



# The Book Predictor Using Machine Learning

<sup>1</sup>Rupali Kaldoke, <sup>2</sup>Kushagar, <sup>3</sup>Hritick Sidana, <sup>4</sup>Ayush Chetan Mahajan,

<sup>1</sup>Assistant Professor, <sup>2</sup>Student, <sup>3</sup>Student, <sup>4</sup>Student

(<sup>1,2,3,4</sup>) Department of Computer Engineering,

(<sup>1,2,3,4</sup>) Nutan Maharashtra Institute of Engineering and Technology, Pune

**Abstract:** The Book Predictor is a web-based recommendation system designed to assist students in selecting the most appropriate study material based on their current knowledge and preparation level. The system leverages a question-answer approach to evaluate users' understanding of specific exam topics and predicts a recommended book that best suits their learning needs.

Users begin by providing their name, exam type, and self-assessed preparation level. The system then presents a series of questions tailored to the selected exam. Each correct answer is awarded a point, and the total score determines the recommended book, based on predefined accuracy thresholds. The results are stored in a database, allowing multi-domain functionality and enabling future improvements in recommendation accuracy. This project integrates web development, database management, and predictive algorithms, offering an intuitive interface for students to assess their readiness and choose the best resources for effective exam preparation.

**Index Terms** – Machine Learning, Analysis, Predictions, Database.

## INTRODUCTION

Education awareness has grown at an unprecedented rate in recent years, with an ever-increasing number of candidates appearing for competitive exams. Each year, this number swells as more students, graduates, and working professionals seek to crack these exams to secure their career paths. This upward trend is not only a reflection of the rising importance of qualifications but also of the dedication and determination candidates demonstrate in their pursuit of success. With the growing competitiveness, aspirants are exploring multiple avenues to find resources and materials that best suit their preparation needs.

However, a common challenge that beginners and even some experienced candidates face is the overwhelming variety of study materials available in the market. Books covering the same subject are written by numerous authors, each offering different perspectives, methodologies, and content structures. Some candidates may be embarking on this journey for the first time, while others might be reattempting the exam after previous attempts. The differences in their levels of experience and knowledge demand personalized guidance to select the right study materials. Choosing the wrong book can lead to confusion, wasted time, and reduced chances of success.

Recognizing this gap, our solution proposes a smart and adaptive "book predictor application" designed to assist users in selecting the most appropriate study material based on their unique preparation level. This application leverages artificial intelligence to offer a dynamic and personalized user experience. It harnesses the power of AI-driven chatbots to communicate with users, gather relevant information about their preparation status, and recommend books that best match their individual needs.

### 1.1 Historical Overview:

In the realm of competitive exams, selecting the right study material is critical for success. With the increasing number of candidates and the vast variety of books available for each subject, students face a significant challenge in determining which book suits their preparation needs.

- **Lack of Personalized Recommendations:** Existing platforms and traditional recommendation systems fail to consider individual preparation levels and specific exam requirements, leading to inefficient study practices.
- **Time Inefficiency:** Students spend unnecessary time trialing various books, and without proper guidance, they might choose resources that do not adequately prepare them for the level of difficulty required by their exams

## 1.2 Objective:

- **Analyse preparation:** This application will analyse the preparation level of the candidate. If the candidate is new then application will set the preparation level as 0 by default and for old candidate's application will judge the preparation on the basis of accuracy of the answers of the candidate.
- **Predict Book:** The application will predict a suitable book for the candidate as per his preparation level. Here book prediction will take place on the basis of accuracy.

## Literature Review and Comparative Analysis

### • Recommendation Systems

Modern recommendation systems employ collaborative filtering, content-based filtering, and hybrid methods (Ricci et al., 2015). The Book Predictor applies content-based filtering by recommending books based on users' quiz performance.

### • Educational Recommendation Systems

Educational systems now use personalized recommendations based on student performance (Lee et al., 2016). The Book Predictor follows this approach by using real-time quiz results to recommend study material.

### • Web-Based Learning Platforms

Online learning platforms like Coursera use quizzes to assess learners and recommend resources (Pardo et al., 2018). The Book Predictor employs a similar quiz-driven recommendation system for selecting books.

### • Machine Learning in Education

Machine learning enhances personalized learning (Khosravi et al., 2017). Although the Book Predictor currently doesn't use full ML models, it could integrate them to improve recommendations.

### • Database Integration

Efficient data storage and management are essential for web applications (Connolly & Begg, 2019). The Book Predictor stores user results in a database for scalability and future expansion.

## 2.1 Strengths and Challenges

### Strengths:

- **Personalization:** Tailored book recommendations based on the student's level, experience, and exam type.
- **Efficiency:** Saves students' time by cutting down the trial-and-error process of selecting study material.
- **Flexibility:** Useful for both new and experienced candidates, making the system versatile and scalable for various exam types.
- **Continuous Improvement:** By incorporating feedback, the system gets smarter and improves recommendations over time.

### Challenges:

- **Limited to available data:** If the dataset doesn't cover a broad range of books, the recommendations may not be comprehensive.
- **Accuracy dependent on training:** The prediction accuracy relies heavily on the quality of data used in training the AI model.
- **Dependence on User Honesty:** The system relies on the accuracy of the input provided by the user. If users misjudge or misrepresent their preparation level, the book recommendations may be ineffective or inappropriate.
- **Limited Adaptability:** The application may struggle to adapt to rapidly changing educational content or new book releases, requiring regular updates to stay relevant and useful.

## 2.2 Case Study 1:

we have used this project with the integration of machine learning to predict the book to the candidates based on the preparation level.

### Calculation

We have used simple calculation. The accuracy percentage is calculated by the following formula Accuracy percentage = (no of correct answers)/Total questions \*100

Accuracy Percentage				Book Level		
Less than 40				Basic		
Between 40 and 70				intermediate		
More than 70				Advanced		
Case Study ID	Input Exam	No of Questions (Total)	No of Questions per Subject	No of correct Answers	Accuracy Percentage	Recommended Book Level
1	JEE	15	Physics: 5 Chemistry: 5 Mathematics: 5	8	53	intermediate
2	JEE	15	Physics: 5 Chemistry: 5 Mathematics: 5	5	33	Basic
3	JEE	15	Physics: 5 Chemistry: 5 Mathematics: 5	13	86	Advanced
4	JEE	15	Physics: 5 Chemistry: 5 Mathematics: 5	7	46	intermediate
5	JEE	15	Physics: 5 Chemistry: 5 Mathematics: 5	12	80	Advanced
6	JEE	15	Physics: 5 Chemistry: 5 Mathematics: 5	3	20	Basic

## 2.3 Case Study 2:

Accuracy Percentage				Book Level		
Less than 40				Basic		
Between 40 and 70				intermediate		
More than 70				Advanced		
Case Study ID	Input Exam	No of Questions (Total)	No of Questions per Subject	No of correct Answers	Accuracy Percentage	Recommended Book Level
1	NEET	15	Physics: 5 Chemistry: 5 Biology: 5	8	53	intermediate
2	NEET	15	Physics: 5 Chemistry: 5 Biology: 5	5	33	Basic
3	NEET	15	Physics: 5 Chemistry: 5 Biology: 5	13	86	Advanced
4	NEET	15	Physics: 5 Chemistry: 5 Biology: 5	7	46	intermediate
5	NEET	15	Physics: 5 Chemistry: 5 Biology: 5	12	80	Advanced
6	NEET	15	Physics: 5 Chemistry: 5 Biology: 5	3	20	Basic

## RESEARCH METHODOLOGY

The project employs a sophisticated predictive algorithm that takes into account various factors such as the user's exam type, previous experience, and current preparation level. This personalized approach ensures that each candidate receives tailored recommendations that can significantly enhance their study experience. The overall methodology is systematically divided into several comprehensive phases to facilitate effective user engagement and resource allocation.

### 4.1 User Registration/Authentication

To efficiently manage and track different users, the system requires each candidate to log in or sign up before accessing its features. During this initial registration phase, the system collects essential basic details from the candidates, including:

- **Name:** To personalize the user experience and maintain a record of individual candidates.
- **Exam Type:** Candidates specify the particular exam they are preparing for, which could range from competitive exams such as the Common Admission Test (CAT) to other significant assessments like the Union Public Service Commission (UPSC) exams. This information is critical for ensuring relevant recommendations.
- **Preparation Level:** Candidates are asked to provide an indication of their preparation level, which will inform the algorithm's recommendations and support strategies.

### 4.2 Preparation Level Assessment:

This Phase focuses on evaluating the candidate's preparation levels to establish a baseline for personalized book recommendations:

- **New Candidates:** For individuals who are new to the examination process, the system assigns a starting score of zero. This score serves as a foundation for their preparation journey, enabling them to gradually build their knowledge and skills.
- **Experienced Candidates:** Those who have previously attempted the exam are prompted with a series of 4-5 subject-related questions designed to assess their knowledge and readiness. Each correct answer provides an increment of 1 point to the candidate's score. This scoring mechanism helps quantify their understanding and mastery of the subject matter.

### 4.3 Book Recommendation Algorithm

The Heart of the project lies in its robust book recommendation algorithm, which utilizes a carefully curated database of educational resources:

- **Database of Books:** The system houses a predefined database of books that are meticulously categorized by subject matter and difficulty level. This structured organization ensures that candidates can easily access resources that match their specific needs.
- **Score Comparison:** Once the candidates' scores are established, the system compares these scores against the book database. Based on the accuracy of their responses and their overall score, a suitable book is selected that aligns with their preparation level. This ensures that candidates receive recommendations that are both challenging and appropriate for their current understanding.

#### 4.4 Feedback Loop:

An integral part of the learning process involves continuous improvement and guidance:

- **Post-Recommendation Feedback:** After a book is suggested, the system initiates a feedback loop where it provides candidates with additional suggestions for improvement. This may include recommendations on key chapters or specific topics that candidates should focus on to strengthen their understanding and fill in knowledge gaps.
- **Personalized Learning Path:** This feedback mechanism not only aids in reinforcing the candidates' learning but also encourages a proactive approach to studying, helping them to navigate their preparation journey more effectively.

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