1 and 2 is to reduce data transmission between databases as much as possible. However, in consideration of load balance, we can also adopt Routing Rule 3: routing a cross-tenant query request to a database with the lowest load based on the statuses of the underlying databases.

For the application of Routing Rule 3, the following case may be considered, for example. When the database (database A) where tenant data of the requesting tenant (such as tenant T1) are located is in a high load status or has a slow responding speed (e.g., lower than a threshold), Routing Rule 3 can be used. A cross-tenant request such as T1 (T1, T2) from the tenant T1 is routed to one of the databases B and C that has the lower load. Herein, the status of the underlying database refers to load, response speed and the like of each underlying database in the SaaS system. The load refers to CPU utilization, memory utilization or the like of a server where each database is located, which can be obtained by known methods such as calling a system function or the like. The response speed refers to the time required for returning a query result. The time can be obtained by timing in the request routing layer.

The request tracker 610 in FIG. 6 is located in the request routing layer for tracking cross-tenant query request behavior in runtime, in particular, for tracking frequency of queries by each tenant, involving other tenants. For example, Log4JDBC in the related art can be used to implement the function of the request tracker 610. Log4JDBC is a JDBC driver capable of recording information such as SQL log and SQL execution time and so on. For example, the request tracker 610 embedded in the request routing layer can track cross-tenant query behavior by analyzing SQL statement or returned ResultSet in runtime. The tracking result of the request tracker 610 is accumulated in the request routing layer, and can be used by the request routing layer to implement routing selection.

23. Summary of Invention

In order to solve the above problems, an example embodiment of the present invention is in a database system including a plurality of databases, provide a database system capable of optimizing, cross-database query by creating a federated view on each database, and a method of optimizing cross-database query.

The database system and the method of optimizing cross-database query of the present invention can reduce the complexity of programming logic, reduce the data traffic

24. Number of Claims : 24

25. Patent Status : Granted Patent & In-force Patent

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

After studying each patent thoroughly and by answering all the previous questions, I can say that A large-size SaaS application may have lots of tenants and data, and generally uses a scaling out mechanism as the business increases.



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 01/10/2016

Dear Jasani Darshit Shirishbhai,

Studied Patent Number for generation of PSAR : 16BE7_130020107026_4

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : student information,information management,student tracking system
3. Search String Used : student information management
4. Number of Results/Hits getting : 5678

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : student information management
- 6 (a) : IPC class of the studied patent : G06Q10,G06Q10/00, G06Q10/10
7. Title of Invention : Institutional student tracking system
8. Patent No. : US20020178038A1
9. Application Number : US10106575
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20020178038A1/>
10. Date of Filing/Application (DD/MM/YYYY) : 26/03/2002
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12. Publication/Journal Number : US 2002/0178038 A1
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1		

16. Inventor/s Details.

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18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

One of the disadvantages with existing software systems to track student records is that they are cumbersome and difficult for a user to learn and use. There are no mention any placement tracking capability.

20. Specific Problem Solved / Objective of Invention

An improved institutional student tracking system comprising in one form of the invention, a software system information that is divided into several modules that interact with each other to control student record management functions. In one embodiment, the system has a school module, a student module, a satisfactory academic progress module, a report module, a default management module, an attendance and grades module, and a utilities module. The system can also print a variety of reports such as performance reports, attendance reports, financial reports and other types of related reports

21. Brief about Invention

In the drawing:

FIG. 1 shows the institutional student tracking system's main menu;

FIG. 2 shows the institutional student tracking system's school module with the general tab selected;

FIG. 3 shows the institutional student tracking system's school module with the subjects tab selected;

FIG. 4 shows the institutional student tracking system's school module with the programs tab selected

FIG. 5 shows the institutional student tracking system's select courses module showing the select courses screen;

FIG. 6 shows the institutional student tracking system's school module with the admissions reps tab selected;

FIG. 7 shows the institutional student tracking system's school module with the lead sources tab selected

FIG. 8 shows the institutional student tracking system's lead sources list;

FIG. 9 shows the institutional student tracking system's school module with the employers tab selected;

FIG. 10 shows the institutional student tracking system's school module with the holidays tab selected;

FIG. 11 shows the institutional student tracking system's select student screen of the student module;

FIG. 12 shows the institutional student tracking system's student module with the general tab selected;

FIG. 13 shows the institutional student tracking system's student module with the prospect tab selected;

FIG. 14 shows the institutional student tracking system's student module with the tracking tab selected;

FIG. 15 shows the institutional student tracking system's student module with the enrollment tab selected;

FIG. 16 shows the institutional student tracking system's review enrollment status screen of the student module;

FIG. 17 shows the institutional student tracking system's student module with the attendance tab selected;

FIG. 18 shows the institutional student tracking system's student module with the

FIG. 19 shows the institutional student tracking system's student module with the accounts receivable tab selected;

FIG. 20 shows the institutional student tracking system's student module with the placement tab selected;

FIG. 21 shows the institutional student tracking system's satisfactory academic progress module;

FIG. 22 shows the institutional student tracking system's reports module;

FIG. 23 shows the institutional student tracking system's default management module;

FIG. 24 shows the institutional student tracking system's default management module for a selected student with the general student information tab selected;

FIG. 25 shows the institutional student tracking system's default management module for a selected student with the loan information tab

selected;

22. Key learning Points

Software systems to track student records of various types are known in the art. Such devices are typically used by schools or other institutions. Schools are commonly faced with the difficult task of collecting, storing, updating and productively using all of the student information available to the school. For example, classes need to be organized and scheduled, students need to have grades assigned and grade reports delivered, and student loans must be managed.

Previous software systems to track student records have some inherent disadvantages. One of the disadvantages with existing software systems to track student records is that they are cumbersome and difficult for a user to learn and use. They are also limited to programs that are Microsoft ® DOS based and are not available for use over the world wide computer network. Many existing systems are greatly limited by or have no marketing analysis capability. Also, existing systems are not easy to work with when generating reports based on the student data. They lack extensive holiday tracking capability and grading scales to record letter grades.

Another disadvantage is that they do not provide for student progress reports for students who change rates of attendance. Further, existing systems have limited or no placement tracking capability and limited or no student loan default management capability.

23. Summary of Invention

The institutional student tracking system ("ISTS") responds to the overwhelming need for a user friendly, year 2000 compliant software system for use by post secondary or other institutions to track student records.

The ISTS provides institutions with a state of the art system to monitor students' progress from their first interest in an institution, through the placement of those student graduates in the occupations for which they trained. An institution will have rapid and easy access to a prospective student's status, an enrolled student's academic progress, and accounts receivable information, as well as alumni placement information, and even student loan borrower's default management records.

Beyond basic student record tracking, the ISTS performs other invaluable school management functions. Institutions will have immediate access at their computers, monitors or other electronic data input and viewing device to every subject offered by the institution, every program of study offered by the institution, complete marketing performance reports on each admissions representative institutions employ, and a perpetual analysis of which types of advertising are best serving student recruitment needs. Institutions will also benefit from a daily schedule report identifying every prospective student who is scheduled for a consultation appointment, enrollment appointment or financial aid appointment on any date selected. And, the ISTS's document tracking reports provide an institution with an "at a glance" view of what important documents may be missing from a student's file. In addition, institutions get a variety of financial reports covering everything from complete outstanding receivables listings, to 90-10 calculations and unearned tuition summaries. These reports can be generated quickly when audit time arrives. The ISTS has been designed to take the burden away from student records administration.

24. Number of Claims : 23

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

In this type there are not mention student placement information, so there are also improvement this features of placement information of student. There are also not mention of security in student information, so there are provide good security of student information so not misuse of this information.



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 01/10/2016

Dear Jasani Darshit Shirishbhai,

Studied Patent Number for generation of PSAR : 16BE7_130020107026_5

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : college students notification,college notification system,student college notification system
3. Search String Used : notification system for college students by individual user profiles
4. Number of Results/Hits getting : 7564

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : online search and notification system based on individual user profiles
6 (a) : IPC class of the studied patent : G06F3/01
7. Title of Invention : Directory And Notification System For College Students Based On Individual User Profiles
8. Patent No. : US20110107232 A1
9. Application Number : US20100925773
9 (a) : Web link of the studied patent : <http://www.google.co.in/patents/US20110107232>
10. Date of Filing/Application (DD/MM/YYYY) : 29/10/2010
11. Priority Date (DD/MM/YYYY) : 29/10/2009
12. Publication/Journal Number : US20110107232A1
13. Publication Date (DD/MM/YYYY) : 05/05/2011
14. First Filled Country : Albania : United States

15. Also Published as

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1		

16. Inventor/s Details.

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2	Brittany Rachel Brody	W. Des Moines, IA

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
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18. Applicant for Patent is : Company**PART 3: TECHNICAL PART OF PATENTED INVENTION****19. Limitation of Prior Technology / Art**

Adjusting to life on a college campus is a challenge that many students face. In most cases, attending college is the first time young people are away from the daily support network of family and home. Unlike high school, which usually consists of a single building, the vast size (i.e., both acreage and number of buildings) and population of a typical college campus can be overwhelming, particularly to a freshmen student. And, due to a lack of an efficient communication system, even junior and senior college students have a difficult time staying informed of events, activities, organizations, lectures and other matters that may be of interest to a college student. Presently, notices of events, activities, club meetings etc. are made by posting paper flyers on walls, doors, and other structures around campus. In short time, these paper notices are torn down, damaged and/or destroyed. The event or organization identified in the notice may be of interest to only a small fraction of the campus population, and often those persons who may have had an interest in attending the event, meeting, etc. may never see the posted flyer. Moreover, even those interested students who read the flyer may subsequently forget the posted date, time and location of the event and will, thus, fail to attend. The lack of an effective search, notification and calendaring system for campus events, activities, organizations, lectures, local businesses and other matters of individual personal interest limits the ability of students to experience all that college life has to offer

20. Specific Problem Solved / Objective of Invention

Considering the foregoing, it is a primary object of the present invention to provide a web based application with a searchable and current directory of events, activities, organizations, lectures and other matters of interest to students at a particular university. It is a further object of the present invention to provide a web based application having a notification system that provides updates and reminders through a medium(s) that the user chooses (e.g., member page of the system website, email, text messaging, RSS, calendar) allowing the user to keep informed of campus events, organizations, activities, lectures and other matters of interest to the user. It is still a further object of the present invention to provide a web based application that creates a user interests profile for each user of the system, thereby allowing the system to suggest events, activities, organizations, etc. that may be of particular interest to a specific user. It is still a further object of the present invention to provide a mechanism for advertisers to target delivery of relevant ads to college students based on current user profiles.

21. Brief about Invention

FIG. 1 is a block diagram that illustrates the functions and processing of the system of the present invention. The searchable social networking, directory and notification system of the present invention is shown in the functional block diagram of FIG. 1. The system utilizes a web (World Wide Web) server. In one preferred embodiment, the system database resides on the web server along with software for rotating ads and tracking statistics such as impressions and click-through rates. The system supports multiple applications including, but not limited to, a user interface, a staff interface, an organization interface, an advertiser interface and a mobile phone application (Blackberry, iPhone). All applications are web based.

The user interface provides an anonymous homepage that directs new users to register and existing users (members) to login. The homepage will detect if the user is currently logged in. If the user is logged in, they are sent to the user's homepage (account). The anonymous homepage further provides the login function, as well as a "Forgot My Password" function, a "Register" option, and a video/flash intro explaining the benefits of the system and why one should become a registered user or organization. From the anonymous homepage, new users are directed to a registration page. Additionally, organizations wishing to register are directed to an organizations registration page. Upon registering, organizations must provide information about the organization along with an explanation or reason for joining the system. All organizations are

reviewed and pre-approved (authorized) by the system administration.

Individual users register by providing their name, email address, forwarding email, cell phone number, iPhone/Blackberry and a selected password (with a password reentry function for confirmation). Upon registering, new users are instructed to input their specific interests for the purpose of building a "user interests profile." The new user is also presented with a list of all student clubs/organizations that are registered with the system. For security purposes, the system compares the user email with the college email system. If the email provided by the new user doesn't match, the system presents required additional fields for entry including: reason wanting access; and a pull down menu to choose a college. A new user will not have access until approved by the system administration.

From the anonymous homepage, organizations, individual users and the system administration are able to login. Login requires entry of a username and password. Upon logging in, individual users are directed to a user homepage. At the user homepage, the user has the selection of various functions that may include any of the following: Upcoming Events and Coupons, Calendar, View my Events (selected), My Interests and Preferences, Events of Interest (scrollable window), Connect with your Friends, Pending Friend Requests, Submit Event, Profile Information, Update Profile, Change Password, Search.

Selecting "Upcoming Events" scrollable window will present the user with all upcoming campus and university related events (e.g., those upcoming events within the next 30-60 days) that may be of interest to the particular user based on the user's interests profile. The user can then select any of these events which will then be automatically entered into the user's calendar. The system will automatically remind the user of the upcoming selected event at several points in the time prior to the event. This can be done by reminders being sent to the user by various mediums of the user's choice including email, text messaging, RSS and calendar.

Selecting the "Calendar" function on the user's homepage will present the user with the user's personal calendar showing all scheduled events

22. Key learning Points

Algorithms - that are used in filtering the events and notifications according to the preferences of the user play a very important role in the whole patent. creating such algorithms which actually yield the wanted results in the key factor.

Modularization - Dividing the application into several useful modules makes the storage of the information easier and access much more faster. Anticipation Thinking in advance about what the users might need in future and implementing it in the application is yet another extremely important thing

23. Summary of Invention

The present invention is directed to a web based (World Wide Web) system that is particularly adapted for enriching a user's college experience by helping the user discover and keep informed of events, activities, organizations (e.g., clubs), lectures, local businesses (i.e., merchant advertisements) and other matters that may be of particular interest to the user based on the user's preferences in a "user interests profile" generated from personal data collected from the user. The system provides a searchable and current directory of both "on campus" and "off campus" events, activities, organizations and other matters of interest to students at a particular university. The events and activities in the directory may be arranged according to user selected methods, such as "most popular" or by price or date. A notification feature provides updates and reminders to each individual student member (user) through a medium(s) that the user chooses

24. Number of Claims : 10

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

There are certain aspects in the patent which can be improved upon:

- i) there is a certain class of users who are entirely opposing the usage of advertisements in the mobile applications. We could take certain measures and allow the users to not be able to see any kind of advertisements after paying a very little amount of money.
- ii) the user has the ability to add, view and schedule an event. But the user should also be given the authority to cancel an event in case of any unforeseen circumstances, and the other users should be notified of the latest development.
- iii) while the user interface includes the Login, User Home, Upcoming Events and Events of Interests pages, it can be combined in a manner which would make the interface less cluttered and more intuitive one. Hence making the user experience smoother and even better.



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 24/09/2016

Dear Patel Miloni,

Studied Patent Number for generation of PSAR : 16BE7_130020107065_1

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : EPR,SAAS,FRONTEND,BACKEND
3. Search String Used : Enterprise Resource Planning and Software as Service with Frontend and Backend
4. Number of Results/Hits getting : 113

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : patent related to Method and system for exchanging information between back-end and front-end system
- 6 (a) : IPC class of the studied patent : G06F17/3056,G06F17/30569,G06F21/6227,G06F9/541
7. Title of Invention : Method and system for exchanging information between back-end and front-end systems
8. Patent No. : US20110282969A1
9. Application Number : US13100974
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20110282969A1/en?q=epr&q=saas&q=frontend&q=backe&q=G06F>
10. Date of Filing/Application (DD/MM/YYYY) : 13/05/2010
11. Priority Date (DD/MM/YYYY) : 13/05/2010
12. Publication/Journal Number : 17/3056 20130101,9/541 20130101,21/6227 20130101
13. Publication Date (DD/MM/YYYY) : 17/11/2011
14. First Filled Country : Albania

15. Also Published as

Sr.No	Country Where Filed	Application No./Patent No.
1		

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
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17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	APPSFREEDOM Inc	Chandler AZ

18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

A system for exchanging information content between a back-end system within a restricted access environment and an end-user includes a front-end system and a manager node outside of the restricted environment, and an access node within the restricted environment. The front-end system executes a mini-application to output query data, wherein the mini-application is created using a mini-application designer, builder and plugin. The manager node receives the query data and applies business logic and connection parameters to generate a request for the information content in a first format. The manager node communicates the request to the access node in the first format. The access node converts the request to a second format particular to the back-end system, and conveys the request to the back-end system. Responses are received at the access node from the back-end system, converted to the first format and sent to the front-end system.

20. Specific Problem Solved / Objective of Invention

A method of exchanging information content between a back-end system and a front-end system comprising: creating a mini-application for use by said front-end system; receiving, at a manager node, query data from said front-end system using said mini-application; generating, at said manager node, a request for said information content in response to receipt of said query data, said request being generated in a first format; communicating said request in said first format from said manager node to an access node within a restricted access environment containing said back-end system; converting, at said access node, said request for said information content from said first format to a second format supported by said back-end system; conveying said request in said second format from said access node to said back-end system; obtaining, at said access node, said information content in said second format from said back-end system; forming, at said access node, a response in said first format, said response containing said information content; and sending said information content contained in said response from said access node to said front-end system via said manager node.

21. Brief about Invention

RELATED INVENTIONS

[0001]

The present invention claims priority under 35 U.S.C. §119(e) to: "System and Method for Managing Micro Applications," U.S. Provisional Patent Application Ser. No. 61/334,235, filed 13 May 2010, which is incorporated by reference herein.

TECHNICAL FIELD OF THE INVENTION

[0002]

The present invention relates to the field of enterprise systems and, more particularly, to a method and system for exchanging information between end-users and back-end enterprise systems.

BACKGROUND OF THE INVENTION

[0003]

An enterprise system refers to the network of computers, interconnection equipment, and software components used within a business or organization to support the execution of business processes, information flows, reporting, data analysis, and so forth within and between organizations. A set of packaged application-software for an enterprise system can include, for example, enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM), strategic enterprise management (SEM), manufacturing integration and intelligence (MII), master data management (MDM), product lifecycle management (PLM), and so forth.

[0004]

An enterprise system can additionally include all the data for manufacturing, supply chain management, financials, projects, human resources,

etc., maintained in a common database. Through the common database, different business units can store and retrieve information. An enterprise system can be advantageous for a number of reasons, including standardization, lower maintenance, providing a common interface for accessing data, greater and more efficient reporting capabilities, sales and marketing purposes, and so forth.

[0005]

Enterprise systems are typically back-end systems that support a company's back office. The "back office" is generally considered to be the technology, services, and human resources required to manage a company itself. Such back-end systems are typically contained within restricted access environments that require appropriate authentication and verification before a user can access such systems.

[0006]

Unfortunately, access to enterprise systems can be complex and limited to certain users in an organization. For example, the use of an enterprise software system often requires a direct connection to the system. As such, use of these enterprise systems is typically limited to users with access to a desktop or a mobile workstation with disparate authorization and verification protocols. Furthermore, user interfaces (i.e., programs and hardware that control a display for the user and that allow the user to interact with the devices to these enterprise systems) can be difficult to implement and greatly varied among the various devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

A more complete understanding of the present invention may be derived by referring to the detailed description and claims when considered in connection with the Figures, wherein like reference numbers refer to similar items throughout the Figures

22. Key learning Points

Increasingly, users of enterprise systems wish to perform business processes from remote locations and using a variety of devices. These business processes can include, for example, order fulfillment and billing, workflow approval, proof of delivery, order capture, human capital management, customer sales and satisfaction, and even inventory and warehouse management. Typically, an organization stores business processes of an enterprise system on a number of different computing systems, which may be deployed on disparate platforms and disparate physical locations. Further, these computing systems may use different protocols, data structures, and databases, each system customized to cater to a specific business process within the organization.

[0021]

The devices from which users may wish to perform business processes can include a myriad of mobile devices, operating systems, wired and wireless processor platforms using web browsers, and so forth. Furthermore, these devices call for various user interfaces, i.e., programs and hardware that control a display for the user and that allow the user to interact with the devices. Exemplary mobile devices include, for example, personal digital assistants (PDAs), tablet PCs, smart phones, and the like.

[0022]

Embodiments of the invention entail methodology and a system for facilitating the exchange of information content between a back-end system contained in a restricted access environment and a front-end system. More particularly, embodiments of the invention facilitate the transfer of business data quickly and easily between multiple source enterprise applications of the back-end systems and various front-end systems.

[0023]

Throughout this discussion, items are assigned three- or four-digit reference numbers whose first digit or first two digits reflects the Figure in which the item first appears. That is, items first appearing in FIG. 1 are assigned reference numbers between 100 and 199, items first appearing in FIG. 10 are assigned reference numbers between 1000 and 1099, etc. Once assigned, a given reference number is used in all Figures in which that item appears

23. Summary of Invention

In summary, the present invention teaches of methodology and a system for facilitating the exchange of information content between a back-end system contained in a restricted access environment and a front-end system outside of the restricted access environment. Embodiments of the invention facilitate the transfer of business data quickly and easily between multiple source enterprise applications of the back-end systems and various front-end systems. Embodiments include mini-applications that execute on any of a variety of front-end systems, a manager node that provides integration, security, usage, and data services between the mini-applications and back-end applications operating on back-end systems via access nodes. The access nodes reside within the restricted access environment and are responsible for communicating with source systems, e.g. the back-end applications operating on the back-end systems. In addition, the access nodes enable access to any business functionality within SAP enterprise systems via the SAP business function enabler. A standardized format, also called an API query language herein, provides a business language for any front-end system, and eliminates the need to store any business data outside the back-end systems. Furthermore, the API query language is "lean" for communications between the front-end systems, manager node, and access node, and enables the receipt of business data in minimal communication traversals. In addition, embodiments of the invention enable continual access to, and ability to update information content at, business applications, thereby improving business productivity.

[0182]

Although the preferred embodiments of the invention have been illustrated and described in detail, it will be readily apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims. For example, the process steps discussed herein can take on great number of variations and can be performed in a differing order than that presented.

24. Number of Claims : 38

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

A User can also add deadlines to the followups. Alert Generation can also be made automatic so each time user has not to worry about generating alerts. and also the principles and features of this invention may be employed in various and numerous embodiments



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



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Dear Patel Miloni,

Studied Patent Number for generation of PSAR : 16BE7_130020107065_2

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
- Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : DATABASE,ERP,FRONTEND
3. Search String Used : ERP as database and frontend
4. Number of Results/Hits getting : 1927

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Architecture and techniques for providing product configurations to an enterprise resource planner
- 6 (a) : IPC class of the studied patent : G06Q10/06,G06Q10/06315
7. Title of Invention : Architecture and techniques for providing product configurations to an enterprise resource planner
8. Patent No. : US20020099583A1
9. Application Number : US09768218
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20020099583A1/en?q=erp&q=database&q=frontend>
10. Date of Filing/Application (DD/MM/YYYY) : 24/01/2001
11. Priority Date (DD/MM/YYYY) : 24/01/2001
12. Publication/Journal Number : 10/06 20130101,10/06315 20130101
13. Publication Date (DD/MM/YYYY) : 25/07/2002
14. First Filled Country : Albania

15. Also Published as

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1	Albania	09/768218

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
1	Matusek Lawrence W	Gurnee, IL
2	Peterson Craig A	Hawthorn Woods, IL
3	Cochran Michael W	Decatur, AL

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
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18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

A custom front-end for order entry and pricing with straight-forward integration to a conventional enterprise resource planning (ERP) system allows integration between the custom front-end and the existing ERP system in a straightforward manner without the need to modify the ERP system source code or other functionality. Order-specific data is stored in custom tables created under the ERP database while using standard ERP application classification for maintaining the link to the ERP object and the custom configuration. Custom function modules enable the dynamic transfer of data between the order specific data and the native ERP variant configuration module. The tables provide a middle ground between the ERP application and any number of custom front end interfaces such as web-based applications accessible via intranets and/or the Internet.

20. Specific Problem Solved / Objective of Invention

The present invention relates to product configurator/resource planning systems, and more particularly, to techniques for connecting Internet-based and other applications to product variant configurator components. More particularly, the invention relates to an external application that can be used to replace the product variant configurator of an enterprise resource planning (ERP) application so as to allow users to create product configurations outside of the normal variant configuration transactions in the ERP system while continuing to take advantage of other ERP application functionality. In still more detail, the present invention provides a system architecture for configuring and selling products in external applications and reading the sales and configuration data in a ERP system to trigger transactions and explode configurable bills of materials and task lists.

21. Brief about Invention

These and other features and advantages provided by the invention will be better and more completely understood by referring to the following detailed description of presently preferred embodiments in conjunction with the drawings, of which:

[0050]

[0050]FIG. 1 shows an example prior art ERP system interfacing to an external application;

[0051]

[0051]FIG. 2 shows a presently preferred example embodiment of an ERP system including customized configuration and control tables providing a shared middle ground between the ERP system and external applications such as network-based front-end products;

[0052]

[0052]FIG. 2A is a flowchart of an example variant function technique; and

[0053]

FIGS. 3-10 show example customized tables for a particular business form product configuration application.

22. Key learning Points

In the example shown, the ERP system 50 includes, in addition to the variant configurator 52 function, several other functions including for

example:

[0056]
routing function 54,
[0057]
bill of materials (BOM) explosion function 56,
[0058]
costing function 66,
[0059]
material master function 62, and
[0060]
sales order function 68.

[0061]

In the example embodiment, the routing function 54 provides routing information; the BOM explosion function 56 allows the ERP system 50 to explode a bill of materials; the costing function 66 provides component and combination cost breakdowns; the material master function 62 provides a master material list; and the sales order function 68 generates and processes an order based on the variant configurator functionality. The variant configurator 52 may interact with routing information provided by a routing information function 54; bill of materials (BOM) information from a BOM function 56; and configuration data from certain native tables 58, 60 within the ERP system database. Tables 58, 60 may, for example, store available product options for a range of possible product configurations.

23. Summary of Invention

Before the industrial age, most products were made to order by individual craftsmen and craftswomen based on customer specifications. For example, the village blacksmith would make his customers precisely the type of tools they wanted, the weaver would weave a blanket in the colors and materials the customer asked for, and the silversmith would make the precise jewelry or tea set in a design that struck the customer's fancy. While custom made-to-order goods had the advantage of giving customers exactly what they wanted, manufacturers eventually found that tremendous cost savings could be achieved through mass production. Factory mass-production of high quality products transformed the world's economy and made goods available to those who previously might not have been able to afford them.

[0003]

While most of the goods bought today are mass produced, there are still certain goods that can or should be custom ordered. For example, if you have ever bought a new car, you know that there are a variety of different options you can request. For example, you may be able to choose:

[0004]

different exterior paint colors, styles and options (e.g. pin striping);

[0005]

interior colors;

[0006]

upholstery and style of the seats (e.g., leather or cloth, bench or bucket);

[0007]

engine size;

[0008]

different sound systems; and

[0009]

other options and variations.

[0010]

This form of custom manufacturing makes available a number of customer-selectable product variations. The customer can configure the product by, for example, selecting from a menu of options. The product can still be mass produced on a factory floor from standard components, but the manufacturer can build each individual product to order based on the customer's selection. Such techniques can be applied to a variety of products in addition, to automobiles including, for example:

[0011]

houses

[0012]

kitchens

[0013]

bathrooms

[0014]

business forms

[0015]

personalized stationary

[0016]

personal computing equipment

[0017]

factory equipment

[0018]

testing equipment

[0019]

pipes and conduits

[0020]

clothing
[0021]
home furnishings
[0022]
other products.

24. Number of Claims : 9

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

A User can also add deadlines to the followups. Alert Generation can also be made automatic so each time user has not to worry about generating alerts. and also the principles and features of this invention may be employed in various and numerous embodiments.



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 24/09/2016

Dear Patel Miloni,

Studied Patent Number for generation of PSAR : 16BE7_130020107065_3

PART 1: PATENT SEARCH DATABASE USED

- 1. Patent Search Database used** : Google Patents
- Web link of database** : <https://patents.google.com/>
- 2. Keywords Used for Search** : ERP,BACKEND,SQL
- 3. Search String Used** : ERP with backend in sql
- 4. Number of Results/Hits getting** : 627

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

- 5. Category/ Field of Invention** : Computer/IT Engineering
- 6. Invention is Related to/Class of Invention** : Process for optimizing software components for an enterprise resource planning (ERP) application SAP
- 6 (a) : IPC class of the studied patent** : G06F11/3471,G06F11/3428,G06F9/5083,G06Q10/06
- 7. Title of Invention** : Process for optimizing software components for an enterprise resource planning (ERP) application SAP
- 8. Patent No.** : US7805706B1
- 9. Application Number** : US11157395
- 9 (a) : Web link of the studied patent** : <https://patents.google.com/patent/US7805706B1/en?q=erp&q=back&q=sql>
- 10. Date of Filing/Application (DD/MM/YYYY)** : 21/06/2005
- 11. Priority Date (DD/MM/YYYY)** : 21/06/2005
- 12. Publication/Journal Number** : 9/5083 (20130101), 11/3428 (20130101)
- 13. Publication Date (DD/MM/YYYY)** : 28/09/2010
- 14. First Filled Country : Albania** : Albania

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1	Albania	11/157,395

16. Inventor/s Details.

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17. Applicant/Assignee Details.

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18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

In a three-tier ERP implementation, multiple servers are interconnected through one or more network infrastructure. Users may observe poor performance due to the complexity and the number of interconnected components in the implementation. Herein is devised a process for tuning the software component by applying tuning techniques to the OS, SAP application and Database Management System software. For each component, the process identifies potential tuning opportunities of various subcomponents. The process is iterated numerous times through all software components while applying the tuning techniques to derive the most optimal performance for the ERP implementation.

20. Specific Problem Solved / Objective of Invention

In the three-tier client/server SAP Sales and Distribution (SD) implementation, where multiple servers are interconnected with one or more network infrastructure, there is provided a process where one can systematically apply proven methodology for tuning the software components to achieve the best results and avoid poor performance and thereby improve the overall results of the SAP SD implementation. This process is a template for tuning software components on multiprocessor servers.

21. Brief about Invention

In order for the Enterprise Resource Planning (ERP) SAP to run efficiently on a multiprocessor server in a multi-tier client/server environment, there is devised a process where one can systematically apply proven methodology to evaluate and optimize the software components to achieve the best system performance on multiprocessor servers.

In the entire ERP implementation, software comprises fifty percent of the tuning opportunity. The other fifty percent is hardware tuning. Thus, a fine tuned software component ensures that one is halfway to achieving the goal of a well-tuned ERP implementation.

The description of how each tier interacts with each other, as well as how the SD benchmark was simulated was described in detail in the co-pending application, U.S. Ser. No. 11/157,393, entitled "Process For Optimizing An Enterprise Resource Planning (ERP) Application SAP On Multiprocessor Servers".

Further information on how to fine-tune hardware components was described in the co-pending application, U.S. Ser. No. 11/157,394, entitled "Process For Optimizing Hardware Components For An Enterprise Resource Planning (ERP) Application SAP On Multiprocessor Servers".

22. Key learning Points

1. CROSSBAR INTERCONNECT (CI): A scalable switch device consists of multiple, independent data paths, or pipes that connect processors and Peripheral Component Interconnect (PCI) modules to memory.
2. PROCESSOR MODULE (POD): A module that consists of a crossbar interconnect (CI) and one or two processor submodules (subpod).
3. PROCESSOR/MEMORY NODULE: A hardware module consisting of processor and memory components for 64-bit ES7000 servers. Each module provides mounting locations and supports an interconnection circuitry for four processor chips and 16 dual inline memory modules (DIMMs).
4. PROCESSOR SUBMODULE (SUBPOD): It is one of the two processing units in a processor module (pod). One processor submodule

contains up to four processors, first- and second-level cache, shared cache, and interconnection logic.

5. ES7000: A family of Unisys multiprocessor servers. ES7000 is a multiplatform server supporting Windows™, Linux, MCP operating systems, OS2200 systems and other applications.

6. SHARED CACHE: A cache shared by multiple processors in the same processor submodule.

7. VIRTUAL INTERFACE ARCHITECTURE (VIA): Virtual Interface Architecture (VIA) is a communication protocol that provides a direct path for applications, bypassing the operating system interfaces and achieving very high throughput. Giganet cLAN is the first native implementation of VIA and is used in the Unisys benchmark environment. Giganet cLAN delivers high throughput and low latency interconnection of multiple servers. Giganet cLAN provides full-duplex throughput of 1.25 Gb/s (20 Gb/s aggregate). Due to small port-to-port latency and minimal CPU overhead, Giganet cLAN is used for data transferring between application servers and the database server.

8. DIRECT I/O BRIDGE (DIB): DIB is hardware unit in the ES7000 where the peripheral component interconnect (PCI) buses are located. It provides a path from the processors and memory to the PCI buses.

9. 32-BIT ARCHITECTURE: 32-bit is a term applied to processors, and computer architectures that manipulate the address and data in 32-bit "chunks" of 4 bytes data.

10. 64-BIT ARCHITECTURE: A computer architecture described as "64-bit" generally has integer registers that are 64 bits wide and thus directly supports 64-bit "chunks" of data.

11. INTERRUPTS: Interrupts are signals that a device can send to a processor when the device is ready to accept or send information.

12. DATA LOCALIZATION: Data localization refers to a method of placing data in a local cache or the nearest memory area in order to provide fast access to the data and reduce memory latency.

13. SYSTEM LATENCY: System latency refers to the delay required to complete a given operation. For example, memory latency describes the delay introduced when a data needs to be transferred from memory to the processors.

23. Summary of Invention

In the entire ERP implementation, software comprises fifty percent of the tuning opportunity. The other fifty percent is the hardware tuning. Thus, a fine tuned software component ensures that one is halfway to achieving the goal of a well-tuned ERP implementation.

Devised herein is a process with proven tuning techniques to optimize an ERP application SAP for better performance on multiprocessor servers in a three-tier client/server implementation.

For the devised process, the focus is only on the software components. This process takes into consideration the Operating System (OS), the SAP application and the Database Management System (DBMS) software. It identifies the potential tuning opportunities for each of those software components.

The process considers each component and evaluates its potential tuning opportunities. For each component, the process further identifies the subcomponents for potential tuning opportunities. For example, after identifying the OS, the process also evaluates the type of OS and the drivers that are supported on that OS.

The process is thus reiterated through all the software components to identify each tuning opportunity and apply tuning techniques to derive at the optimal result. Once all the opportunities are identified and all the tuning techniques are applied, the process is deemed completed. Once the process is completed, optimal performance is achieved and bottlenecks and poor performance is thus avoided.

24. Number of Claims : 21

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

The patent does not include / mention anything about the security of the same data that has been input and stored.

Hence, as solutions/ improvements to it, we can consider:

- i) adding certain measures to the security of the data so the unauthorized accesses can be prevented
- ii) making sure that when the newer data is added then the older data is preserved in a safe environment, without getting damaged or changed
- iii) the patent is supporting the display of the analyzed data on multiple platforms, but if the entry of the data is also made available on multiple platforms then the process of the collection of the data would become much more easier
- iv) the attendance taking should also be made available on the mobile phones in the classroom for the faculty members / teachers so that at-the-time accurate attendance can be taken



GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)



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PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : WEBSITE, STUDENT MANAGEMENT, PHP
3. Search String Used : Generating website using php for satudent management
4. Number of Results/Hits getting : 9

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : System and method for a virtual school
6 (a) : IPC class of the studied patent : G09B7/00
7. Title of Invention : System and method for a virtual school
8. Patent No. : US20090197234A1
9. Application Number : US12359930
9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20090197234A1/en?q=website&q=studentmanagement&q=php>
10. Date of Filing/Application (DD/MM/YYYY) : 26/01/2009
11. Priority Date (DD/MM/YYYY) : 26/01/2009
12. Publication/Journal Number : 7/00 20130101
13. Publication Date (DD/MM/YYYY) : 06/08/2009
14. First Filled Country : Albania

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1	Albania	12/359930

16. Inventor/s Details.

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2	Modi Manoj	Phoenix, AZ

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
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18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

The present invention is directed at a software system for use in an online educational environment. In one embodiment, a software system combines and allows communication between a student management system, a learning management system, and various other portals are interconnected and communicate with one another to allow for a completely integrated online educational institution that allows patents, students, and educators to plan and monitor a student's progress.

20. Specific Problem Solved / Objective of Invention

CROSS REFERENCE TO RELATED APPLICATIONS

[0001]

This application claims benefit and priority of U.S. Provisional Patent Application Ser. No. 61/025,068 entitled "Management System For Online Education Providers" filed on Jan. 31, 2008.

FIELD OF INVENTION

[0002]

The present invention relates to an improved software system for managing students enrolled in an online educational program. More specifically, the present invention is directed at an improved software system for an education provider to enable an efficient, seamlessly integrated Virtual School.

21. Brief about Invention

The detailed description of exemplary embodiments of the invention herein makes reference to the accompanying drawings, which show embodiments by way of illustration and best mode. While these embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, it should be understood that other embodiments may be realized and that logical and mechanical changes may be made without departing from the spirit and scope of the invention. Thus, the detailed description herein is presented for purposes of illustration only and not of limitation.

[0017]

For the sake of brevity, conventional data networking, application development and other functional aspects of the systems (and components of the individual operating components of the systems) may not be described in detail herein. Furthermore, the connecting lines shown in the various figures contained herein are intended to represent exemplary functional relationships and/or physical couplings between the various elements. It should be noted that many alternative or additional functional relationships or physical connections may be present in a practical system.

[0018]

In one embodiment, the system includes a user interface (UI), a software module, logic engines, numerous databases and computer networks. While the system may contemplate upgrades or reconfigurations of existing processing systems, changes to existing databases and business information system tools are not necessarily required by the present invention.

22. Key learning Points

The subject invention will hereinafter be described in conjunction with the appended drawing figures, wherein like numerals denote like elements, and wherein;

[0011]

FIG. 1 is a block diagram depicting various system components for a virtual school system, in accordance with one embodiment of the present invention;

[0012]

FIG. 2 is a flow chart depicting representative process for configuring a virtual school, in accordance with one embodiment of the present invention;

[0013]

FIG. 3 is a flow chart depicting a representative application process, in accordance with one embodiment of the present invention;

[0014]

FIG. 4 is a flow chart depicting a representative process for assigning classes to a student, in accordance with one embodiment of the present invention; and

[0015]

FIG. 5 is a flow chart depicting a representative process for coordinating a standardized test, in accordance with one embodiment of the present invention.

23. Summary of Invention

The present invention provides systems and methods to define, automate and implement processes and tools for a virtual school. In one embodiment, the system comprises numerous interconnected applications and software subsystems that are configured for the total management of an online educational institution.

[0007]

In one embodiment, a virtual school system provides dynamic, customizable user interfaces, data processing functions, process definition, rule definition and rule evaluation capabilities, workflow functionality, interoperability with existing educational and government systems and processes, and planning, reporting, audit and compliance functions. The virtual school system ("VSS") comprises a student management system ("SMS") for managing a plurality of students, a learning management system ("LMS") for managing and delivering the content of a plurality of online courses and a school administration system ("SAS") for managing the administrative functions of at least one virtual school. The VSS further includes a workflow engine to define processes, evaluate predefined rules and automate workflow, and a central data repository to store, manage, track and integrate comprehensive data for an educational environment. The VSS provides relevant content and rich functionality to users through dynamic and customizable user interfaces.

[0008]

In one embodiment, a system and/or method allows students to completely enroll online. According to this embodiment, the SMS is configured to allow faculty and staff at an online educational institution to properly admit students, provide them necessary guidance counseling and various other instructions. A parent/student portal ("PSP") provides parents and students access to an LMS and numerous other portals and databases such as client database and a standardized testing database. Therefore, the system of the present invention manages a student's entire educational process from admission through graduation or course completion.

[0009]

In one embodiment, the system comprises a software based student management system in communication with a learning management system. The student management system of the present invention is configured to enable an online educational system provider to manage its student body. Further, according to another embodiment, the student management system is configured to enable staff members to contact and follow up with one another to ensure that all students' needs are adequately met. According to one embodiment, the software system further comprises a parent/student portal. According to another embodiment, the system of the present invention further comprises an application portal that enables student to apply for admission into an online educational program.

24. Number of Claims : 56

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

While the patent provides a very strong and a pretty reliable method for securing the database in the ERP, we have to keep in mind that the software world and the technological world is a constantly evolving one. Hence what seems to be technically impenetrable today, might end up being just another common security measure after 10-15 years (or even less!).

Hence, keeping the everchanging security methods at the center of the idea, we can improvise the current datasource proxy method in such a manner that it can avail benefits from the technological advances of the latest year and protect the data successfully even against the most determined of attacks.

Page



GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)



Date of Submission : 25/09/2016

Dear Patel Miloni,

Studied Patent Number for generation of PSAR : 16BE7_130020107065_5

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : website,college,easy management
3. Search String Used : creating website for college and making easy management
4. Number of Results/Hits getting : 1365

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Web deployed e-learning knowledge management system
- 6 (a) : IPC class of the studied patent : G09B7/00,G09B5/00
7. Title of Invention : Web deployed e-learning knowledge management system
8. Patent No. : US20060134593A1
9. Application Number : US11314444
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20060134593A1/en?q=website&q=college&q=easy&q=management>
10. Date of Filing/Application (DD/MM/YYYY) : 21/12/2004
11. Priority Date (DD/MM/YYYY) : 21/12/2004
12. Publication/Journal Number : 7/00 20130101,5/00 20130101
13. Publication Date (DD/MM/YYYY) : 22/06/2006
14. First Filled Country : Albania

15. Also Published as

Sr.No	Country Where Filed	Application No./Patent No.
1	Albania	11/314444

16. Inventor/s Details.

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2	Heyman Alfred	Nashville, TN

17. Applicant/Assignee Details.

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18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

A web deployed e-learning knowledge management system for remote learning users and remote management controls is disclosed, comprising, in the preferred embodiment: (a) a login system for authenticating users and permitting access to the proper portal; (b) a learner portal for allowing remote learners to access e-learning content; (c) a builder portal for allowing course developers to create and deploy e-learning content; (d) a manager portal for managing learners, course developers and their access to the learner and builder portals, and for preparing relevant reports (such as learner progress reports); (e) a super-administrator portal for establishing and managing access to the system and for preparing administrative system-related reports; and, (f) a database for storing data used by the four preceding portals and the login system. The present invention provides a comprehensive system that enables remote learning over a computer network.

20. Specific Problem Solved / Objective of Invention

This application claims the benefit of U.S. provisional patent application Ser. No. 60/638,019, titled "Web Deployed Learning Management System," filed on Dec. 21, 2004, the contents of which are incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002]

Not applicable.

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

[0003]

Not applicable.

REFERENCE TO A "SEQUENCE LISTING," A TABLE, OR A COMPUTER PROGRAM LISTING APPENDIX

[0004]

Not applicable.

21. Brief about Invention

As shown in FIG. 1, the web deployed e-learning knowledge management system of the present invention consists of six primary components in the preferred embodiment: a login system 1 for authenticating users and permitting access to the proper portal; a super-administrator portal 2 for managing customer access to the system and for preparing administrative system-related reports; a builder portal 4 for allowing course developers to create and deploy e-learning content; a learner portal 5 for allowing remote learners to access e-learning content; a manager portal 3 for managing groups, courses, learners, course developers and university information, managing access to the learner and builder portals, and for preparing relevant reports (such as learner progress reports); and, a database 6 for storing data used by the four preceding portals and the login system. FIG. 1 shows the general operational relationship of the six primary components. A more detailed description of the design and operation of each component are presented below.

[0070]

In the preferred embodiment of the web deployed e-learning knowledge management system of the present invention, the four portals and the login system reside (or are "hosted") on a web server computer, and the database resides on a database server computer. The web server and database server computers are of the type that are well known to those skilled in the art, and generally consist of a processor, storage means,

input and output means, and a means to network the computers with each other and with other computers for communications purposes. The web server and database server computers communicate using traditional networking hardware, software, and protocols. In the preferred embodiment, the login system and the four portals use Structured Query Language ("SQL") to communicate with the database hosted on the database server and to retrieve and update data from the database as needed.

[0071]

In the preferred embodiment, the login system and each of the four portals are written in Microsoft ASP ("active server page") code, and are designed to operate from Microsoft Internet Information Server, running on a Microsoft Windows 2000 Server (or newer) operating system. This software platform is well known to those skilled in the art. Microsoft ASP code creates output in hypertext markup language (or "HTML") code, which can be interpreted by, and viewed using, a traditional Internet web browsing program, such as Internet Explorer. It is important to note that other embodiments of the present invention could operate using other web server software, such as Sybase, Oracle, FileMaker, Apache Web Server, or 4D, as desired, without substantially affecting the operation of the system and without departing from the scope of this disclosure. The database in the preferred embodiment is created using Microsoft SQL Server 2000 software, again a platform well known to those skilled in the art. However, other suitable database software, such as Microsoft Access, Sybase, Oracle, FileMaker, and 4D, may be used without substantially affecting the operation of the system and without departing from the scope of this disclosure.

22. Key learning Points

The present invention relates generally to a learning management system ("LMS"). More specifically, the present invention relates to a web deployed e-learning knowledge management system for remote learning users and remote management controls that enables remote learning over a computer network, such as the Internet, and enables course developers to create and deploy courses to remote learners, to manage the remote learners' access to the courses, to track the remote learners' progress through the courses, to study and analyze remote learners' test results and to develop and evaluate learning curricula. It also enables universities, corporations, or other administrative entities to setup, administer and monitor course developers' and remote learners' access to the system.

[0007]

(B) Description of the Prior Art

[0008]

In today's global economy, knowledge is key, and the ability to create, manage, and convey knowledge to geographically remote locations is critically valuable. For example, in a society where the Internet spreads knowledge instantaneously around the world through various networks reaching billions of people, those who best create, manage, and control the dissemination, content, and integration of knowledge and information will realize the greatest benefits from their efforts.

23. Summary of Invention

The web deployed e-learning knowledge management system of the present invention consists, in the preferred embodiment, of six primary components: (a) a login system for authenticating users and permitting access to the proper portal; (b) a learner portal for allowing remote learners to access e-learning content; (c) a builder portal for allowing course developers to create and deploy e-learning content; (d) a manager portal for managing learners, course developers and their access to the learner and builder portals, and for preparing relevant reports (such as learner progress reports); (e) a super-administrator portal for establishing and managing access to the system and for preparing administrative system-related reports; and, (f) a database for storing data used by the four preceding portals and the login system.

[0020]

In the preferred embodiment of the web deployed e-learning knowledge management system of the present invention, the four portals reside on a single web server computer, and the login system and database reside on a single database server computer. However, in other embodiments, the portals can be run from independent web servers, if desired, without affecting the functionality of the invention. The login system and each of the four portals are written in Microsoft ASP ("active server page") code, and are designed to operate from Microsoft Internet Information Server, running on a Microsoft Windows 2000 Server (or newer) operating system. The database is created using Microsoft SQL Server 2000 software in the preferred embodiment. The web server computer and the database server computer communicate using traditional prior art networking hardware and software. The login system and portals use structured query language ("SQL") to communicate with the database and to manage and view data from the database as needed.

[0021]

The login system authenticates users of the system using standard authentication protocols that are well known in the prior art. Based on the type of user (learner, course developer, administrator, etc.), the login system allows the user to access the proper portal.

[0022]

Learners are directed to the learner portal. A learner uses the learner portal to view courses available to the learner, register for courses, take courses, complete online assessments, and track personal history. The learner portal also provides access to supplemental course materials, such as course syllabi, schedules, required reading, and the like. It will be appreciated that the term "learner" as used throughout this disclosure refers to students, employees, or any other entity similarly situated that uses the system for education and/or training purposes.

24. Number of Claims : 33

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

There are certain aspects in the patent which can be improved upon:

- i) there is a certain class of users who are entirely opposing the usage of advertisements in the mobile applications. We could take certain measures and allow the users to not be able to see any kind of advertisements after paying a very little amount of money.
- ii) the user has the ability to add, view and schedule an event. But the user should also be given the authority to cancel an event in case of any unforeseen circumstances, and the other users should be notified of the latest development.
- iii) while the user interface includes the Login, User Home, Upcoming Events and Events of Interests pages, it can be combined in a manner which would make the interface less cluttered and more intuitive one. Hence making the user experience smoother and even better.
- iv) The advertiser interface uses Internet ad serving software or rotation software for rotating ads and tracking statistics. But we should work on making sure that the data collected by the advertisers is not used in any other illegal actions, and hence risking user's safety.

Page



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 23/09/2016

Dear Rathod Harshrajsinh Vijaysinh,

Studied Patent Number for generation of PSAR : 16BE7_130020107086_1

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : ERP,College,Student Management
3. Search String Used : Enterprise Resource Planning And College or Student Management
4. Number of Results/Hits getting : 86

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Patent Related to Student Retention Management
- 6 (a) : IPC class of the studied patent : G06Q 50/00, G06Q 10/00, G06Q10/06
7. Title of Invention : Workflow Method and System for Student Retention Management
8. Patent No. : US20120233084A1
9. Application Number : US13045257
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20120233084A1/>
10. Date of Filing/Application (DD/MM/YYYY) : 10/03/2011
11. Priority Date (DD/MM/YYYY) : 10/03/2011
12. Publication/Journal Number : US 2012/0233084 A1
13. Publication Date (DD/MM/YYYY) : 13/09/2012
14. First Filled Country : Albania

15. Also Published as

Sr.No	Country Where Filed	Application No./Patent No.
1	United States	US 2012/0233084 A1

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3	Robert Stober	Hull, MA US

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
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18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

This is by far the largest category of research. It is being generated mainly by individual colleges as they attempt to identify the reasons for dropout and exam failure in order to develop improvement strategies. Because it is usually intended for internal consumption and use, the work is largely unknown and unseen outside the originating institutions.

20. Specific Problem Solved / Objective of Invention

A retention management system identifies, analyzes, and evaluates student information collected by the enterprise resource planning systems and learning management systems. The retention management system applies an algorithm to collected information and locates students that are struggling before they are lost to attrition. The retention management system also provides tools to allow personnel at the academic institution to communicate with students, implement plans to correct current problems with student, and to predict and prevent future problems.

21. Brief about Invention

In the accompanying drawings, reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale; emphasis has instead been placed upon illustrating the principles of the invention. Of the drawings:

FIG. 1(<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00000.TIF/1.png>) is a block diagram showing academic enterprise systems and illustrating the relationships between the users, the application server, the management systems, and stored data.

FIG. 2 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00001.TIF/1.png>)is a flow chart illustrating the operations performed by the retention management system (RMS).

FIG. 3 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00002.TIF/1.png>)is a flow chart that illustrates the steps for a user to manually create an early alert, intervention, or assign a follow-up.

FIG. 4 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00003.TIF/1.png>)shows an exemplary main screen that is presented to a user after they access the RMS.

FIG. 5 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00004.TIF/1.png>)shows a screen presenting an example of risk factors associated with a retention model.

FIG. 6 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00006.TIF/1.png>)shows the retention action tab screen.

FIG. 7A (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00007.TIF/1.png>) shows the early alerts tab screen.

FIG. 7B (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00008.TIF/1.png>)shows the interventions tab screen.

FIG. 7C (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00009.TIF/1.png>) shows the

followup assignments tab screen.

FIG. 8 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00010.TIF/1.png>) shows an example of an early alert screen.

FIG. 9 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00011.TIF/1.png>) shows the student list tab screen.

FIG. 10 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00012.TIF/1.png>) shows the student profile tab screen.

FIG. 11 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00013.TIF/1.png>) shows the model results tab screen.

FIG. 12 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00014.TIF/1.png>) shows the student relationships tab screen.

FIG. 13 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00015.TIF/1.png>) shows the course schedule tab screen.

FIG. 14A (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00016.TIF/1.png>) illustrates an example of an early alert submission form.

FIG. 14B (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00017.TIF/1.png>) illustrates an example of an intervention submission form.

FIG. 14C (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00018.TIF/1.png>) illustrates an example a follow-up assignment submission form.

FIG. 15 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00019.TIF/1.png>) is a flowchart illustrating the steps for automatically generating alerts.

FIG. 16 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00020.TIF/1.png>) shows screen providing an example of how to configure an automatically generated alert.

FIG. 17 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00021.TIF/1.png>) shows screen illustrating an example an alert message associated with an automatically generated alert.

FIG. 18 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00022.TIF/1.png>) shows a screen illustrating an example of an automatically generated alert.

FIG. 19 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00023.TIF/1.png>) shows the early warning configuration screen.

FIG. 20 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00024.TIF/1.png>) shows screen illustrating how different members of the university are granted different access levels to the retention management system based on their role within the university.

FIG. 21 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00025.TIF/1.png>) shows screen illustrating an example of how concern types are configured.

FIG. 22 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00026.TIF/1.png>) shows screen illustrating an example of how notifications are configured for different people.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

22. Key learning Points

Academic enterprise systems are used to manage student and business information at colleges, universities, high schools, and other academic institutions. The systems are used to manage student information such as enrollment, class registration, courses information, grades and financial aid information as well as business information such as payroll, room scheduling, professor course assignments, billing, and budgeting, to list a few examples.

Learning management systems are examples of academic enterprise systems and are sometimes referred to as content management systems, learning content management systems, managed learning environments, learning support systems, or online learning centers. Regardless of the name, the purpose is to provide web-based tools and strategies to supplement or replace traditional classroom learning and student management tools. The systems allow the institution's personnel, including administrators, faculty, and advisers, to update grades, assign online quizzes, track attendance, and create and monitor course groups. Likewise, the learning management systems can populate student and faculty accounts with courses, schedules, course descriptions, class lists, contact information and provide 24-hour access to course documents, announcements, links, syllabus, discussions, and online chat for students and the institution's personnel.

Similarly, business information is managed by academic enterprise resource planning (ERP) systems. The enterprise systems manage business information such as payroll, invoices, billing, budgeting, and other similar business functions required to keep an academic institution operational.

Academic institutions are always concerned with student attrition. When a student withdraws from an academic institution there is certainly a loss of revenue to the institution, but more importantly, it suggests a failure. As a result, personnel at many institutions are dedicated to engaging at-risk students in hopes of reducing attrition. In fact, retention systems have been developed to identify at-risk students. Systems are available that access student grades in order to identify the students that are at-risk.

23. Summary of Invention

Many of the existing retention systems exist separate from the learning management and academic ERP systems that are common to academic institutions. This impairs their performance since they do not have access to all student data that might be relevant to identifying at-risk students. Moreover, it impairs the usability of the retention systems from the standpoint of the institutional personnel since they must learn and then access a new and separate system.

The present invention is directed to a retention management system. The retention management system analyzes the information collected by the enterprises resource planning systems and learning management systems and identifies critical factors that lead to the loss of students. The retention management system is able to evaluate students based on academic, financial, and social risk factors to determine which students are

most in danger of attrition. The system is also able to manage the workflow associated with engaging at risk students and then tracking their progress.

In general, according to one aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create alerts concerning retention issues for students and displaying the alerts to institutional personnel including types of the alerts and student names for the student for whom the alerts were created.

In embodiment, the types of the alerts include academic, financial and social types. More specific examples include academic grades and academic attendance.

The alerts are preferably displayed along with dates of creation, users submitting the alerts and relationships of the users to the students.

In the preferred embodiment, users can assign follow-ups for the alerts including designating assignee to perform the follow-ups. A status of the follow-ups are tracked as being pending or completed. Preferably, users can also add interventions with the students including specifying types of interventions performed.

In operation, users can select students and then display alerts associated with the students and also possibly follow-ups and interventions associated with the students.

In general, according to another aspect, the invention features a system for student retention management. The system comprises a user interface that enables users to create alerts concerning retention issues for students and a retention management system that displays the alerts to institutional personnel including types of the alerts and student names for the student for whom the alerts were created.

In general, according to still another aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create interventions concerning retention issues for students and displaying the interventions to institutional personnel including specifying contact with the student for whom the interventions were created.

In general, according to still another aspect, the invention features a system for student retention management for managing interventions concerning retention issues for students.

In general, according to still another aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create follow-ups concerning retention issues for students and displaying the follow-ups to institutional personnel including personnel designated to perform the follow-ups. This can also be characterized in terms of a system.

In general according to still another aspect, the invention features a method of generating alert messages in an academic retention management system. The method comprises retrieving and displaying student information, enabling selection of students, enabling the population of alert forms with information related to retention concerns with respect to the selected students, and submitting the alert forms to the retention management system to create corresponding alerts.

The above and other features of the invention including various novel details of construction and combinations of parts, and other advantages, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular method and device embodying the invention are shown by way of illustration and not as a limitation of the invention. The principles and features of this invention may be employed in various and numerous embodiment without departing from the scope of the invention.

24. Number of Claims : 32

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

A User can also add deadlines to the followups. Alert Generation can also be made automatic so each time user has not to worry about generating alerts. and also the principles and features of this invention may be employed in various and numerous embodiments



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 23/09/2016

Dear Rathod Harshrajsinh Vijaysinh,

Studied Patent Number for generation of PSAR : 16BE7_130020107086_2

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
- Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : ERP,SaaS,Backend
3. Search String Used : ERP As SaaS and Backend
4. Number of Results/Hits getting : 187

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Related to system for exchanging information between both ends of systems
- 6 (a) : IPC class of the studied patent : G06F17/30569
7. Title of Invention : Method and system for exchanging information between back-end and front-end systems
8. Patent No. : US20110282969A1
9. Application Number : US13100974
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20110282969A1/en?q=erp&q=saaS&q=backend>
10. Date of Filing/Application (DD/MM/YYYY) : 13/05/2010
11. Priority Date (DD/MM/YYYY) : 13/05/2010
12. Publication/Journal Number : 13/100974
13. Publication Date (DD/MM/YYYY) : 17/11/2011
14. First Filled Country : Albania
- United States

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1	United States	20110282969

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
1	Iyer Vaidyanathan	Tempe, AZ
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17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	SEAL Innotech	APPSFREEDOM Inc

18. Applicant for Patent is : College

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

A system for exchanging information content between a back-end system within a restricted access environment and an end-user includes a front-end system and a manager node outside of the restricted environment, and an access node within the restricted environment. The front-end system executes a mini-application to output query data. The manager node receives the query data and applies business logic and connection parameters to generate a request for the information content in a first format. The manager node communicates the request to the access node in the first format. The access node converts the request to a second format particular to the back-end system, and conveys the request to the back-end system. Responses containing the information content are received at the access node from the back-end system. The access node converts the responses to the first format and sends information content contained in the responses to the front-end system via the manager node.

20. Specific Problem Solved / Objective of Invention

A retention management system identifies, analyzes, and evaluates student information collected by the enterprise resource planning systems and learning management systems. The retention management system applies an algorithm to collected information and locates students that are struggling before they are lost to attrition. The retention management system also provides tools to allow personnel at the academic institution to communicate with students, implement plans to correct current problems with student, and to predict and prevent future problems.

21. Brief about Invention

In the accompanying drawings, reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale; emphasis has instead been placed upon illustrating the principles of the invention. Of the drawings:

FIG. 1(<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00000.TIF/1.png>) is a block diagram showing academic enterprise systems and illustrating the relationships between the users, the application server, the management systems, and stored data.

FIG. 2 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00001.TIF/1.png>)is a flow chart illustrating the operations performed by the retention management system (RMS).

FIG. 3 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00002.TIF/1.png>)is a flow chart that illustrates the steps for a user to manually create an early alert, intervention, or assign a follow-up.

FIG. 4 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00003.TIF/1.png>)shows an exemplary main screen that is presented to a user after they access the RMS.

FIG. 5 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00004.TIF/1.png>)shows a screen presenting an example of risk factors associated with a retention model.

FIG. 6 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00006.TIF/1.png>)shows the retention action tab screen.

FIG. 7A (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00007.TIF/1.png>) shows the early alerts tab screen.

FIG. 7B (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00008.TIF/1.png>)shows the interventions tab screen.

FIG. 7C (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00009.TIF/1.png>) shows

the followup assignments tab screen.

FIG. 8 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00010.TIF/1.png>) shows an example of an early alert screen.

FIG. 9 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00011.TIF/1.png>) shows the student list tab screen.

FIG. 10 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00012.TIF/1.png>) shows the student profile tab screen.

FIG. 11 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00013.TIF/1.png>) shows the model results tab screen.

FIG. 12 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00014.TIF/1.png>) shows the student relationships tab screen.

FIG. 13 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00015.TIF/1.png>) shows the course schedule tab screen.

FIG. 14A (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00016.TIF/1.png>) illustrates an example of an early alert submission form.

FIG. 14B (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00017.TIF/1.png>) illustrates an example of an intervention submission form.

FIG. 14C (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00018.TIF/1.png>) illustrates an example a follow-up assignment submission form.

FIG. 15 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00019.TIF/1.png>) is a flowchart illustrating the steps for automatically generating alerts.

FIG. 16 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00020.TIF/1.png>) shows screen providing an example of how to configure an automatically generated alert.

FIG. 17 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00021.TIF/1.png>) shows screen illustrating an example an alert message associated with an automatically generated alert.

FIG. 18 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00022.TIF/1.png>) shows a screen illustrating an example of an automatically generated alert.

FIG. 19 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00023.TIF/1.png>) shows the early warning configuration screen.

FIG. 20 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00024.TIF/1.png>) shows screen illustrating how different members of the university are granted different access levels to the retention management system based on their role within the university.

FIG. 21 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00025.TIF/1.png>) shows screen illustrating an example of how concern types are configured.

FIG. 22 (<https://patentimages.storage.googleapis.com/US20120233084A1/US20120233084A1-20120913-D00026.TIF/1.png>) shows screen illustrating an example of how notifications are configured for different people.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

22. Key learning Points

Academic enterprise systems are used to manage student and business information at colleges, universities, high schools, and other academic institutions. The systems are used to manage student information such as enrollment, class registration, courses information, grades and financial aid information as well as business information such as payroll, room scheduling, professor course assignments, billing, and budgeting, to list a few examples.

Learning management systems are examples of academic enterprise systems and are sometimes referred to as content management systems, learning content management systems, managed learning environments, learning support systems, or online learning centers. Regardless of the name, the purpose is to provide web-based tools and strategies to supplement or replace traditional classroom learning and student management tools. The systems allow the institution's personnel, including administrators, faculty, and advisers, to update grades, assign online quizzes, track attendance, and create and monitor course groups. Likewise, the learning management systems can populate student and faculty accounts with courses, schedules, course descriptions, class lists, contact information and provide 24-hour access to course documents, announcements, links, syllabus, discussions, and online chat for students and the institution's personnel.

Similarly, business information is managed by academic enterprise resource planning (ERP) systems. The enterprise systems manage business information such as payroll, invoices, billing, budgeting, and other similar business functions required to keep an academic institution operational.

Academic institutions are always concerned with student attrition. When a student withdraws from an academic institution there is certainly a loss of revenue to the institution, but more importantly, it suggests a failure. As a result, personnel at many institutions are dedicated to engaging at-risk students in hopes of reducing attrition. In fact, retention systems have been developed to identify at-risk students. Systems are available that access student grades in order to identify the students that are at-risk.

23. Summary of Invention

Many of the existing retention systems exist separate from the learning management and academic ERP systems that are common to academic institutions. This impairs their performance since they do not have access to all student data that might be relevant to identifying at-risk students. Moreover, it impairs the usability of the retention systems from the standpoint of the institutional personnel since they must learn and then access a new and separate system.

The present invention is directed to a retention management system. The retention management system analyzes the information collected by the enterprises resource planning systems and learning management systems and identifies critical factors that lead to the loss of students. The retention management system is able to evaluate students based on academic, financial, and social risk factors to determine which students

are most in danger of attrition. The system is also able to manage the workflow associated with engaging at risk students and then tracking their progress.

In general, according to one aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create alerts concerning retention issues for students and displaying the alerts to institutional personnel including types of the alerts and student names for the student for whom the alerts were created.

In embodiment, the types of the alerts include academic, financial and social types. More specific examples include academic grades and academic attendance.

The alerts are preferably displayed along with dates of creation, users submitting the alerts and relationships of the users to the students.

In the preferred embodiment, users can assign follow-ups for the alerts including designating assignee to perform the follow-ups. A status of the follow-ups are tracked as being pending or completed. Preferably, users can also add interventions with the students including specifying types of interventions performed.

In operation, users can select students and then display alerts associated with the students and also possibly follow-ups and interventions associated with the students.

In general, according to another aspect, the invention features a system for student retention management. The system comprises a user interface that enables users to create alerts concerning retention issues for students and a retention management system that displays the alerts to institutional personnel including types of the alerts and student names for the student for whom the alerts were created.

In general, according to still another aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create interventions concerning retention issues for students and displaying the interventions to institutional personnel including specifying contact with the student for whom the interventions were created.

In general, according to still another aspect, the invention features a system for student retention management for managing interventions concerning retention issues for students.

In general, according to still another aspect, the invention features a workflow method for student retention management. The method comprises enabling users to create follow-ups concerning retention issues for students and displaying the follow-ups to institutional personnel including personnel designated to perform the follow-ups. This can also be characterized in terms of a system.

In general according to still another aspect, the invention features a method of generating alert messages in an academic retention management system. The method comprises retrieving and displaying student information, enabling selection of students, enabling the population of alert forms with information related to retention concerns with respect to the selected students, and submitting the alert forms to the retention management system to create corresponding alerts.

The above and other features of the invention including various novel details of construction and combinations of parts, and other advantages, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular method and device embodying the invention are shown by way of illustration and not as a limitation of the invention. The principles and features of this invention may be employed in various and numerous embodiment without departing from the scope of the invention.

24. Number of Claims : 32

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

A User can also add deadlines to the followups. Alert Generation can also be made automatic so each time user has not to worry about generating alerts. and also the principles and features of this invention may be employed in various and numerous embodiments

Page



GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)



Date of Submission : 24/09/2016

Dear Rathod Harshrajsinh Vijaysinh,

Studied Patent Number for generation of PSAR : 16BE7_130020107086_3

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
- Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : Database,SQL,Website,SaaS
3. Search String Used : Create database using SQL for SaaS website
4. Number of Results/Hits getting : 2438

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Related to database management
- 6 (a) : IPC class of the studied patent : G06F 17/30545 , G06F 17/30 20060101 G06F 017/30
7. Title of Invention : Database system and method of optimizing cross database query
8. Patent No. : US20110106789A1
9. Application Number : US12916412
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US20110106789A1/en?q=database&q=sql&q=website&q=saaS&page=2>
10. Date of Filing/Application (DD/MM/YYYY) : 30/10/2009
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1	China	200910209075.X

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
1	Gao Bo	Beijing, CN
2	Guo Chang Jie	Beijing, CN
3	Jiang Zhong Bo	Beijing, CN
4	Sun Wei	Beijing, CN
5	Tang Kai	Beijing, CN
6	Wang Feng Juan	Beijing, CN

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	International Business Mac	Armonk NY

18. Applicant for Patent is : Company

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

A database system comprising: a plurality of databases, at least two of the plurality of databases are stored with one or more data collections composed of tables with the same structure, a federated view of the data collection is created, by at least one computer processor, on each of the at least two databases; and a request routing layer for routing, in response to a query request crossing the data collections, the query request crossing the data collections to one of the at least two databases according to a predetermined routing rule, so as to query by using the federated view of the database.

20. Specific Problem Solved / Objective of Invention

A computer-implemented method of optimizing cross-database query in a database system comprising a plurality of databases, at least two of the plurality of databases are stored with one or more data collections composed of tables with the same structure, the method comprising the steps of: a federated view creating step for creating a federated view of the data collections on each of the at least two databases; and a routing step for routing, in response to a query request crossing the data collections, the query request crossing the data collections to one of the at least two databases according to a predetermined routing rule so as to query by using the federated view of the database.

21. Brief about Invention

The figures form a part of the specification and are used to describe the embodiments of the invention and explain the principle of the invention together with the literal statement.

FIG. 1 shows an exemplary SaaS database system using the scaling out mechanism;

FIG. 2 shows several example cases requiring cross-tenant access;

FIG. 3 shows examples of tables stored in a database;

FIG. 4 is a schematic view showing a SaaS database system according to the first embodiment of the present invention;

FIG. 5 shows a flowchart of process for building a federated view on each database in the SaaS database system according to the embodiment of the present invention;

FIG. 6 is a schematic view showing a SaaS database system according to the second embodiment of the present invention;

FIG. 7 is a weighted directed graph illustrating an example of tracking result obtained by the request tracker 600;

FIG. 8 is a flowchart showing a method of optimizing cross-database query according to the first embodiment of the present invention;

FIG. 9 is a flowchart showing a method of optimizing cross-database query according to the second embodiment of the present invention;

FIG. 10 is a flowchart showing an embodiment of moving step performed by tenant data mover according to the present invention; and

FIG. 11 is a flowchart showing an embodiment of determining processing in FIG. 10.

22. Key learning Points

Since the data required for satisfying a cross-tenant query request of one tenant generally include the data in the tenant data of the tenant itself, the data traffic between databases can be reduced by routing using Routing Rule 1. When the tenant data involved in a cross-tenant query request are located in one database, data transmission between databases can even be avoided. For example, data transmission is avoided by routing a request T3 (T3, T4) to the database B. Herein, the request T3 (T3, T4) schematically represents a query request from the tenant T3 that involves the tenants T3 and T4.

With regard to a request T3 (T1, T2, T3), the request will be routed to the database B if Routing Rule 1 is adopted. However, T1 and T2 are located in the database A, data transmission can still be generated between the databases A and B if the query is performed using the database B. In this case, data traffic between databases can be further reduced by using Routing Rule 2. In particular, the sizes a, b and c of T1, T2 and T3 can be obtained from the underlying database by using database command or other mechanism, which, for example, may be the number of records in the tables involved in the current query, in T1, T2 and T3. Then, the data amount (a+b) involved in the database A and the data amount c involved in the database B are compared. If the former is relatively larger, the request T3 (T1, T2, T3) is routed to the database A; and if the latter is relatively larger, the request T3 (T1, T2, T3) is routed to the database B. The cross-tenant query request can be routed to the database that has most of data required for satisfying the request by using Routing Rule 2, thereby reducing data traffic between databases. The forgoing only illustrates several possible routing rules for routing a cross-tenant query request, and does not intend to enumerate all of the routing rules. Those skilled in the art can understand that many known methods can be applied to SQL routing. The purpose of the above Routing Rules 1 and 2 is to reduce data transmission between databases as much as possible. However, in consideration of load balance, we can also adopt Routing Rule 3: routing a cross-tenant query request to a database with the lowest load based on the statuses of the underlying databases.

For the application of Routing Rule 3, the following case may be considered, for example. When the database (database A) where tenant data of the requesting tenant (such as tenant T1) are located is in a high load status or has a slow responding speed (e.g., lower than a threshold), Routing Rule 3 can be used. A cross-tenant request such as T1 (T1, T2) from the tenant T1 is routed to one of the databases B and C that has the lower load. Herein, the status of the underlying database refers to load, response speed and the like of each underlying database in the SaaS system. The load refers to CPU utilization, memory utilization or the like of a server where each database is located, which can be obtained by known methods such as calling a system function or the like. The response speed refers to the time required for returning a query result. The time can be obtained by timing in the request routing layer.

The request tracker 610 in FIG. 6 is located in the request routing layer for tracking cross-tenant query request behavior in runtime, in particular, for tracking frequency of queries by each tenant, involving other tenants. For example, Log4JDBC in the related art can be used to implement the function of the request tracker 610. Log4JDBC is a JDBC driver capable of recording information such as SQL log and SQL execution time and so on. For example, the request tracker 610 embedded in the request routing layer can track cross-tenant query behavior by analyzing SQL statement or returned ResultSet in runtime. The tracking result of the request tracker 610 is accumulated in the request routing layer, and can be used by the request routing layer to implement routing selection.

The tracking result of the request tracker 610 can be represented in a form of weighted directed graph. FIG. 7 shows an example of the tracking result obtained by the request tracker 610 in a form of weighted directed graph. In FIG. 7, a node denotes a tenant, and a directed side between nodes denotes a cross-tenant query request. For example, the directed side from T1 to T2 denotes that there exists a query request from the tenant T1 involving tenant data of the tenant T2. The weight value $w_{sub.ij}$ on a directed side represents a frequency of cross-tenant query, where i denotes a serial number of a tenant that sends a query request, and j denotes a serial number of a tenant that is queried. For example, w_{43} refers to times of query request from the tenant T4 involving tenant data of the tenant T3. When w_{ij} is zero, it denotes that there is not a query request from tenant Ti involving tenant data of tenant Tj. The above weighted directed graph can be stored as a simple two-dimension array structure $w[i][j]$. Of course, other data structures known to those skilled in the art can be also adopted to store the weighted directed graph.

is a flowchart showing a method of optimizing cross-database query according to the second embodiment of the present invention. The processing in FIG. 9 includes a federated view building step 910, a routing query step 920, a tracking step 930 and a moving step 940. The operations in steps 910 and 920 are the same as those in steps 810 and 820 in FIG. 8, and the description thereof is not repeated herein. After the step 920, the process in FIG. 9 proceeds to the step 930 to track cross-tenant data query request behaviors, e.g. queries and frequencies thereof of each tenant involving other tenants, in runtime by using the request tracker 610. In addition, the request tracker 610 accumulates the tracking result, e.g., in a form of weighted array $w[i][j]$, in the request routing layer. The process in FIG. 9 proceeds to the step 940 after the step 930. In the step 940, tenant data are moved among the plurality of databases based on the tracking result of the cross-tenant data query request behavior in off-line time by using the tenant data mover 620.

23. Summary of Invention

In order to solve the above problems, an example embodiment of the present invention is in a database system including a plurality of databases, provide a database system capable of optimizing, cross-database query by creating a federated view on each database, and a method of optimizing cross-database query.

The database system and the method of optimizing cross-database query of the present invention can reduce the complexity of programming logic, reduce the data traffic when cross-database query is performed, and balance the query request intensity among databases, and thereby

can increase query speed and efficiency. In addition, the database system and the method of optimizing cross-database query of the present invention can further use a function in a SQL statement of cross-database query.

24. Number of Claims : 22

25. Patent Status : Granted Patent & In-force Patent

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

After studying each patent thoroughly and by answering all the previous questions, I can say that A large-size SaaS application may have lots of tenants and data, and generally uses a scaling out mechanism as the business increases. The so-called scaling out is to divide the data of the application and to distribute data that should have been collectively stored onto different physical databases according to a certain rule..



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



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Dear Rathod Harshrajsinh Vijaysinh,

Studied Patent Number for generation of PSAR : 16BE7_130020107086_4

PART 1: PATENT SEARCH DATABASE USED

1. Patent Search Database used : Google Patents
Web link of database : <https://patents.google.com/>
2. Keywords Used for Search : ERP,Website,Database,Backend
3. Search String Used : ERP Website And Database Backend design
4. Number of Results/Hits getting : 2499

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

5. Category/ Field of Invention : Computer/IT Engineering
6. Invention is Related to/Class of Invention : Related to generating secure Web service architectures
- 6 (a) : IPC class of the studied patent : G06Q 10/10 (20130101); H04L 67/16 (20130101); H04L 67/02 (20130101); H04L 63/20 (20130101); G06F 9/4
7. Title of Invention : System and method for generating secure Web service architectures using a Web Services security assessment methodology
8. Patent No. : US8346929B1
9. Application Number : 10642928
- 9 (a) : Web link of the studied patent : <https://patents.google.com/patent/US8346929B1/en?q=erp&q=website&q=database&q=backend>
10. Date of Filing/Application (DD/MM/YYYY) : 18/08/2003
11. Priority Date (DD/MM/YYYY) : 18/08/2003
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13. Publication Date (DD/MM/YYYY) : 01/01/2013
14. First Filled Country : Albania : United States

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1	United States	6738908
2	United States	6792605

16. Inventor/s Details.

Sr.No	Name of Inventor	Address/City/Country of Inventor
1	Lai Ray Y	Fremont, CA

17. Applicant/Assignee Details.

Sr.No	Name of Applicant/Assignee	Address/City/Country of Applicant
1	Oracle America Inc	Redwood City, CA

18. Applicant for Patent is : University

PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

The Web Service system as recited in claim 1, wherein, to generate the Web Service architecture in accordance with the Web Services security assessment structured methodology, the Web Service architecture design system is configured to: determine one or more security components of the Web Service architecture according to one or more Use Case requirements for the Web Service architecture; determine one or more Web Service objects of the Web Service architecture to be protected; define an object relationship for security protection in the Web Service architecture; determine one or more associated trust domains, security policy and strategy, and one or more threat profiles for the Web Service architecture; determine one or more protection schemes and measures for the Web Services objects; and apply one or more Web Services design patterns including the one or more security design patterns to the Web Service architecture.

20. Specific Problem Solved / Objective of Invention

Web Services technologies enable the reuse of business functionality provided by mainframes and legacy systems. They help protect past investments of business functionality developed on legacy and proprietary platforms and ease building "killer" applications based on existing customer and account data kept by these legacy systems. "Killer" applications may create user stickiness by aggregating useful and timely customer and account information from different data sources that may run on legacy systems using Web Services as the technology enabler.

21. Brief about Invention

FIG. 1 illustrates the Web Services consumer-service provider relationship according to one embodiment.

FIG. 2 illustrates an exemplary complete Web Services application according to one embodiment.

FIG. 3 illustrates an exemplary Membership Award scenario according to one embodiment.

FIG. 4 illustrates business scenarios or use cases for the membership award processes according to one embodiment.

FIG. 5 illustrates an exemplary Membership Award Sequence Diagram according to one embodiment.

FIG. 6 illustrates an exemplary Business-to-Business Payment Services scenario according to one embodiment.

FIG. 7 illustrates business scenarios or use cases for the payment services according to one embodiment.

FIG. 8 is a Payment Services Sequence Diagram according to one embodiment.

FIG. 9 illustrates different layers of the Web Services technology stack according to one embodiment.

FIG. 10 presents a typical scenario for using Web Services according to one embodiment.

FIG. 11 illustrates Web Services use cases according to one embodiment.

FIG. 12 is a Web Services sequence diagram according to one embodiment.

FIG. 13 illustrates different areas of Web Services security according to one embodiment.

FIG. 14 illustrates a process for bringing together the various technologies described so far in order to build a workable Web Services solution according to one embodiment.

FIG. 15 illustrates a process for Web Services-enabling an application or applications according to one embodiment.

FIG. 16 illustrates an exemplary Web Services scenario according to one embodiment.

FIG. 17 illustrates an exemplary Web Services architecture using Sun ONE Framework according to one embodiment.

FIG. 18 illustrates an exemplary detailed Web Services architecture according to one embodiment.

FIG. 19 illustrates an example of a Web Services development life cycle using the Unified Process development methodology.

FIG. 20 illustrates a server-level architecture view of a securities trading (or brokerage) firm that adopts Web Services technology according to one embodiment.

FIG. 21 elaborates on the architecture diagram in FIG. 20 and depicts the logical components in each server according to one embodiment.

FIG. 22 is a table that shows an exemplary tiers vs. platform layers analysis, according to one embodiment.

FIG. 23 is a Quality of Services analysis matrix, according to one embodiment.

FIG. 24 illustrates the logical process of SOAP cache according to one embodiment.

FIG. 25 illustrates four Use Cases for managing a SOAP cache according to one embodiment.

FIG. 26 is a SOAP cache sequence diagram.

FIG. 27 illustrates an exemplary case of an investment manager placing a trade order with a brokerage firm.

FIG. 28 illustrates five business scenarios or business cases according to one embodiment.

FIG. 29 is a JMS Bridge sequence diagram according to one embodiment.

FIG. 30 illustrates an exemplary scenario with four instances of SOAP servers, each of which uses a separate IP port number, according to one embodiment.

FIG. 31 illustrates an exemplary scenario using three SOAP server machines connected to a HTTP load balancer according to one embodiment.

FIG. 32 illustrates exemplary State Management using RPC-based Web Services calls according to one embodiment.

FIG. 33 illustrates six business scenarios or Use Cases according to one embodiment.

FIG. 34 is a State Management Sequence Diagram according to one embodiment.

FIG. 35 illustrates an exemplary scenario where the SOAP server (SOAP reply) generates a logging event before it initiates a SOAP-RPC call or a document-based Web Services call according to one embodiment.

FIG. 36 illustrates four Use Cases for transaction logging according to one embodiment.

FIG. 37 is a SOAP Logger Sequence Diagram according to one embodiment.

FIG. 38 illustrates an example of clustering the hardware platform of multiple Service Registries according to one embodiment.

FIG. 39 illustrates deployment scenarios for both a public UDDI Service

Registry and a private UDDI Service Registry according to one embodiment.

FIG. 40 is an example of a staging Service Registry according to one embodiment.

FIG. 41 illustrates an exemplary design of a CTG running on the same platform with CICS and the Web server according to one embodiment.

FIG. 42 illustrates an exemplary design of a CTG running on a different host that communicates with CICS applications on a z/OS host according to one embodiment.

FIG. 43 illustrates an exemplary design of a remote CTG according to one embodiment.

FIG. 44 illustrates some design configurations that may be used when using CWS according to one embodiment.

FIG. 45 illustrates CWS Direct Connection according to one embodiment.

FIG. 46 illustrates the interaction process between components using the CICS Web Server Plug-in according to one embodiment.

FIG. 47 illustrates the interaction process between components using the 3270 Web Bridge according to one embodiment.

FIG. 48 illustrates CICS EJB Support according to one embodiment.

FIG. 49 illustrates an exemplary high-level application architecture for a SOAP Proxy on a Mainframe according to one embodiment.

FIG. 50 is a table of Integration Points for Mainframe Interoperability, according to one embodiment.

22. Key learning Points

Embodiments of a generic Web Services architecture may provide a repeatable and consistent way to design and deploy scalable, reliable Web Services, independent of the underlying vendor products. Embodiments may provide a vendor-independent architecture framework to design Web Services and to bring different technology pieces together in a big, complete picture. Embodiments may include best practices of delivering Web Services solutions with Quality of Services.

Web Services design patterns and when-to-use architecture principles are described. The Web Services design patterns and best approaches address the different needs of infrastructure architects, J2EE developers, security architects, and integration architects. In one embodiment, Web Services design patterns may be designed based on Quality of Service principles. Embodiments may be used in designing and implementing Quality of Services (the so-called "ilities") for reliable, available, and scalable Web Services. One embodiment may provide a Business-to-Business Integration (B2Bi) integration framework for Web Services. In this embodiment, one or more of the design patterns may be extended to B2Bi.

Embodiments may provide a Web Security framework. Embodiments may provide a security framework to design end-to-end Web Services security. Embodiments may address security at different levels, from network level, infrastructure level, message level, to application level, and may bring different security technologies together in the security framework.

Embodiments of a system and method for providing a structured methodology and design patterns for implementing Web Services may include one or more of, but are not limited to: Deployment (Quality of Service) Scalability design patterns--e.g. SOAP server farm (load balancing SOAP requests), SOAP cache, multiple servlet engines, proxy/gateway, etc. Reliability design patterns--e.g. session management, state management, SOAP logger, etc. Availability design patterns--e.g. redundant SOAP servers, high availability service registries, etc. Service Registry Service versioning and registry management. Registry deployment (e.g. centralized and federated). Publish, unpublish to registry--JAXR. Synchronization of registries (content management). Integration Application-to-application patterns. Standard build design pattern. EAI design pattern--e.g. hub-spoke, replication, federated replication, multi-step application integration, etc. Data exchange design patterns. Process integration design patterns--e.g. closed process, open process, etc. Broker integration design patterns--e.g. service consolidation broker, reverse auction broker, etc. Security Protecting Web Services objects. Cross-domain single sign-on.

In this document, design patterns are defined in structured pattern format (e.g. context, problem, force, and solution) and are further described using Unified Modeling Language (UML) notation (e.g. sequence diagrams).

Embodiments of the Web Services architecture are generally described herein using Sun's Web Services technology (for example, JWSDP and JAX) with a Sun ONE architecture and J2EE flavor. Note, however, that embodiments are not limited to these technologies, and may be implemented with other Web Services technologies.

23. Summary of Invention

Embodiments of a system and method for generating a generic, vendor-independent secure Web Services architecture incorporating a Web Services Security Assessment structured methodology and security design patterns for designing and implementing secure Web Services are described. Lifecycles of the Web Services Security Assessment structured methodology may include one or more of, but are not limited to: vision and strategy, architecture design, development, integration, and deployment. In one embodiment, in the Vision and Strategy Web Services life cycle, architects may collect user security requirements and technical security requirements, and encapsulate them into use case requirements using Use Case modeling techniques. Architects may identify a set of Web Services objects that need to be protected and secured, and their associated relationship in the context of the deployment infrastructure. In the Architecture Design life cycle, architects may define trust domains, define security policy, and identify potential security threats. In the Development life cycle, architects may develop protection measures or security application codes to protect the Web Services objects and components. If necessary or desired, architects may apply one or more Web Services security tools. In the Integration life cycle, architects may apply one or more Web Services security design patterns to integrate different Web Services components together. In the Deployment life cycle, architects may deploy the Web Services infrastructure in accordance with the generated secure Web Services architecture. Security of the deployed Web Service may then be assessed.

In one embodiment of a Web Services Security Assessment methodology design process, one or more security components may be identified and implemented based on one or more use case requirements. The Web Services objects or components that need to be protected may be identified. The object relationship for security protection may be defined, and the associated trust domains, security policy and strategy and threat profiles may be identified. A set of protection schemes and measures for these Web Services objects may be derived. One or more supporting Web Services (security) tools may be applied to complete the security protection schemes, if necessary. Web Services design patterns, including security design patterns may be applied wherever appropriate. In some cases, re-architecting or re-engineering may be desired or required. Upon deployment to production, the security levels may be assessed by tiers, e.g. host scan and host security health checking.

One embodiment may be implemented as a Secure Web Services architecture design mechanism. The secure Web Services architecture design mechanism may receive Web Services requirements as input and, using the input, assist a user in designing and generating a secure Web Services architecture using the Web Services Security Assessment methodology and design patterns including security design patterns. A Web Services infrastructure may then be deployed or implemented in accordance with the secure Web Services architecture.

24. Number of Claims : 57

25. Patent Status : Published Application

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

The various methods as illustrated in the Figures and described herein represent exemplary embodiments of methods. The methods may be implemented in software, hardware, or a combination thereof. The order of method may be changed, and various elements may be added, reordered, combined, omitted, modified, etc.

Various modifications and changes may be made as would be obvious to a person skilled in the art having the benefit of this disclosure. It is intended that the invention embrace all such modifications and changes and, accordingly, the above description to be regarded in an illustrative rather than a restrictive sense.



**GUJARAT TECHNOLOGICAL UNIVERSITY
(GTU)
INNOVATION COUNCIL (GIC)
Patent Search & Analysis Report
(PSAR)**



Date of Submission : 25/09/2016

Dear Rathod Harshrajsinh Vijaysinh,

Studied Patent Number for generation of PSAR : 16BE7_130020107086_5

PART 1: PATENT SEARCH DATABASE USED

- 1. Patent Search Database used** : Google Patents
- Web link of database** : <https://patents.google.com/>
- 2. Keywords Used for Search** : Website,Backend,Interaction,ERP
- 3. Search String Used** : Website and Backend interaction with ERP
- 4. Number of Results/Hits getting** : 2172

PART 2: BASIC DATA OF PATENTED INVENTION /BIBLIOGRAPHIC DATA

- 5. Category/ Field of Invention** : Computer/IT Engineering
- 6. Invention is Related to/Class of Invention** : Related to Accessing a ERP application
- 6 (a) : IPC class of the studied patent** : G06Q 10/06 (20130101); Y10S 707/99944 (20130101) ;G06F 9/00 (20060101);
- 7. Title of Invention** : Accessing a ERP application over the internet using strongly typed declarative language files
- 8. Patent No.** : US6854120B1
- 9. Application Number** : US09483069
- 9 (a) : Web link of the studied patent** : <https://patents.google.com/patent/US6854120B1/en?q=website&q=backend&q=interaction&q=erp>
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PART 3: TECHNICAL PART OF PATENTED INVENTION**19. Limitation of Prior Technology / Art**

An article of manufacture for use in a computer system comprising a computer readable medium for storing statements or instructions for use in execution in a computer in accordance with the following steps: (a) transmitting a Hypertext Markup Language (HTML) input form to a browser executed by a client computer in said network for display on a monitor attached thereto; (b) receiving a HyperText Transfer Protocol (HTTP) request from said browser to access said ERP System, wherein said request optionally includes data entered by said user into an HTML input form; (c) transferring any data entered by said user into said HTML input form and any data stored in said requested HTML page into said ERP application API; (d) transferring control to said ERP application for execution; (e) receiving output data from said ERP application in response to said transmitted data and request; (f) merging said output data from said ERP application into a strongly typed object, the strongly typed object being an object where arbitrary, implicit conversion between object types is not permitted; (g) transforming said strongly typed object into a transmittable format, such as XML or HTML; and (h) transmitting said HTML or XML object to said browser for display on said monitor attached to said client computer.

20. Specific Problem Solved / Objective of Invention

A method for executing enterprise resource planning (ERP) application requests in a computer-implemented ERP data processing system via a network, comprising the steps of: (a) transmitting a HyperText Markup Language (HTML) input form to a browser executed by a client computer in said network for display on a monitor attached thereto; (b) receiving a HyperText Transfer Protocol (HTTP) request from said browser to access said ERP System, wherein said request optionally includes data entered by said user into an HTML input form; (c) transferring any data entered by said user into said HTML input form and any data stored in said requested HTML page into said ERP application API; (d) transferring control to said ERP application for execution; (e) receiving output data from said ERP application in response to said transmitted data and request; (f) merging said output data from said ERP application into a strongly typed object, the strongly typed object being an object where arbitrary, implicit conversion between object types is not permitted; (g) transforming said strongly typed object into a transmittable format, such as XML or HTML; and (h) transmitting said HTML or XML object to said browser for display on said monitor attached to said client computer.

21. Brief about Invention

The present invention provides a method and apparatus for executing ERP application requests in a computer-implemented ERP data processing system via a network, using the steps of:

- (a) transmitting a HyperText Markup Language (HTML) input form to a browser executed by a client computer in the network for display on a monitor attached thereto;
- (b) receiving a HyperText Transfer Protocol (HTTP) request from the browser to access the ERP System, wherein the request optionally includes data entered by the user into an HTML input form;
- (c) transferring any data entered by the user into the HTML input form and any data stored in the requested HTML page into the ERP application

API

- (d) transferring control to the ERP application for execution;
- (e) receiving output data from the ERP application in response to the transmitted data and request;
- (f) merging the output data from the ERP application into a strongly typed Java object;
- (g) transforming the strongly typed Java objects into a transmittable format, such as XML or HTML, and
- (h) transmitting the HTML or XML object to the browser for display on the monitor attached to the client computer.

Referring now to the drawings in which like reference numbers represent corresponding parts throughout:

FIG. 1 schematically illustrates the hardware environment of the preferred embodiment of the present invention;

FIG. 2 shows schematically an overview of the preferred embodiment of the present invention, and in particular, shows the interaction among components in the present invention;

FIG. 3 shows schematically an overview of the preferred embodiment of the present invention, and in particular, shows the relationship between the user runtime environment and the application development environment of the present invention;

FIG. 4 is a flowchart illustrating the steps involved in creating an ERP data definition used as data access code to access data in a database accessed by ERP API's;

FIG. 5 is a flowchart illustrating the steps involved in populating strongly typed objects that correspond to a weakly typed ERP object.

FIG. 6 shows a student course list panel and the fields associate with the panel.

FIG. 7 shows a strongly typed Student Course List Java Object.

FIG. 8 is a flowchart illustrating the steps involved in invoking strongly typed objects, and converting strongly typed objects into a format requested by a web client; and,

FIG. 9 depicts the defining of a sub-graph of data objects.

22. Key learning Points

ERP Web Gateway

Referring to FIG. 2, the ERP Web Gateway 16 is designed to be sufficiently flexible and powerful, yet be available on multiple platforms, such as OS/2, AIX, MVS, etc. as long as a Java Virtual Machine is available on the platform. Further, the ERP Web Gateway 16 is designed to work with existing Web and ERP application development tools, with minimal modifications required to such tools.

These goals led also to the development of the code generation and run-time environment of the present invention. The ERP Web Gateway introduces an interface object, the ERP Connector 17, to map the procedural ERP Application native API. It also incorporates a mechanism that allows input data from an HTML-format input form to be inserted as parameters for the ERP Application. Another mechanism is incorporated to allow the ERP Application results to be merged into HTML report forms. The runtime engine of the ERP Web Gateway 16 reads the XML template files to generate the appropriate Java objects with their attributes and report forms. The use of XML instead of a new or hybrid language, allows the full expressive power without artificial limitations. Both object definitions and report forms can be laid out in any fashion as long as the specification are conformed to the XML syntax.

Interaction Among Components

FIG. 2 shows schematically an overview of the preferred embodiment of the present invention, and in particular, shows the interaction among components in the present invention. The user interacts with the Web browser executing on a client computer 12 remotely located from the Web server 14. At some point, the user executes an HTTP command via the Web browser on client 12 that results in communication with an HTFP daemon executing on the Web server 14. The Web server 14 would then transmit an initial or home page in HTML format to the Web browser on client 12 for presentation to the user. The ERP Web Connector 16 would be invoked by the user selecting a hyperlinked item from the home page. The ERP Web Connector 16 conforms to a web server interface, such as the Common Gateway Interface (CGI) defined for Web servers 14, or the Java Servlet API and thus can be invoked from an HTML page in one of two ways: either by an HTTP anchor reference or by an HTTP form action.

23. Summary of Invention

To overcome the limitations in the prior art described above, and to overcome other limitations that will become apparent upon reading and understanding the present specification, the present invention discloses a method and apparatus for executing pre-defined API calls in an ERP system via the Internet. In accordance with the present invention, Web users can request information from ERP software via HTML input forms, which request is then used to create an sequence of ERP API calls for execution by the ERP software. The results output by the ERP software are themselves transformed into HTML or XML/XSL format for presentation to the Web user. The specification of the ERP interface is done through the specification of ERP data definition.

One aspect of the invention provides a method for executing ERP application requests in a computer-implemented ERP data processing system via a network, comprising the steps of: (a) transmitting a HyperText Markup Language (HTML) input form to a browser executed by a client

computer in the network for display on a monitor attached thereto; (b) receiving a HyperText Transfer Protocol (HTTP) request from the browser to access the ERP System, wherein the request optionally includes data entered by the user into an HTML input form; (c) transferring any data entered by the user into the HTML input form and any data stored in the requested HTML page into the ERP application API (d) transferring control to the ERP application for execution; (e) receiving output data from the ERP application in response to the transmitted data and request; (f) merging the output data from the ERP application into a strongly typed Java object; (g) transforming the strongly typed Java objects into a transmittable format, such as XML or HTML, and (h) transmitting the HTML or XML object to the browser for display on the monitor attached to the client computer.

Preferably the merging step comprises the step of merging the output data from the ERP application into a strongly typed object form using an ERP Web Gateway, wherein the strongly typed object form comprises strongly typed Java objects.

In another aspect the HTML input form, dynamic ERP Application data access, Java objects definitions and HTML report form are stored in form of XML files; wherein the XML file strongly couples the data in the ERP Application to the Java objects and the XML file which specifies the presentation of the Application data.

Yet another aspect of the invention provides a method of converting ERP data in a database managed by an ERP application and accessed through an ERP API and ERP Message Agent API (MAAPI) to strongly typed data in Java objects comprising the steps of: (a) reading a XML file containing the definition of the Java objects and their attributes; or HyperText Markup Language (HTML) statements which specifies presentation format; (b) parsing each of the declarations and HTML statements to identify definitions of objects and their attributes; and (c) creating the respective objects with their attributes (d) populating the objects with data from the ERP data.

24. Number of Claims : 8

25. Patent Status : Expired Patent

26. How much this invention is related with your IDP/UDP?

< 70 %

27. Do you have any idea to do anything around the said invention to improve it? (Give short note in not more than 500 words)

After studying each patent thoroughly and by answering all the previous questions, this concludes the description of the preferred embodiment of the invention. The following describes some alternative embodiments for accomplishing the present invention. For example, any type of computers, such as a mainframe, minicomputer, or personal computer, could be used with the present invention. In addition, any software program adhering (either partially or entirely) to the HTTP protocol or the HTML or ERP Application that exposes a set of external API could benefit from the present invention

APPENDIX 3

DESIGN ENGINEERING CANVAS

1.Ideation Canvas :

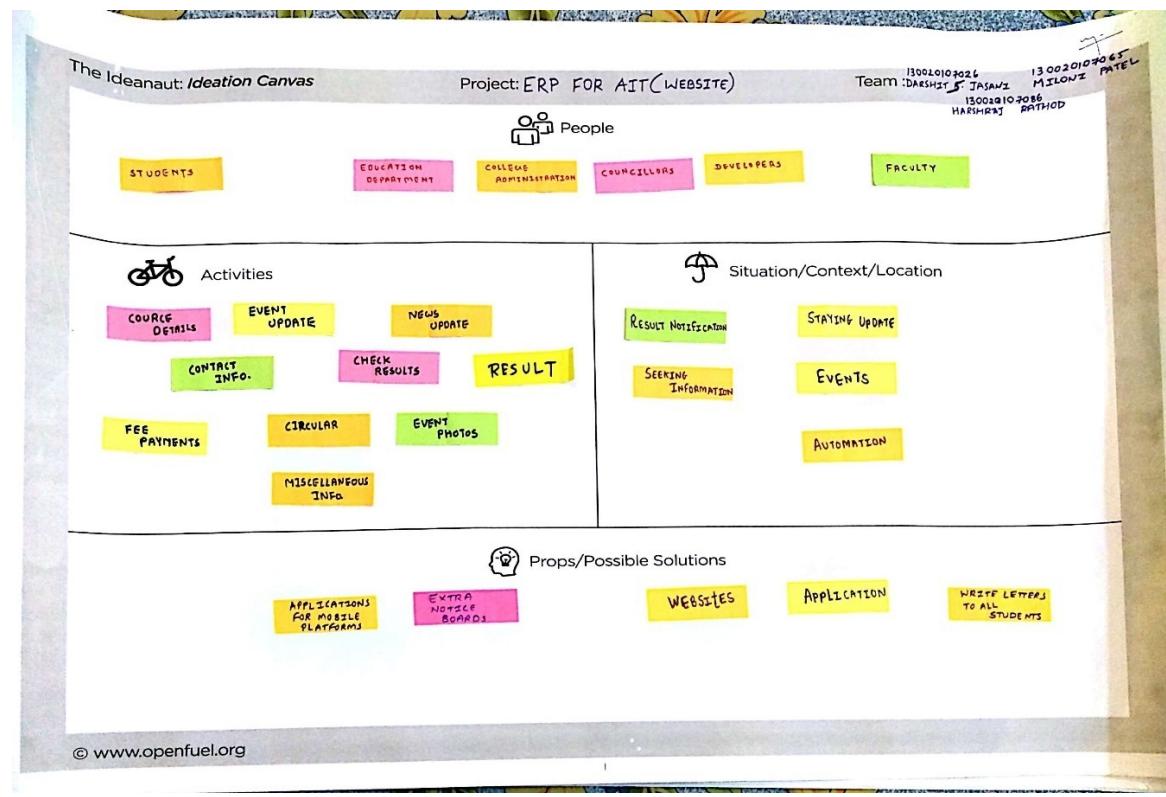


Fig : 1 Ideation Canvas

Content:

- People
- Activities
- Situation/Context/Location
- Props/Possible/Solutions

2.Empathy Summary Canvas :



Fig : 2 Empathy Summary Canvas

Content:

- User
- Stake Holders
- Activities
- Story Boarding- 2 Happy stories, 2Sad stories

3.AEIOU Canvas :

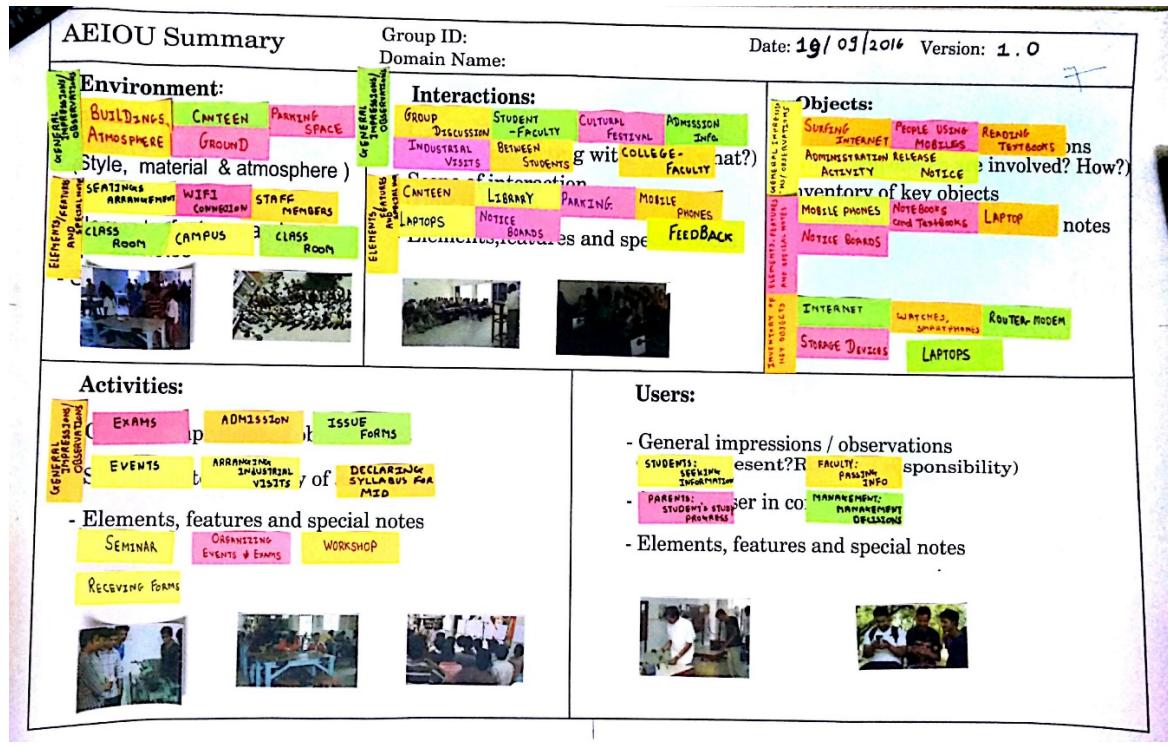


Fig : 3 AEIOU Canvas

Content:

- Environment
- Interactions
- Objects
- Activities
- Users

4. Product Development Canvas :

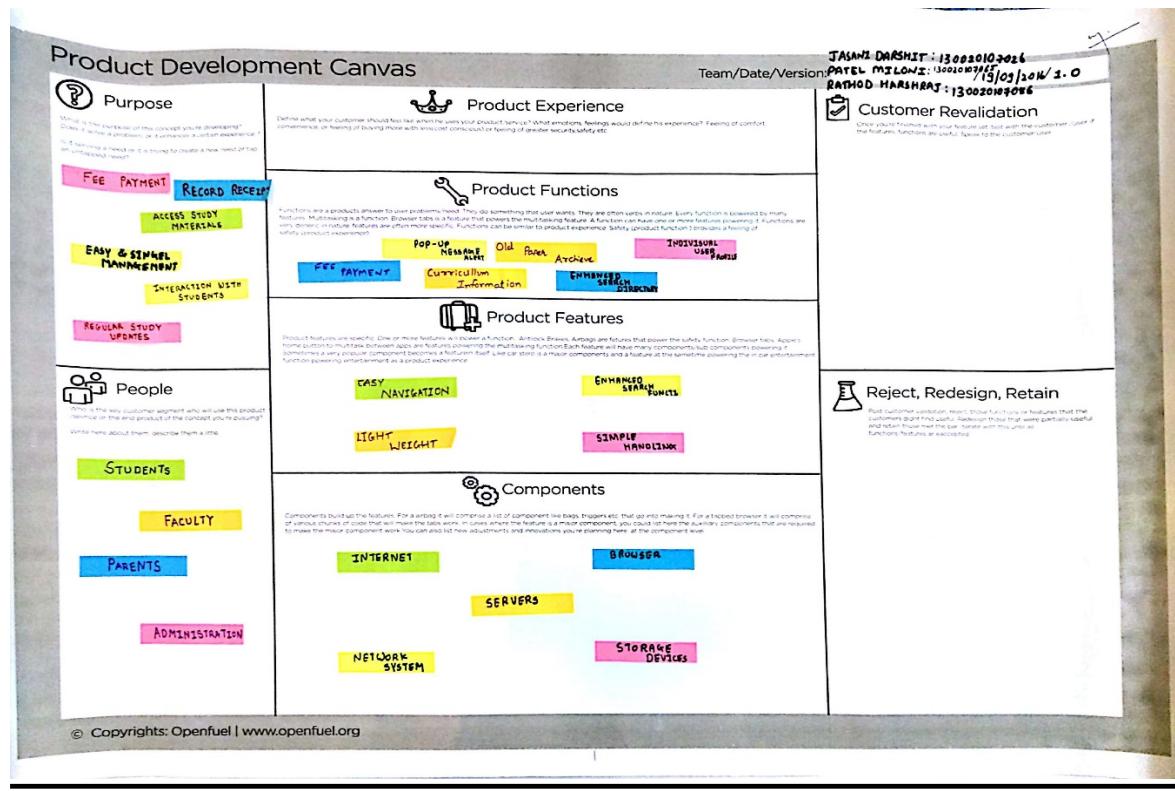


Fig : 4 Product Development Canvas

Content:

- Purpose
 - People
 - Product Experience
 - Product Function
 - Product Features
 - Components
 - Customer Revalidation
 - Reject, Redesign, Retain