

Automated Student Project Allocation and Verification System

Chapter One: Introduction

1.1. Background of the Study

The automated student project allocation and verification system which consists of designing and implementing of a student project allocation system plays a fundamental role in ensuring easy selection of project topics and the prevention of duplication. In most universities or education sectors of higher learning, a research project is a very important requirement for the completion of the program or degree the individual started, it serves a platform to improve problem solving abilities, researching skills and critical thinking skills.

In today's world most universities and tertiary institutions carry out the process of project allocations manually which is stressful and most times inefficient. The student picks a topic independently or is assigned one by his or her supervisors and most times the project topic is being written on a piece of paper for the purpose of record keeping. This manual approach brings inconsistency, risk of losing record (data loss) and in most cases multiple students end up working on the same project topic which reduces the originality of the research. In addition, the lack of a digitalized system for verifying and approving project topics introduces a serious challenge for the academic supervisors or staff in charge.

A centralized system for the fast tracking of student progress is required because it is in fact challenging situation for institutions to monitor if the students actually achieve their project goals. Poor documentation, late submission leads to situation where project deadline is missed which disrupt the academic calendar and puts student under pressure. By implementing such a system, academic institutions can provide real-time tracking of student research activities and can enhance the overall management.

Finally with the advancement of technology especially in the web-based design systems and database management system will provide a reliable solution to these problems. The implementing and designing of an automated student project allocation and verification system will establish a well organized and improved framework for the allocating of project topics. This system will promote fairness by preventing duplication, only an individual or a group can be assigned a particular topic. With an automated system all project related activities are handled, improving the efficiency of project management within the academic institutions.

1.2. Statement of the Problem

Despite the importance of project topics in academic institutions, universities still face issues when it comes to the managing of the allocation and verification process of the project topics.

Some of the key issues faced in the current system include:

- i. **Manual and Time Consuming:** Most institutions still carry out project allocation manually which requires faculty member to consider student preference individually and match them with appropriate project topics and in most cases, this requires a physical meet (face to face meeting). This traditional approach is not only time consuming but highly inefficient because it leads to delay in project topic approval.
- ii. **Duplication of Project Topics:** In most academic institutions they usually experience cases where student work on the same project or similar research topics especially when not authorized to work on it as a group. Duplications can occur due to the absence of a verification system to cross check new project submission against existing project topics. In a situation where you select an already existing project topic the verification system will reject the submission and prompt you to select a different topic or to see your supervisor. The introduction of an automated student project allocation and verification system will introduce a structured and digital approach to ensure uniqueness and originality in your research
- iii. **Absence of a centralized system to prevent data loss:** Academic institutions often face challenges in the aspect of the preservation of student project topics due to a scattered and messy storage practice. A well-structured and implemented database management systems can reduce the risk of data loss by providing a centralized management system. Data loss is a serious problem when the storage of data is left to individuals. As a result, an important document can be accidentally deleted or misplaced such losses cause setbacks for students and make them prone to failure. Finally, database management system like Postgre SQL, MySQL, and Mongo dB are appropriate for storing, managing data, and maintaining robust security features.

1.3. Aims and Objectives of the Study

The aim of this study is to develop an automated student project allocation and verification system by designing and implementing a process that improves efficiency in universities or academic sectors.

The objectives of the study are as follows:

- i. To design and implement an automated project allocation system.
- ii. To create a user-friendly interface for both the student and the supervisors.
- iii. To establish a centralized system for storing and managing project topics.
- iv. To integrate an authentication system for secure access of project data.
- v. To develop a verification mechanism to prevent project topic duplications.
- vi. To support future scalability over time.

1.4. Scope of the Study

This study prioritizes on the development of an online platform for the automation of a student projects allocation and verification system. This aims to replace the inefficiencies of the traditional manual process used in most universities. The system will provide a better approach in allocating project topics and preventing duplication by making use of modern database management system for storing data. This system will improve the overall management of student academic research.

One of the major aspects of this study is the automation of a student registration and authentication page that will ensure only authorized users, students, supervisors and administrators can access the system. A secure system will provide students the ability to view and submit their project topics while supervisors will manage the allocation of project topics by approving and rejecting it. This process will eliminate the manual record-keeping process by making the allocation and verification of topics more efficient.

The study addresses the implementation of a Centralized database management system that stores project topic submission, approval records and the prevention of data loss. This system provides a platform where student can propose a project topic and wait for the approval of the project topic based on the universities guidelines. The centralized system will include a duplicate topic detection feature which will automatically verify new project topics submitted against a database of topics that have been assigned before.

In conclusion the study will contribute to the transformation of traditional project topics allocation to a modern system for the management of project topic by providing an automated and scalable system that improves efficiency.

1.5. Significance of the study

This study holds an important value as it aims to improve academic integrity, fairness and efficiency in the allocation and verification of project topics for student. By introducing a modern design and automated approach, the system will eliminate any issue or inconsistency associated with the manual approach of allocating project topics and ensure that students are assigned project topics fairly without bias.

Through a well implemented verification system multiple students will be prevented from working on the same project topic except with the approval of the supervisors and in most cases, they work as a group.

One of the most important contributions of this study is the ability to reduce the workload on supervisors and academic staff. The traditional approach, the supervisors or faculty members spend most of their time managing project allocation and verifying project topics to prevent duplication of topics. This manual process mostly led to misallocations and delay in approval. By implementing an automated approach, the system will free up time for the supervisors allowing them to focus on more important things like providing mentorship and guiding the student which will improve the quality of research and supervision.

This study is significant in promoting academic integrity and presenting a more efficient method of allocating project topics to students. With a verification system project topics will be screened properly to prevent duplicate topics. This will encourage student to research more creating an academic environment with a unique, impactful and meaningful contributions. The centralized nature of the database management system will ensure that records are properly maintained allowing universities to track their previous records and prevent data loss.

The study provides a transformative approach to the allocation of project topics for students by introducing an automated system that eliminates the manual process thereby reducing the administrative burdens on faculty members and creating a user-friendly method of the selecting and submission of project topics. The successful implementation of an automated

student project allocation and verification system will enhance the overall research experience for students and faculty members.

1.6. Limitations of the Study

While this study provides an innovative approach to the allocation and verification of project topics, certain limitations may affect the usability and effectiveness across different academic institutions. Whereas this system is designed to enhance project topic management some challenges must be acknowledged to ensure a realistic outcome or expectation.

The primary limitations of the system is that it is mostly designed to meet a specific universities requirement which limits its relevance to other academic institutions.

Unlike universities where project topics most meet a specific requirement in government or corporate institutions it often involves a dynamic topic selection process or multi-disciplinary collaboration which may not align with the framework of the design used in the study. Despite the fact that the system can be modified to include those requirements, such adjustments will require a serious redesigning of the application.

Another key limitation is that the effectiveness of the verification system depends on the quality and comprehensiveness of the project topic database. The systems duplicate topic detection system functions by comparing new project submission against the previous topics submitted. If the database is incompetent, outdated or has a fault in general the verification system will fail to detect similarities therefore leading to duplicate topics bypassing the verification mechanism. For the most effective performance academic institutions must ensure that all project topics approved in the past are properly documented, updated and stored in the database to improve the accuracy of the verification system.

The system is designed to be Web based which means that a stable Internet connection is required for a full functionality. This causes limitation in areas or institutions with a poor Internet infrastructure. Students and faculty members in these areas will often times experience delays in accessing the system, submitting project topics and approving project topics. While an offline model could be explored in the future improvement of the system, the current model depends heavily on Internet connection for real-time updates and authentication. Institutions with low bandwidth issues and cybersecurity attacks will need to implement additional precautions to address these challenges.

Despite these limitations, the design system proposed will provide a secure platform for improving the student project allocation and verification process. The effectiveness and automation it introduces takes precedence over the limitations making it a valuable tool for universities and institutions looking to improve their management framework. Future improvement could focus on expanding compatibility with non-academic institutions and integrating offline access features accommodating institutional diversity. By addressing these limitations, the potential of this automated student project allocation and verification system can be optimized to serve a wider range of academic and research environment.

1.7. Definition of term

- i. SPA (Student Project Allocation): The systematic process of assigning research topics to students based on predefined criteria, ensuring fair distribution and topic relevance.
- ii. Verification System: A digital mechanism that cross-checks newly submitted project topics against an existing database to prevent duplication and ensure research originality.
- iii. Authentication System: A security feature that ensures only authorized users—such as students, supervisors, and administrators—can access the system using credentials like usernames and passwords.
- iv. Web-Based Application: A software system accessible via a web browser, allowing users to interact with the project allocation and verification system from any device with an internet connection.
- v. Database Management System (DBMS): A software tool used to store, manage, and retrieve research-related data, ensuring structured organization and accessibility.
- vi. Role-Based Access Control (RBAC): A security model that grants system permissions based on user roles (e.g., student, supervisor, or administrator), ensuring that each user has access only to relevant functionalities.
- vii. User Interface (UI): The visual design and layout of the system that enables users to interact with project allocation features in an intuitive and efficient manner.
- viii. User Experience (UX): The overall experience and ease of use for individuals navigating the project allocation system, ensuring accessibility and efficiency.

- ix. Duplicate Topic Detection: A feature within the verification system that identifies and flags research topics that have been previously assigned, preventing redundant studies.
- x. System Algorithm: A set of predefined rules and calculations used to automate the allocation of research topics and supervisors based on institutional policies.
- xi. GA's (Genetic Algorithms): These are optimization techniques inspired by natural selection, used in decision-making systems. In your project, genetic algorithms could be applied to optimize project allocation, ensuring a fair distribution of research topics and supervisors by selecting the best possible matches based on predefined criteria.
- xii. ILP (Integer Linear Programming): A mathematical optimization approach that solves allocation problems where variables are whole numbers. In your system, ILP could be used to assign students to supervisors while considering constraints like workload balance, topic preferences, and institutional rules.
- xiii. AHP (Analytic Hierarchy Process): A structured decision-making method that ranks alternatives based on multiple criteria. This can be applied in your project for evaluating and ranking research topics based on factors like relevance, originality, and supervisor expertise.
- xiv. SAW (Simple Additive Weighting): A multi-criteria decision-making technique that assigns scores to alternatives based on weighted criteria. This could help in prioritizing project topics for students, ensuring that they are matched with the most suitable research areas.
- xv. AI (Artificial Intelligence): AI can be incorporated into your system to automate project allocation, topic verification, and supervisor recommendations. AI-driven models can predict the best matches based on past data and improve system efficiency.
- xvi. ML (Machine Learning): Machine learning algorithms can analyze historical project allocation data to identify patterns, detect duplicate research topics, and predict optimal matches between students and supervisors.
- xvii. RL (Reinforcement Learning): A subset of machine learning where an agent learns to make optimal decisions through trial and error. RL could be used in your project to

continuously improve the allocation algorithm, learning from past assignments to enhance future recommendations.