System Design Specification

for

Project Title: Website for BDA Lab,IIITA

Team Name: Challengers

Version: 1.0

Date: 20/05/23

Contents

1 Document Management

Section 9 Contents such as Archiving Policy Are Not Required in the scope of this project due to limited data handling need.

1.1 Contributors

Member	Roll Number	Name
1	IIT2021138	Mani Kumar Baitha
2	IIT2021150	Vivek Sarkar
3	IIT2021157	Sarvesh Kumar Shukla
4	IIT2021171	Soumik Karmakar
5	IIT2021206	Vivek Manwar

1.2 Version Control

Please document all changes made to this document since initial distribution.

Date	Version	Author	Section	Amendment
20 / 05 /2023	1.0	Challengers	**Main Code**	**Final Arrangemnets**

2 OVERVIEW

The BDA Lab Website is a standard dynamic designed to cater the needs of the Big Data Analytics Lab of IIIT Allahabad. The website provides comprehensive descriptions of the various events conducted by the Big Data Analytics Lab. This allows visitors to learn about past, ongoing, and upcoming events, including their topics, dates, and any additional relevant information.

Dedicated Courses Section: The website features a dedicated section that showcases the courses offered by the Lab's faculty members. Each course is presented with detailed information such as the schedules and resources. This section helps students and interested individuals to understand the curriculum and make informed decisions about enrolling in these courses.

General Research Publications: The BDA Lab Website includes a niche specifically designed to display research publications. This section serves as a summary for academic papers, reports, and other scholarly publications generated by the lab's members. It allows visitors to access and explore the lab's contributions to the field of big data analytics.

Dynamic Profile Page System: The website incorporates a fully dynamic profile page system that caters to the needs of lab members. Each member has their own profile page, which can be viewed by others. Additionally, authorized members have the ability to edit their profiles. This feature enables lab members to showcase their expertise, research interests, publications, and any other relevant information.

Database System Implementation: To streamline content management and facilitate easy updates, a database system has been implemented. By utilizing phpMyAdmin and MySQL, the website enables the admin and authorized members to edit and make changes without directly accessing the internal code. This allows for efficient management of content, such as adding or updating events, courses, publications, and member profiles.

Frontend Enhancements: The BDA Lab Website has been designed using standard HTML, CSS, and JavaScript to enhance its frontend features. HTML provides the structure and content of the web pages, CSS is utilized to add visual styles and layouts, while JavaScript adds interactivity and responsiveness. By employing these technologies, the website is visually appealing, user-friendly, and adaptable to different devices and screen sizes.

Its features, such as event descriptions, courses section, research publications display, and dynamic profile pages, along with the efficient database system, create a valuable platform for lab members and visitors alike.

3 DEVELOPMENT TOOLS AND STANDARDS

3.1 Development Tools

Visual Studio Code
PHPmyadmin
MySQL
HTML
CSS
Javascript
PHP
Ajax
BootStrap
PL/SQL

3.2 Development Standards

Tick the appropriate box to indicate the standards being followed for this application:

Standard	√ indicates compliance
Database Design	√
Frontend Design	√
PHP	√
Uportal Development	
Accessibility	√
Web Style Standards	√
Supported Web Browsers	All Desktop Browsers

4 SYSTEM PROCESSES

Take each process specified in the Business Requirements Document (BRD) and state how it will be implemented technically (please make reference to the corresponding paragraph number in the BRD). Where applicable, a specification of each screen which makes up a process should be provided (ie a screenshot and descriptions of every data item displayed).

All paragraphs should be numbered to assist cross referencing in testing stages.

.

5 USER INTERFACE

The BDA Lab Website provides a standard index page that is accessible to viewers who are not members of the lab. This page serves as the main entry point for external users and provides them with essential information and features to access various sections of the website. Here's an elaboration of the mentioned components:

Events: The index page includes information about various events organized by the lab. It may feature details such as event titles, dates, descriptions, and any additional relevant information. This allows external viewers to stay updated with the lab's events and potentially participate or engage with them.

Courses: The index page provides a section dedicated to showcasing the courses offered by the lab. It may provide a summary of the courses, including titles, descriptions and more detailed information. This helps external users to explore and learn about the educational offerings of the lab.

Team Profiles: The index page may feature profiles of the lab's team members. These profiles typically include names, positions, areas of expertise, and possibly contact information. By providing team profiles, external viewers can learn about the lab's members and their roles within the organization.

Publications: The index page may highlight the lab's research publications. This could involve showcasing recent or notable publications along with brief summaries or links to access the info on papers or reports. External viewers can explore the lab's research contributions and access relevant publications.

Feedback: The index page offers a means for external viewers to provide feedback. This could be in the form of a feedback form. By allowing viewers to provide feedback, the lab can gather insights, suggestions, or inquiries from its audience, fostering engagement and potential collaboration.

By presenting all these elements on the index page, the BDA Lab Website ensures that external viewers have easy access to the necessary information, such as events, courses, team profiles, and publications. Additionally, providing a feedback mechanism enables viewers to share their thoughts or inquiries with the lab, promoting interaction and potential collaboration between the lab and its external audience.

5.1 MEMBER INTERFACE

Fully Fledged Profile Pages: Each lab member has their own dedicated profile page on the website. These profile pages serve as a comprehensive showcase of the member's information, background, and contributions to the lab.
Personalization and Customization: Lab members have the freedom to personalize and customize their profile pages according to their preferences. They can add and update their personal and professional information, including their bio, profile picture, contact details, education background, work experience, and any other relevant information they wish to share with the lab community and external viewers. Lab members have the privilege of showcasing their research work on their profile pages

5.2 ADMIN INTERFACE

The BDA Lab Website has dedicated a specific section of the visible interface for the admin's convenience. This section includes various functionalities that assist the admin in managing different aspects of the website. Here's an elaboration of the mentioned functionalities:
Edit Team: The admin has the ability to modify and update information related to the lab's team members. This could include their profiles, roles, contact details, or any other relevant data. The admin can make changes to the existing team entries through the interface.
Edit Course: The admin can edit and update the details of the courses offered by the lab's faculty members. This functionality allows the admin to modify course information, such as the course title, description, prerequisites, schedules, and other related details.
Edit Upcoming Events: The admin can manage and update the information related to upcoming events organized by the lab. This functionality enables the admin to modify event details, such as the event title, description, date, time, location, and any other relevant information.
Register New Members: The admin has the capability to register new members to the lab. This functionality allows the admin to add new member entries by providing their relevant information, such as name, designation, contact details, and any other required data.
Data Viewing, Addition, and Deletion: The pages in the admin section provide functions to view, add new entries, and even delete them. This means that the admin can access the data stored in the website's database, view it in a structured manner, add new records or entries, and delete any unnecessary or outdated information when necessary.
Based on the statement that the admin knows all constraints, it implies that the admin has a clear understanding of the data structure, rules, and requirements associated with the website. Therefore, a validation system is not deemed necessary, as the admin can directly manage the data without the need for additional checks or restrictions.
Overall, this dedicated section for the admin enhances the ease of managing the BDA Lab Website by providing convenient functionalities to edit team details, courses, upcoming events, register new members, and perform data-related operations without the need for a separate validation system.

6 APPLICATION SECURITY

This section relates to application rather than physical security which is covered in the Technical Architecture Document (TAD).

6.1 Authentication

The admin controller possesses full credentials, including a unique username and a secure password, to access the admin section of the website. These credentials authenticate their identity and grant them exclusive access to administrative functionalities and features.
Lab members have their unique credentials, including usernames and passwords, that authenticate their identity and grant them access to their personal profile pages and associated functionalities.

6.2 Authorisation

These roles and credentials ensure that the admin has full control and authority over the website's management and content, while lab members have the autonomy to manage their profiles and contribute their research work. This division of roles and access rights helps maintain an organized and collaborative environment within the BDA Lab.

6.3 Business Objects

Event Authorization:

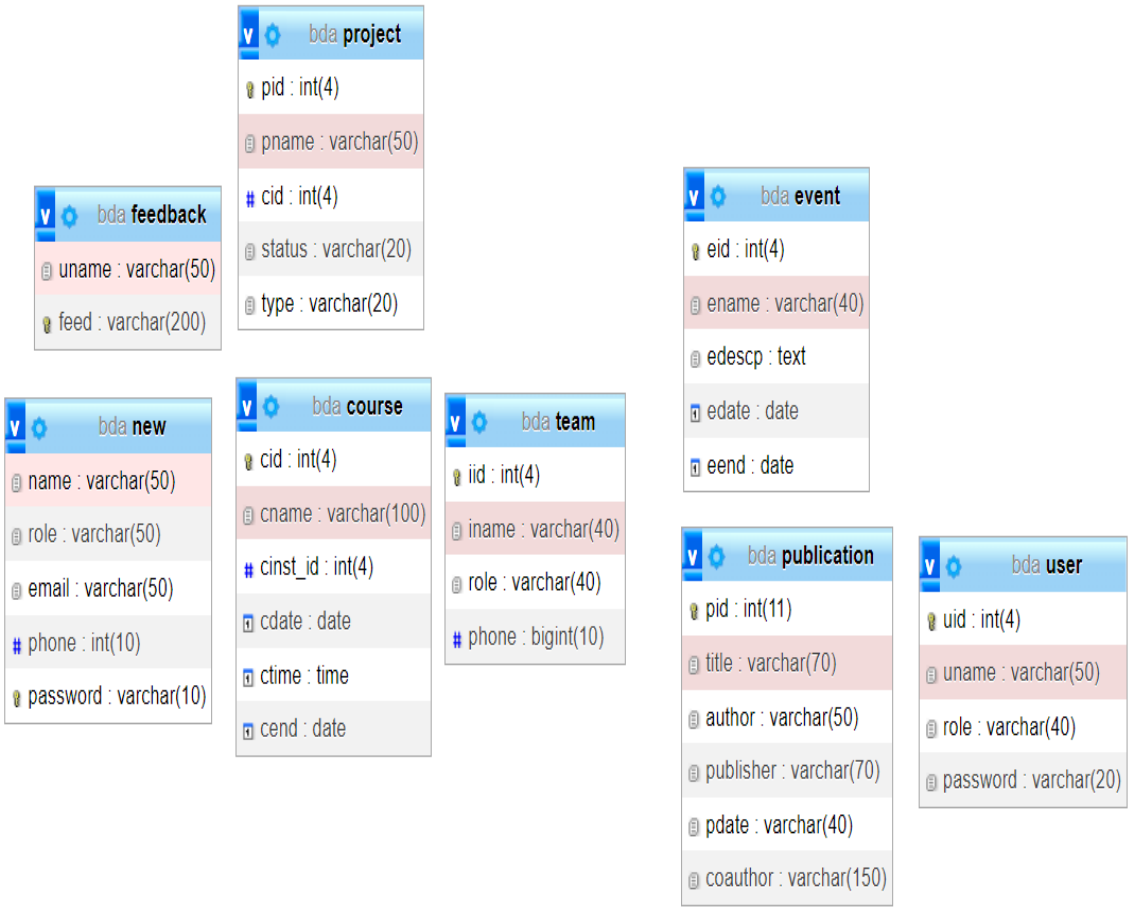
Object: Event Editing
Authorization: The admin and authorized lab members may have the authorization to edit event details, such as updating event information, adding or removing participants, or changing event schedules.
Implementation: The system can assign different levels of authorization to admin and lab members based on their roles. When editing event details, the system checks the user's authorization level before allowing any modifications.
Publication Authorization:

Object: Publication Editing
Authorization: The admin or designated lab members may have authorization to add or modify research publications displayed on the website, ensuring accuracy and relevance.
Implementation: A publication management system can be implemented where authorized users can submit new publications or request modifications. The admin can review and approve these changes before they are published on the website.

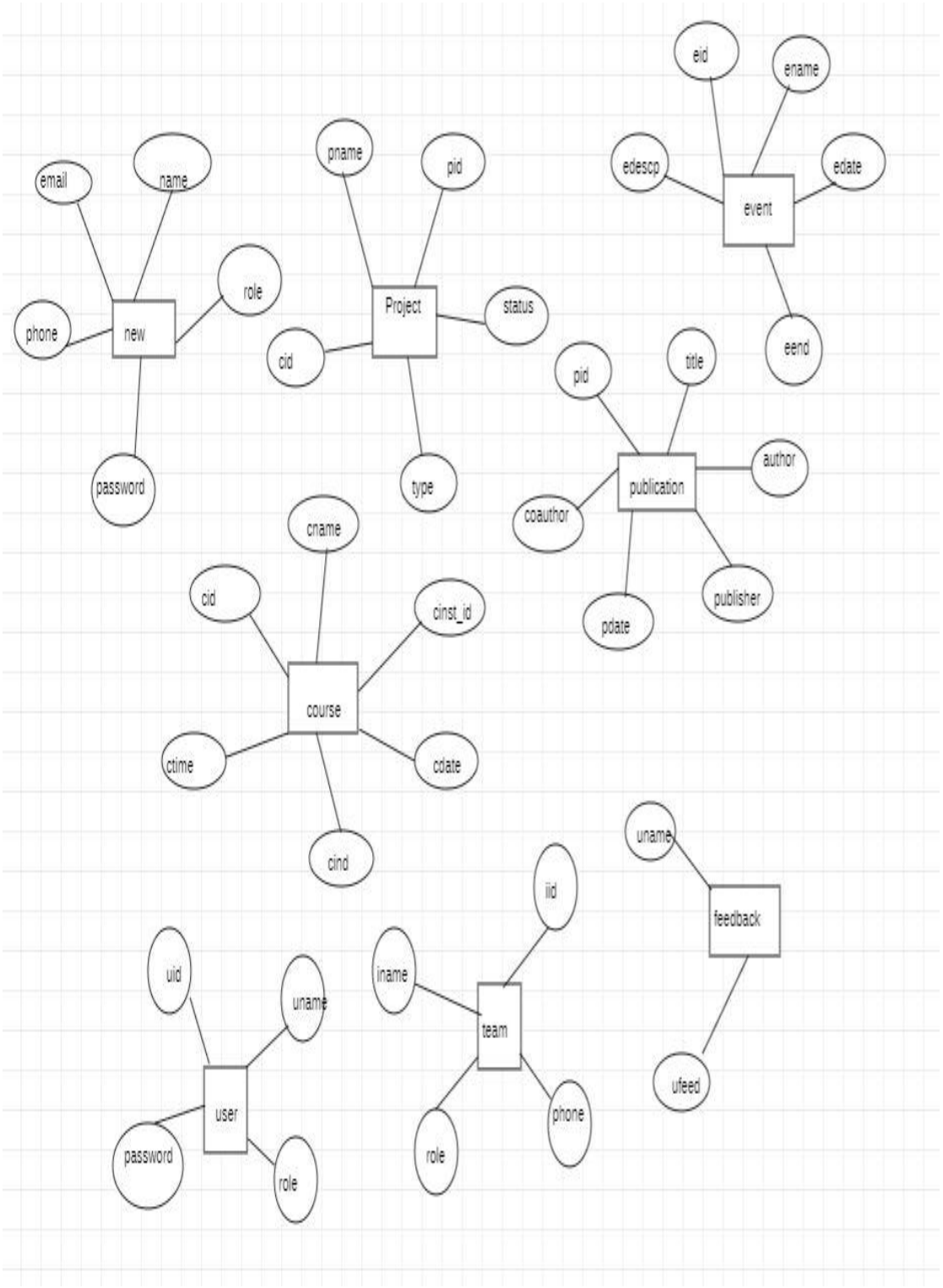
7 DATABASE DESIGN

Insert an Entity-Relationship Diagram of the system. If new tables have been added to an existing system then highlight these in your ER Diagram (full diagram of existing system not needed).

Full specifications should be provided for all new tables/views/columns in the system (ie name, datatype, mandatory, default values, constraints).



Schema Diagram


eid
ename
edesc
edate
event
eend
email
name
role
phone
new
password
pname
pid
Project
status
cid
type
pid
title
author
publication
coauthor
pdate
publisher
cname
cid
cinst_id
course
ctime
cdate
cind
uname
iid
feedback
ufeed
uid
uname
iname
team
user
phone
password
role
role

ER Diagram

8 APPLICATION INTERFACES

Inputs to the System from Other Applications:

Registration System:

Input Data Specification: User details such as name, email address, contact information, and desired login credentials.
Impact on Existing Processes: The registration system allows new users to create accounts and access the website's functionalities. It may require integration with an email verification system to ensure the validity of user information.

Feedback System:

Input Data Specification: Feedback messages or forms submitted by viewers or lab members, including their comments, suggestions, or inquiries.
Impact on Existing Processes: The feedback system enables users to provide input, which can be valuable for improving the website and the lab's operations. The website may need to incorporate a mechanism for storing and managing feedback data effectively.

Outputs from the System to Other Applications:

Email Notifications:

Output Data Specification: Automated email notifications sent to users, such as registration confirmation, event updates, or notifications related to their profile or research contributions.
Impact on Existing Processes: The integration of an email notification system allows for timely communication with users, enhancing user engagement and keeping them informed about relevant updates.

Database System:

Output Data Specification: Data stored in the website's database, including user profiles, team member information, course details, event data, research contributions, and feedback records.
Impact on Existing Processes: The database system facilitates data storage and retrieval, enabling seamless access to information within the website. It may require regular backups and appropriate security measures to protect sensitive data.

9 (DATA

When transitioning from an existing system to a new system like the BDA Lab Website, it is important to consider mappings between the two systems to ensure a smooth transition of data, processes, and functionalities. Here are some common mappings that may need to be considered:

User Accounts and Roles:

Existing System: Identify how user accounts and roles are managed in the current system. This may include user authentication, access levels, and permissions.

New System: Determine how user accounts and roles will be mapped to the new system. Ensure that existing user roles and access privileges are appropriately transferred to the new system.

Data Migration:

Existing System: Identify the relevant data stored in the existing system that needs to be migrated to the new system. This can include user profiles, research work, event details, course information, and other relevant data.

New System: Determine how the data from the existing system will be mapped and migrated to the corresponding data structures in the new system. Plan for any data transformations or format conversions that may be required during the migration process.

Functionality Mapping:

Existing System: Identify the key functionalities and processes supported by the existing system, such as event management, course registration, research work submission, and feedback collection.

New System: Determine how these existing functionalities will be mapped to the features and modules of the new BDA Lab Website. Ensure that the new system can support the required functionalities and provide any necessary enhancements or improvements.

Integration Points:

Existing System: Identify any external systems or applications that are currently integrated with the existing system, such as research publication databases, collaboration platforms, or notification systems.

New System: Determine how these integration points will be mapped to the new system. Consider the compatibility of APIs, data formats, and communication protocols to ensure seamless integration between the BDA Lab Website and external systems.

10 IMPLEMENTATION

Technical Compatibility: Ensure that the chosen technologies and frameworks for development are compatible with each other and with the targeted environment. Consider factors such as programming languages, libraries, frameworks, and their versions to avoid compatibility issues during the implementation process.

Resource Allocation: Plan and allocate resources effectively to ensure smooth implementation. This includes determining the required hardware, software, development tools, and infrastructure needed to support the implementation phase. Consider factors such as server resources, development environments, testing environments, and adequate storage capacity.

Timeline and Milestones: Establish a realistic timeline and set milestones for the implementation process. Break down the development tasks into smaller, manageable components and assign appropriate timeframes for each task. Consider dependencies between tasks and allow buffer time for unexpected delays or challenges.

Team Collaboration: Foster effective collaboration among team members involved in the implementation process. Clearly define roles and responsibilities, establish communication channels, and ensure that team members have the necessary skills and expertise to carry out their assigned tasks. Regularly communicate progress, address issues promptly, and encourage teamwork to maintain a smooth implementation flow.

Testing and Quality Assurance: Incorporate a robust testing and quality assurance process into the implementation plan. Include various types of testing, such as unit testing, integration testing, system testing, and user acceptance testing, to ensure the functionality, performance, and security of the website. Allocate sufficient time for testing, bug fixing, and refinement before deployment.

Security Considerations: Address security concerns during the implementation phase. Implement secure coding practices, follow industry standards for authentication and authorization, protect sensitive data through encryption, and implement measures to prevent common security vulnerabilities such as cross-site scripting (XSS) and SQL injection attacks.

Scalability and Performance: Anticipate future growth and scalability requirements for the BDA Lab Website. Design and implement the system architecture, database schema, and code structure with scalability in mind. Optimize performance by considering factors such as caching mechanisms, database indexing, and efficient query optimization.

Documentation and Knowledge Transfer: Document the implementation process, including technical specifications, code documentation, configuration details, and setup instructions. This documentation will aid in maintenance, troubleshooting, and knowledge transfer to other team members or stakeholders.

By considering these implementation issues during the Build stage, you can help ensure a successful implementation of the BDA Lab Website, mitigate risks, and deliver a high-quality, functional, and secure system.