

Smart College Admission Recommendation System

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Abstract: *The Smart College Admission Recommendation System is an intelligent web-based platform designed to help students find suitable colleges based on academic performance, category, location, branch preference, and admission criteria. With the increasing competition in higher education admissions, students face difficulty in selecting the right college due to lack of structured data and proper guidance. This survey paper reviews existing research and technologies used in recommendation systems, data-driven admission platforms, and intelligent decision-support systems. The system integrates datasets such as cutoff marks, seat matrix, placement statistics, and college profiles to generate personalized recommendations. It uses filtering techniques, database management systems, and web technologies to provide accurate and user-friendly results. The study highlights different approaches, methodologies, and frameworks used in college recommendation systems and proposes an effective architecture for smart admission guidance*

Keywords: Recommendation System, College Admission, Dataset, Web Application, Decision Support System

I. INTRODUCTION

In the present era of digital transformation and rapid technological advancement, the higher education admission process has become increasingly complex and competitive. Every year, a large number of students seek admission to engineering and other professional colleges based on their academic performance, entrance exam scores, category, and personal preferences. However, the availability of numerous colleges, branches, and admission criteria often creates confusion among students while selecting the most suitable college. Traditional admission guidance methods rely heavily on manual research, counseling sessions, and scattered information sources such as brochures, websites, and cutoff PDFs, which are time-consuming, inefficient, and prone to errors. With the growth of data-driven decision-making systems, there is a strong need for an intelligent and automated platform that can assist students in selecting appropriate colleges based on their academic profile and preferences. A Smart College Admission Recommendation System is an intelligent web-based application designed to provide personalized college suggestions using structured datasets such as cutoff marks, seat matrix, placement statistics, college type, admission type, and location. The system analyzes student inputs like percentage, category, preferred branch, and area to recommend colleges that match their eligibility and career goals. In many existing admission systems, students are required to manually compare multiple colleges by checking historical cutoff data, placement records, and infrastructure details. This manual comparison process not only consumes significant time but also leads to poor decision-making due to lack of proper data analysis tools. Moreover, most current college websites provide static information rather than intelligent recommendations, which limits their usefulness for students seeking guidance. As a result, students often make admission decisions based on incomplete information, peer influence, or assumptions rather than accurate data. The integration of Artificial Intelligence (AI), database management systems, and web technologies has opened new opportunities for developing smart educational recommendation platforms..



II. LITERATURE SURVEY

The rapid growth of educational institutions and courses has increased the complexity of the college selection process for students. Over the years, several researchers and developers have proposed recommendation systems and educational decision-support platforms to simplify college selection. These systems aim to provide personalized suggestions based on user preferences, academic performance, and historical data analysis.

Early educational recommendation systems were primarily based on simple search and filtering mechanisms. Traditional college portals allowed students to manually search colleges based on location, course, or ranking. However, these systems lacked intelligent personalization and eligibility-based recommendations. According to Schafer et al. (2007), recommendation systems improve decision-making by analyzing user inputs and matching them with relevant datasets, which makes them highly suitable for educational applications.

Based on the review of existing literature and systems, it is observed that:

- Traditional systems rely on manual searching and static datasets
- Many platforms lack personalized eligibility-based filtering
- Machine learning systems are complex and resource-intensive
- Few systems provide real-time admin-controlled dataset updates
- Limited research focuses on diploma and cutoff-based college recommendation systems

III. EXISTING SYSTEM

The current college selection process used by students includes:

- Searching colleges manually on multiple websites
- Comparing cutoff lists manually
- Percentage or cutoff eligibility
- Category (OPEN, OBC, SC, ST)
- Preferred branch or course
- College type (Government/Private)
- Fees range / Location or Area Limitations of Existing System:
- Time-consuming manual research
- No personalized recommendations
- Outdated cutoff data
- Complex comparison process
- Lack of centralized college dataset

These limitations demand a secure and automated solution.

IV. PROPOSED SYSTEM

The proposed system is a Smart College Admission Recommendation System developed using a web-based architecture where the frontend UI is built using HTML, CSS, and JavaScript, and the backend database is Firebase Firestore, connected through JavaScript. The main purpose of the system is to recommend engineering colleges to students based on their percentage, selected branch, category, and preferred area (Mumbai/Navi Mumbai). The complete college dataset (college details, cutoff values, seat matrix, and placement data) is stored in Firestore so that the website can fetch and display updated data in real time.

The proposed system is a web-based College Recommendation Application that provides personalized college suggestions based on student inputs and eligibility criteria.

Key Features:

- Smart college filtering system
- Eligibility-based recommendation (cutoff matching)
- Admin dashboard for dataset entry



- Firestore database integration
- Student and Admin user modes
- Dynamic dataset viewer
- Responsive and user-friendly UI

The system automatically compares student percentage with cutoff data and displays eligible colleges instantly.

V. FILTERING ALGORITHM USED IN THE PROPOSED SYSTEM

1. Type of Algorithm

- The system uses a Rule-Based Multi-Criteria Filtering Algorithm.
- It is also known as Constraint-Based Filtering.

2. Input Parameters (User Filters)

- The filtering algorithm takes the following inputs from the frontend UI:
- Branch (Engineering Stream)
- Category (OPEN, OBC, SC, etc.)
- Percentage / Cutoff Eligibility
- Area / Location
- College Type (Government / Private)
- Fees Range

These inputs are collected using JavaScript DOM elements (e.g., dropdown filters).

3. Data Source for Filtering

- College data is stored in Firebase Firestore Database.
- Each college record contains:
- College Name
- Address
- Type
- Area
- Photo URL
- Branch-wise cutoff data
- Fees and placement details
- If Firebase is not available, the system uses local dataset fallback.

4. Working Principle of the Filtering Algorithm

- The system retrieves all college records from the database.
- A linear search is performed over the dataset.
- Each college is evaluated against selected filter conditions.
- Only colleges satisfying all constraints are displayed.

VI. SYSTEM ARCHITECTURE

The system architecture consists of three major layers:

1. Frontend (UI Layer)

- HTML
- CSS
- JavaScript
- Interactive filters and dashboards

2. Backend (Cloud Database Layer)

- Firebase Firestore
- Real-time data storage



- Structured collections (college info, cutoffs, placements)
 - Logic Layer
3. Filtering algorithm
- Eligibility matching
 - Data processing using JavaScript
4. Working Flow:
- Student enters percentage and preferences
 - System fetches data from Firestore database
 - Filtering algorithm processes eligibility
 - Recommended colleges are displayed
 - Admin can pdate dataset through dashboard

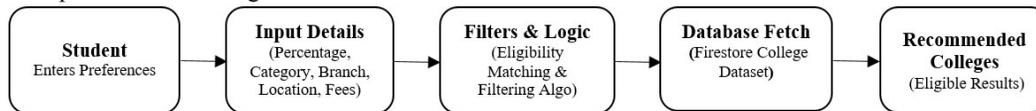


Fig 1 : College Recommendation Flow

VII. IMPLEMENTATION

The system is implemented using modern web technologies.

1. Frontend Technologies:

- HTML
- CSS
- JavaScript

2. Database:

- Firebase Firestore (Cloud NoSQL Database)

3. Functional Modules Implemented:

- Welcome Screen UI
- Login Modal (Admin Mode)
- College Filter Panel
- Dataset Viewer
- Admin Dashboard
- College Recommendation Engine Database Connectivity

VIII. RESULTS

The developed College Recommendation System was tested with multiple datasets and user inputs. Observed Results:

- Accurate college recommendations based on eligibility
- Fast filtering and search performance
- Real-time dataset updates from admin panel
- Improved user experience with interactive UI
- Reduced manual effort in college searching

Testing confirmed that the system correctly filters colleges according to percentage, category, and branch preferences

- Reduced manual verification effort

Testing showed that any change in certificate data resulted in hash mismatch and invalid certificate detection.



IX. CONCLUSION

The Smart College Recommendation System successfully provides an intelligent and efficient platform for students to find suitable colleges based on their academic performance and preferences. By integrating web technologies with a cloud database, the system ensures real-time data updates, scalability, and improved accessibility.

The platform eliminates the need for manual research and provides accurate, data-driven recommendations. It is especially useful for students applying through centralized admission processes and diploma lateral entry admissions

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