Software Requirements Specification
Management Information System

Index

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1. Introduction

This section gives a scope description and overview of everything included in this SRS document. Also, the purpose of this document is described and a list of abbreviations and definitions is provided.

1.1 Purpose

The purpose of this document is to give a detailed description of the requirements for the “Management Information System” software. This software is intended to be integrated with IITBombayX site to provide additional functionality of generating MIS reports. It will illustrate the purpose and complete declaration for the development of system. It will also explain system constraints, interface and interactions with other external applications.

1.2 Scope

The “Management Information System” is a web based application based on EDX architecture which helps people to gather and analyze the data about students and courses given on a particular MOOC platform. The application provides functionalities to maintain MIS reports.

Users can provide their personal as well as courses enrolled information using the web-portal. This information will act as the basis for generating MIS reports.

All system information is maintained in a database, which is located on a web-server. The application interacts with mysql and mongo database and perform insertion, update as well as deletion as directed by the user.
1.3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Someone who interacts with the web portal</td>
</tr>
<tr>
<td>Admin</td>
<td>Administrator - the person who maintains the entire web application</td>
</tr>
<tr>
<td>HOI</td>
<td>Head of Institute – The person with highest status in Institute</td>
</tr>
<tr>
<td>Coordinator</td>
<td>Person who supervises the activity of professors.</td>
</tr>
<tr>
<td>Instructor</td>
<td>Person who leads a course.</td>
</tr>
<tr>
<td>Mentor</td>
<td>Person who guides the student and reports to instructor.</td>
</tr>
<tr>
<td>Student</td>
<td>Person who enrols for a course.</td>
</tr>
<tr>
<td>I/U/D</td>
<td>Insertion/Update/Deletion</td>
</tr>
<tr>
<td>DFD</td>
<td>Data Flow Diagram</td>
</tr>
<tr>
<td>MOOC</td>
<td>Massive Open Online Courses</td>
</tr>
<tr>
<td>Web Portal</td>
<td>A web application which present special facilities for analysing performance of student.</td>
</tr>
</tbody>
</table>

1.4 References

1.5 Overview
The remainder of this document includes three chapters. The second one provides an overview of the system functionality and system interaction with other systems. This chapter also introduces user’s interaction with the system. Further, the chapter also mentions the system constraints and assumptions about the product. The third chapter provides the requirements specification in detailed terms and a description of the different system interfaces.
2. Overall description
This section will give an overview of the whole system. The system will be explained in its context to show how the system interacts with other systems and introduce the basic functionality of it. At last, the constraints and assumptions for the system will be presented.

2.1 Product perspective
The system will consist of a web portal. The web portal will be used to maintain reports regarding the performance of institute, faculty and student. This software is to be used as a grading tool to analyze performance of student of various institute. These grades would be a part of academic curriculum of respective institute.

2.2 Product functions
In the Web Portal:

1. The admin has the privilege to insert delete and update information about Head of institute and various institute details. He can view the MIS report of various Institutes and analyze their performance.
2. The HOI has the privilege to insert delete and update info about the respective Coordinators. He can view MIS reports about various departments of his Institute and compare his institute’s performance with other institutes that are registered on IITBOMBAYX.
3. The Coordinators is the one who guides the instructor and reports to HOI. A HOI can have various coordinators working under him.
4. The Instructor is the person who manages the courses and analyzes the student’s performance and reports to coordinator.
5. Mentor is the person who directly interacts with the students and gives a brief analysis of student’s performance to his respective instructor.
6. Student is the person who enrolls for the courses and gains knowledge through quizzes, assignments given by IIT BOMBAYX courses.

2.3 Constraints
- GUI is only in English and Hindi.
- Login and password is used for the identification of users.
- The web portal will be constrained by the capacity of the database. Since the database is shared it may be forced to queue incoming requests and therefore increase the time it takes to fetch data.
- As the number of sources and concurrent incoming request increases, Portal takes more and more time to perform actions resulting into degradation of performance of application.
- Limited to HTTP/HTTPS.

2.4 Assumptions and dependencies
One assumption about the product is that it will always be used on operating system and browser that have enough performance. If the system does not have enough hardware resources available for the application, for example the users might have allocated them with other applications; there may be scenarios where the application does not work as intended or even at all.
2.5 Apportioning of requirements
In the case that the project is delayed, there are some requirements that could be transferred to the next version of the application. Those requirements are to be developed in the second release.

3. Specific requirements
This section contains all of the functional and quality requirements of the system. It gives a detailed description of the system and all its features.

3.1.1 Hardware interfaces
Since the web portal does not have any designated hardware, it does not have any direct hardware interfaces over Client Side. The hardware connection to the database server is managed by the underlying operating system on the web server over Server Side.

3.1.2 Software interfaces
The web application communicates with the database in order to get the information about the users which are basically institutes and students. The communication between the database and the web portal consists of operation concerning reading, modifying and deleting the data.

3.1.3 Communication Interface
User on Intranet will be using HTTP/HTTPS protocol.

3.1.4 Use case model

![Use case diagram](image)
Instructor

- View, Insert, Delete accounts of mentors working under him
- View MIS reports for his course performance, student performance
- View the courses allotted to him/her
- View Discussions and Forum

Mentor

- Sent link to students for registration
- View performance of students and courses weekly and monthly
- View least and most viewed topics
- View total number of students under him/her
- View Discussions and Forum
Student

- View his performance on daily, weekly, and monthly basis
- Challenges and context
- List of enrolled courses
- View Discussions and Forum
3.1.4 ER Diagram

IITBombay X MIS Reports
Entity Relationship Diagram

- auth_user(from edx)
  - user_id
  - password
  - is_staff

- auth_user_profile(from edx)
  - id
  - user_id
  - name
  - location
  - year_of_birth
  - gender
  - level_of_education
  - mailing_address
  - city
  - country
  - goals
  - allow_certificate

- Institute_details
  - RC_id
  - institute_id
  - hoi_id
  - coordinator_id
  - name
  - address1
  - address2
  - city
  - state
  - pincode
  - email
  - telephone
  - website
  - hoi_name
  - hoi_email
  - hoi_office
  - hoi_mobile

- Institute_student
  - student_id
  - course_id
  - institute_id
  - faculty_id
  - active_from
  - active_upto
  - is_student

- student_course_enrollment(from edx)
  - course_id
  - user_id

- student_performance(from edx)
  - id
  - final_grade

- faculty_personal
  - faculty_id
  - name
  - department
  - joining_year
  - role_id
  - email

- user_role
  - role_id
  - role_name

- semester_details
  - institute_id
  - semester_id
  - semester_start
  - semester_end

- Quiz_score(from edx)
  - user_id
  - problem_id
  - problem_score
Description of E-R Diagram entities

1. auth_user(from edx): for authentication of user
   - user_id PRI int(11)
   - password varchar(128)
   - is_staff tinyint(1)

2. auth_role: assigns different roles to different users
   - user_id PRI int(11) references auth_user(user_id)
   - role_id int(11) references user_role(role_id)

3. institute_details: defines details of an institute
   - RC_id MUL int(11) Remote Center ID
   - institute_id PRI int(11)
   - hoi_id UNI int(11) Head of Institute ID
   - coordinator_id UNI int(11)
   - name varchar(255)
   - address1 varchar(255)
   - address2 varchar(255)
   - city varchar(255)
   - state varchar(255)
   - pincode MUL int(6)
   - email UNI varchar(255)
   - website UNI varchar(255)
   - hoi_name varchar(255)
   - hoi_email varchar(255)
   - hoi_office varchar(255)
   - hoi_mobile int(10)

4. auth_userprofile(from edx): defines personal profile of user(student)
   - id PRI int(11)
   - user_id UNI int(11) references auth_user(user_id)
   - name MUL varchar(255)
   - location MUL varchar(255)
   - year_of_birth MUL int(11)
   - gender MUL varchar(6)
   - level_of_education MUL varchar(6)
   - mailing_address MUL longtext
   - city longtext
   - country varchar(2)
   - goals longtext
allow_certificate tinyint(1)

5. institute_student: defines institute, courses associated with a student

- student_id MUL int(11) references auth_user(user_id)
- course_id MUL varchar(255) from edx table student_courseenrollment
- institute_id MUL int(11) references institute_details(institute_id)
- faculty_id MUL int(11) references faculty_personal(faculty_id)
- active_from MUL date
- active_upto MUL date
- is_student tinyint(1)

6. student_courseenrollment(from edx): defines courses enrolled by students

- course_id MUL varchar(255)
- user_id MUL int(11)

7. user_role: defines different roles (hoi, coordinator, instructor, mentor, student)

- role_id PRI int(11)
- role_name UNI varchar(255)

8. course_grade(fetch from edx): provides specification of grades

- grade_ID (AA, A, B, C, D) PRI varchar(2)
- grade_percentage_start MUL numeric(4,2)

9. student_performance(fetch from edx): provides final grades of each student

- id PRI int(11) references auth_user(user_id)
- final_grade MUL varchar(2) references course_grade(grade_ID)

10. faculty_personal: provides personal information of faculty

- faculty_id PRI int(11) references auth_user(user_id)
- name MUL varchar(255)
- department MUL varchar(255)
- joining_year MUL int(11)
- role_id MUL int(11) references user_role(role_id)
- email varchar(255)

11. semester_details: provides details of semesters within an institute

- institute_id PK int(11) references institute_details(institute_id)
- semester_id MUL int(2)
- semester_start date
- semester_end  date

12. quiz_score (from edx) : provides score of quiz performance of students

- user_id  PK  int(11)  references auth_user(user_id)
- problem_id  MUL  varchar(255)
- problem_score  int(3)

3.1.5 Data Flow Diagram
Level 1 dfd
Dashboard Images (Demo)
Mis Reports-

**MIS Reports**
- **Courseware**
  - No. of users
  - No. of staff
- **Institute-wise**
  - No. of users
  - No. of staff
  - No. of courses
- **Institute Performance**

**Performance**
- **Courseware**
  - Daily
  - Weekly
  - Monthly
  - Specific Range
3.3 Drawbacks of pin code’s algorithm

- There may be a situation where a user may not be a part of any institute but because his pin code is similar to the pin code of the university within that area. This results into ambiguity and misleading reports of a particular institute.
- There may be a situation where a student might enter his home address which might not be present in the same locality as that of the institute in which he studies. The admin will not be able to determine whether the pin code is of the institute in which he studies or of his home address.

So, the strategy adopted for acquiring the pin code to register a student with his institute will fail in above mentioned scenarios.

So, we could take the info of institute pin code of a student after he logins as a user in IITBombayX.

3.4 Performance requirements

The requirements in this section provide a detailed specification of the user interaction with the software and measurements placed on the system performance.

1. Effective use of colours
   Title: Colour Usage
   Desc: Usage of colour coding to explicitly separate various subsections of the MIS reports for enhanced readability and using different color codes for various courses.

2. Allowing multiple deletion
   Title: Multiple deletion of various users
Desc: Multiple deletion is allowed simultaneously to ease out the work of user ensuring consistency of data to be maintained effectively.

3. **Guiding user to enter valid data**
   
   Title: Preventing illegal states
   
   Desc: With the usage of alert boxes, guiding user to prevent entering any illegal data and thus ensuring data to be consistent as well as non-redundant.

4. **Providing necessary and reliable options**
   
   Title: Options Reliability
   
   Desc: Using javascript to hide and show visibility of reliable options at various interval of time when necessary and at same time making it simple and smooth to run.

3.5 **Software system attributes**

The requirements in this section specify the required reliability, availability, security and maintainability of the software system.

1. **Reliability**
   
   Title: System Reliability
   
   Desc: The reliability of the system.
   
   Scale: The reliability that the system gives the right result on an operation.
   
   Meter: Measurements obtained from 1000 searches during testing.
   
   Must: More than 98% of the searches.
   
   Plan: More than 99% of the searches.
   
   Wish: 100% of the searches.

2. **Availability**
   
   Title: System Availability
   
   Scale: The average system availability (not considering network failing).
   
   Meter: Measurements obtained from 1000 hours of usage during testing.
   
   Must: More than 98% of the time.
   
   Plan: More than 99% of the time.
   
   Wish: 100% of the time.

   Title: Internet Connection
   
   Desc: The application should be connected to the Internet in order for the application to communicate with the database.

3. **Maintainability**
Title: Application extendibility
Desc: The application should be easy to extend. The code should be written in a way that it favors implementation of new functions

Title: Application testability
Desc: Test environments should be built for the application to allow testing of the applications different functions.

4. **Portability**
   Title: Application portability
   Desc: The application should be portable with OS and should be able to run smoothly with minimum requirements.

3.6 Scope of Expansion

- Allowing different institutes to add their own courses in IITBombayX site to provide a good scope of opportunity in excelling in academics.
- these grades will be used by various institutes as a part of their academic report card.

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