EDUSLOT: SLOT BOOKING PLATFORM FOR LAB AND CLASS BOOKING

*MINI PROJECT REPORT submitted in partial fulfillment of the requirements*

*for the Award of the Degree of*

## BACHELOR OF TECHNOLOGY

#### In

**INFORMATION TECHNOLOGY**

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**DEPARTMENT OF INFORMATION TECHNOLOGY V R SIDDHARTHA ENGINEERING COLLEGE**

**(AUTONOMOUS - AFFILIATED TO JNTU-K, KAKINADA)**

## Approved by AICTE &Accredited by NBA

**KANURU, VIJAYAWADA-520007 ACADEMIC YEAR**

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Kanuru, Vijayawada – 520007



# CERTIFICATE

This is to certify that this project report titled **“EDUSLOT: SLOT BOOKING PLATFORM FOR LAB AND CLASS BOOKING”** is a bonafide record of work done by **K.KEERTHI(218W1A1222), E.PRASHANTH(218W1A1210)** under my guidance and supervision is submitted in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Information Technology, **V.R. Siddhartha Engineering College** (Autonomous under JNTUK) during the year 2023-24.

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*Date of examination:*

## ACKNOWLEDGEMENT

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On the submission of this Project report, I would like to extend my honour to **Dr. M.Suneetha**, Head of the Department, IT for her constant motivation and support during the course of my work.

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## ABSTRACT

Eduslot is a comprehensive scheduling platform designed for educational institutions to efficiently manage timetables for departments, classes, labs, and faculty members. The system has timetables for each department and class, incorporating lab and class assignments. Faculty members can access the Eduslot mobile app to book slots for labs or classes at specific times, checking availability in real-time.

One of the key features of Eduslot is its recommendation system, which suggests labs based on a faculty member's previous bookings. This recommendation system utilizes the cosine similarity algorithm and another lab recommendation algorithm to analyze booking patterns and provide relevant suggestions. By leveraging these algorithms, Eduslot enhances user experience by simplifying the booking process and ensuring optimal resource utilization within the educational institution.

**Keywords**: Timetable generation, Department scheduling, Class scheduling, Lab assignment, Slot booking, Real-time availability, Faculty booking, Recommendation system, Cosine similarity, Resource optimization.

## CHAPTER-1: INTRODUCTION

This chapter discusses the origin of the problem, the problem description, basic definitions, and the various parameters used in our project.

#### 1.1 Origin of the Problem

The origin of the problem lies in the inherent complexity of scheduling and resource management in educational institutions. Traditionally, these tasks are managed manually, leading to inefficiencies and errors. Teachers often face challenges in determining the availability of labs and classes when creating their timetables, which can result in scheduling conflicts and suboptimal use of resources. Moreover, the lack of a centralized system for managing timetables and booking slots can lead to double bookings and confusion among faculty members. This manual approach not only consumes time and effort but also increases the likelihood of errors and inconsistencies in scheduling.

**1.2 Problem Description**

Teachers in educational institutions currently face challenges in determining the availability of labs and classes when booking slots, leading to potential clashes and scheduling issues. This project aims to address these challenges by developing the Eduslot mobile app, which allows teachers to easily book slots for labs and classes. The app provides real-time visibility into lab and class availability, enabling teachers to make informed decisions when scheduling their activities.

**1.3 Basic Definitions:**

* Eduslot: A mobile application designed to facilitate the booking of slots for labs and classes in educational institutions.
* Slot Booking: The process of reserving a specific time slot for a lab or class.
* Recommendation Algorithm: A set of rules or procedures used to suggest or recommend labs based on a user's booking history.
* Cosine Similarity: A measure of similarity between two vectors, often used in recommendation systems.
* Machine Learning: A field of computer science that focuses on the development of algorithms and models that allow computers to improve their performance on a task through experience.

#### 1.4 Objectives and Outcomes

#### Objectives:

* To create a Mobile Application for the teachers to book a slot and a lab/class.
* To implement 2 different algorithms for recommendation.
* To integrate recommendation system to suggest classes/labs for a teacher based on their previous searches and bookings into the mobile application.

#### Outcomes:

* To provide a Mobile application to the IT department to provide convenience in terms of slot booking.
* Optimized Resource Use: Efficient use of classrooms/labs with reduced conflicts.
* Reduced Disruptions: Real-time availability info leading to confident planning.
* To recommend classes/lab slots through a notification to the teacher’s mobile .

**1.5 Societal Applications**

* Improved Education Quality
* Time Saving
* Resource Optimization
* Enhanced Collaboration
* Student Satisfaction

## CHAPTER-2: REVIEW OF LITERATURE

A literature review is a piece of academic writing demonstrating knowledge and understanding of the academic literature on “eduslot: slot booking platform for lab and class booking .”

#### 2.1: Literature Review

This paper emphasizes the use of Cosine Similarity and Content-Based Filtering in a deep learning framework to predict movie recommendations. It details the mathematical aspects of Cosine Similarity in measuring movie similarities and the implementation of the KNN algorithm to find the nearest neighbors for recommendations.

This paper implements the design and implementation of an android and web application, BOOKiiIT, it is developed using Flutter and is intended to facilitate the booking and management of spaces in the institution .It addresses the challenges faced in the existing manual booking system, such as lack of knowledge of available spaces, communication failures

This paper delves into the technical aspects of recommendation systems, including the use of cosine similarity and KNN algorithms to predict recommendations. It discusses the mathematical principles behind cosine similarity and its application in measuring similarities between items

This paper introduces the development of an online room reservation system to optimize the scheduling of room reservations in a higher education institution in the Philippines. This system, aims to facilitate ease of room management, provide real-time information, and offer a convenient manner of room reservation for students, faculty.

This paper explores online facilities reservation system for Imam Abdulrahman Bin Faisal University (IAU) is designed to allow users to reserve university facilities such as halls, stadiums, theaters, and swimming pools.it uses UML, MySQL, and VB.

The paper addresses the imbalanced use of university sports venues by designing an online booking system based on the table tennis hall of Zhengzhou University.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.**  **NO** | **Title** | **Author** | **Published Year** | **Description** |
| 1 | Movie Recommendation System using  Cosine Similarity and KNN | Singh. R. H,  Maurya.S,  Tripathi.T | 2020 | Emphasizes the use of cosine similarity and content based filtering in a deep-learning framework. |
| 2 | BOOKiiIT - Designing a Venue Booking System (Technical Demo) | H.Singh,  R.R.Shah | 2020 | Design and implementation of an android and web application, BOOKiiIT. |
| 3 | Career Recommendation Systems using Content  based Filtering | T.V.Yadalam,V.M.Gowda,V.S.Kumar | 2020 | Delves into technical aspects of recommendation system including use of cosine similarity and KNN. |
| 4 | eReserba Cardinal: An Integrated Room Reservation System for Higher Education Institutions | Josephine and Benoya | 2020 | Development of an online room reservation system to optimize the scheduling of room reservations. |
| 5 | Developing and Implementing Web-based Online University Facilities Reservation System | Junjie and Cao | 2019 | Online facilities reservation system for IAU designed to allow users to reserve university facilities. |
| 6 | Design and Implementation of Online Booking System of University Sports Venues | Daniyah and Alkhaldi | 2021 | Addresses the imbalanced use of university sports venues by designing online booking system. |

#### Summary of Literature Study

The research paper focuses on designing and implementing online reservation systems tailored to the specific needs of higher education institutions, covering room bookings, venue reservations, and sports facility reservations.

Utilizing technologies such as Flutter, UML, MySQL, and VB, the project aims to streamline reservation processes, enhance space management, and improve overall operational effectiveness. This initiative seeks to make it easier for students and faculty to access and book university facilities, improving the overall user experience.

Furthermore, the research delves into recommendation systems, with a particular focus on cosine similarity and KNN algorithms within a deep learning framework. It discusses the mathematical principles behind cosine similarity for measuring item similarities, emphasizing content-based filtering. Additionally, it details the implementation of the KNN algorithm to find nearest neighbors for recommendations. This research contributes to the advancement of reservation systems in higher education by integrating advanced algorithms and technologies to enhance user experience and operational efficiency.

## CHAPTER-3: PROPOSED METHOD

#### Design Methodology

In this project, the design methodology for the Eduslot system begins with a thorough understanding of the problem statement. The first step is to create a mobile application that allows teachers to book slots and labs or classes easily. Next, two different algorithms will be implemented for recommendation purposes. The first algorithm, cosine similarity, will be used to measure the similarity between a teacher's previous bookings and available slots, providing personalized recommendations. The second algorithm will focus on lab recommendation based on previous searches and bookings, enhancing the overall user experience. The integration of these recommendation algorithms into the mobile application will be a critical step. It will involve integrating the algorithms with the booking system to provide real-time recommendations to teachers based on their preferences and booking history. Overall, the design methodology aims to create an efficient and user-friendly booking system for educators

#### System Architecture Diagram

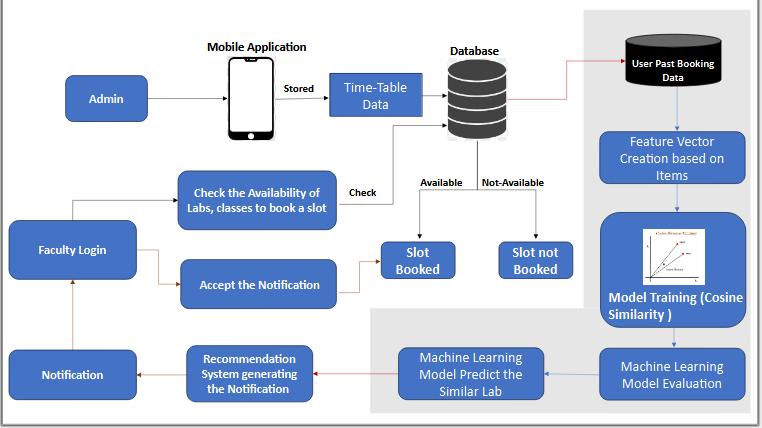
****

Fig. 3.1. Architecture Diagram

## Description of Algorithms

### **Cosine Similarity Algorithm:**

#### Input*:*

* teacher\_booked\_slots: This is a list of slots that the teacher has already booked. It represents the teacher's booking history and is used to calculate the similarity with available slots in labs.
* lab\_availability: This is a dictionary containing lab IDs as keys and lists of available slots as values. Each lab's availability is represented by a list of slots that are open for booking.

**Output**: Recommendation of Lab or Class

#### Method:

#### **Step 1:** Initialize Variables: Set max\_similarity to -1 and recommended\_lab to null.

#### **Step 2:** Loop Through Labs: For each lab in all\_labs, do the following:

#### a. Create a vector representation (lab\_vector) for the lab's availability using the create\_vector function.

#### b. Calculate the cosine similarity between teacher\_booked\_slots and lab\_vector using the cosine\_similarity function.

#### c. If the similarity is greater than max\_similarity, update max\_similarity to the new similarity value and recommended\_lab to the current lab.

#### Return Recommended Lab: After looping through all labs, return the recommended\_lab.

#### **Step 3:** Create Vector Function (create\_vector):

#### a. Initialize an empty vector.

#### b. For each slot in all\_slots, check if the slot is in the slots list (lab availability). If it is, append 1 to the vector; otherwise, append 0.

#### c. Return the vector.

#### **Step 4:** Cosine Similarity Function (cosine\_similarity):

#### a. Initialize dot\_product, magnitude\_A, and magnitude\_B to 0.

#### b. Calculate the dot product of vectorA and vectorB.

#### c. Calculate the magnitudes of vectorA and vectorB.

#### d. Calculate the cosine similarity using the formula: cosine\_similarity = dot\_product / (magnitude\_A \* magnitude\_B).

#### e. Return the cosine similarity.

#### 3.3.2 Lab Recommendation Algorithm:

#### Input:

* teacher\_availability: The availability of the teacher, which may include time constraints or preferences.
* booked\_slots: Slots that the teacher has already booked.

**Output** : Recommendation of Lab or Class

#### Method:

#### **Step 1:** Get Available Labs (get\_available\_labs):

#### a. Initialize an empty list available\_labs to store labs that are available for booking.

#### b. Iterate through all labs in all\_labs.

#### c. For each lab, check if it is available for booking using the is\_available method of the lab class, passing teacher\_availability and booked\_slots as arguments.

#### d. If the lab is available, append it to the available\_labs list.

#### e. Return the list of available\_labs.

#### **Step 2:** Recommend Lab (recommend\_lab):

#### a. Implement a recommendation logic to choose the recommended lab from the list of available labs.

#### b. For example, you can recommend the lab with the fewest bookings by using the min function on available\_labs, specifying a key function to determine the minimum value based on the length of the bookings attribute of each lab.

#### c. Return the recommended lab.

#### **Step 3:** Main Algorithm (lab\_recommendation):

#### a. Call the get\_available\_labs function to get the list of available labs.

#### b. Call the recommend\_lab function with the list of available labs to get the recommended lab.

#### c. Return the recommended lab as the output of the algorithm.

#### Description of Requirement software and data:

**Data requirements**

**Timetable Data:**

**Day:** The day of the week on which the slot or lab is scheduled.

**Time:** The time slot of the timetable entry (start and end times).

**Class/Lab:** The class or lab where the class is scheduled.

**Instructor/Teacher:** The name or ID of the instructor or teacher for the class.

**Faculty Booking Records:**

Day: The day of the week on which the booking is made.

Time: The time slot of the booking (start and end times).

Room/Location: The room or location booked by the faculty.

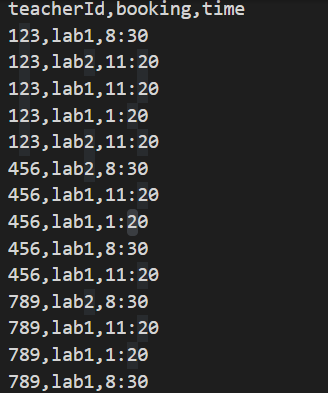
Faculty ID: The ID or name of the faculty member booking the room.

**Software Requirements**

* React Native
* MongoDB
* Node Js
* Wireframes: Done in Figma for UX UI Design

## CHAPTER-4: RESULTS AND OBSERVATIONS

## The below figure is the small part of the csv file containing the teacherId, booking and time at which they booked that specific lab or class



## Fig-4.1 CSV File containing teacherId, booking and timeslot

## COSINE SIMILARITY ALGORITHM:

## After giving the csv file as input to the cosine similarity algorithm the result is as follows :

## 

## Fig-4.2 Output of cosine similarity algorithm

## LAB RECOMMENDATION ALGORITHM:

## After giving the csv file as input to the lab recommendation algorithm the result is a

## as follows :

## 

## Fig-4.3 Output of lab recommendation algorithm

## EDUSLOT MOBILE APPLICATION:

## The user logs into the mobile app and creates the Department facilities like the name f the department,The number of rooms and labs present in the department the numbers of the labs and the classes and the number of sections and years present in the department.

## 

## 

## 

## 

## Fig-4.4 Login and creation of department facilities

## After creating the department facilities the user creates the timetable for each year which consists of the day , the time and the name of class along with where the class is being conducted.

## 

## 

## Fig-4.5 Time Table Creation

## Once the TimeTable is created the Teachers can login and can book a slot for a lab or a class at their convenience and at their time of interest

## 

## 

## Fig-4.6 Slot Booking

## CHAPTER-5: CONCLUSION AND FUTURE WORK

#### Conclusion

The development of the Eduslot project has addressed the challenges faced by educational institutions in managing and booking labs and classes efficiently. The implementation of the reservation system has streamlined the booking process and enhanced space management. The integration of recommendation algorithms, including cosine similarity, has further improved user experience by providing personalized lab recommendations based on booking history

## Future study:

Future studies of this project could explore:

1. Enhanced Recommendation System: Implement more advanced recommendation algorithms to provide more accurate and personalized recommendations for teachers.
2. User Feedback and Analytics: Incorporate user feedback mechanisms and analytics to gather insights into user preferences and booking patterns, allowing for continuous improvement of the system.
3. Mobile App Features: Introduce additional features to the mobile application, such as notifications for available slots, reminders for booked slots, and integration with calendar apps.
4. Integration with Learning Management Systems (LMS): Integrate the reservation system with existing LMS platforms to provide a seamless experience.
5. Expansion to Other Educational Institutions: Extend the use of the Eduslot system to other educational institutions, including universities, colleges, and training centers, to benefit a larger audience.

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DEPARTMENT OF INFORMATION TECHNOLOGY V.R.SIDDHARTHA ENGINEERING COLLEGE

**PROJECT SUMMARY**

|  |  |  |
| --- | --- | --- |
| S.No | Item | Description |
| 1 | **Project Title** | **Eduslot: Slot booking platform for lab and class booking** |
| 2 | **Student Names &**  **Numbers** | **KEERTHI KONERU,218W1A1222 ,**  **EDE PRASHANTH, 218W1A1210** |
| 3 | **Name of The Guide** | **K.SITA KUMARI** |
| 4 | **Name of The**  **Mentor** |  |
| 5 | **Research**  **Group** | **App Development, Machine Learning** |
| 6 | **Application**  **Area** | **Education** |
| 7 | **Aim of the**  **Project** | The aim of our project is to simplify lab and class booking for educators, enhancing operational efficiency in educational institutions |
| 8 | **Project Outcomes** | * Efficient Booking System * Optimized Resource Utilization * Improved User Experience |

#### Student Signatures

**1.**

#### 2.

#### Signature of the Guide