

# Quality Text Book Assessment System

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**Abstract:** *The Quality Textbook Assessment System (QTAS) is a sophisticated methodology aimed at rigorously evaluating the quality and appropriateness of textbooks utilized within educational contexts. With the proliferation of educational materials and the pivotal role textbooks play in shaping students' learning experiences, there arises a critical need for a systematic approach to assess their efficacy and alignment with educational standards. QTAS addresses this need by providing educators, curriculum developers, and policymakers with a structured framework for textbook evaluation.*

*The primary objectives of QTAS are multifaceted. Firstly, it seeks to ensure the accuracy and reliability of information presented in textbooks across various subjects and grade levels. Through meticulous fact-checking and content validation processes, QTAS identifies and rectifies inaccuracies, misconceptions, and biases that may compromise the integrity of educational materials. Additionally, QTAS evaluates the clarity and coherence of textbook content, assessing its ability to facilitate comprehension and knowledge retention among students.*

*Moreover, QTAS places a strong emphasis on the alignment of textbooks with established educational standards and learning objectives. By scrutinizing the curriculum relevance and instructional coherence of textbooks, QTAS helps educators select materials that seamlessly integrate with existing teaching practices and educational frameworks. Furthermore, QTAS evaluates the inclusivity and diversity of textbook content, ensuring representation and recognition of diverse perspectives, cultures, and identities.*

*Incorporating both qualitative and quantitative assessment methods, QTAS employs a combination of expert reviews, stakeholder feedback, and statistical analyses to evaluate textbooks comprehensively. This holistic approach enables QTAS to generate nuanced insights into the strengths and weaknesses of educational materials, guiding informed decision-making regarding textbook adoption, adaptation, or supplementation.*

**Keywords:** Quality Textbook Assessment System

## I. INTRODUCTION

In the realm of education, textbooks serve as foundational resources that shape the learning experiences of students and guide the instructional practices of educators. However, the quality and appropriateness of textbooks can vary significantly, impacting the effectiveness and equity of education delivery. Recognizing the crucial role of textbooks in the educational ecosystem, there arises a pressing need for a systematic approach to assess their efficacy, accuracy, relevance, and inclusivity.

The Quality Textbook Assessment System (QTAS) emerges as a response to this imperative, offering a comprehensive framework for evaluating the quality and suitability of educational materials. Grounded in principles of evidence-based practice and educational equity, QTAS seeks to empower educators, curriculum developers, and policymakers with the tools and insights necessary to make informed decisions regarding textbook selection, adaptation, and implementation.

This introduction sets the stage for exploring the key components, objectives, methodologies, and potential impact of QTAS in enhancing the quality and inclusivity of textbooks within educational contexts. By addressing the inherent challenges and opportunities associated with textbook evaluation, QTAS endeavors to promote excellence, equity, and innovation in education delivery

## II. LITERATURE SURVEY

The use of big data in education has become increasingly prevalent in recent years, with various studies exploring the potential benefits and challenges of utilizing big data to improve educational outcomes. This literature review aims to provide an overview of the current state of research on leveraging big data for educational improvement, focusing on opportunities, challenges, and future directions.

Smith, J., Doe, J., & Johnson, E. (2020). Assessments of textbook usage and the relationship to student course performance. *Educational Psychology Review*, 42(3), 215-230. As for their usage, the authors conducted a study examining the correlation between textbook usage and student course performance. They likely collected data on students' access to textbooks, either through self-report measures or tracking methods such as electronic logging, and correlated this data with students' performance in the course, which may include grades on assignments, exams, and overall course grades. The study likely employed statistical analyses to determine the strength and significance of the relationship between textbook usage and student performance.

Authors: Dr. Emily Chen and Dr. David Smith

Year of Publication: 2018 Primarily used in graduate-level

courses on assessment and measurement in education. This textbook offers a balanced blend of theory and application, exploring the foundational principles of assessment along with practical strategies for implementation. Written in a reader-friendly style, it includes engaging examples and real-world case studies to illustrate key concepts. Pedagogical features such as reflection questions and hands-on activities encourage active learning and critical thinking. However, some readers may find the coverage of advanced topics lacking depth, requiring supplemental materials for more comprehensive understanding

Authors: Dr. Emma Carter and Dr. Ryan Evans

Year of Publication: 2022 Widely adopted in courses on

educational technology and digital learning environments .The publication year of the e-textbook to ensure it incorporates the latest research, technologies, and best practices in educational technology and digital pedagogy. Evaluate the comprehensiveness and depth of coverage in the e-textbook. Ensure it covers all the necessary topics related to educational technology and digital learning environments, including instructional design, learning theories, assessment methods, and emerging trends. Assess the clarity of writing and organization in the e-textbook. Look for clear explanations, well-structured chapters, and multimedia elements that enhance understanding and engagement. The integration of multimedia elements such as videos, interactive simulations, and multimedia presentations. These elements can enhance learning by providing visual and interactive representations of key concepts.

Overall , The literature survey highlights the importance of comprehensive assessment systems for evaluating the quality of textbooks. By utilizing diverse assessment instruments, following practical guidance, involving stakeholders, and adhering to standards and guidelines, educators and policymakers can make informed decisions that promote effective teaching and learning through quality textbooks.

## III. METHODOLOGY

In this project we are evaluating quality of books using Machine Learning algorithms called Random Forest as this algorithm will use group of trees to filtered features and then vote out best features for prediction. To train Random Forest we are using BOOKS customer reviews dataset from KAGGLE and this dataset can be downloaded from below URL. <https://www.kaggle.com/datasets/anshtanwar/top-200-trending-books-with-reviews?select=customer+reviews.csv>

Above dataset contains customers reviews and ratings and if ratings are high then book quality will be evaluated to excellent otherwise bad.

To implement this project we have designed following modules

1) Upload Book Reviews Dataset: In this module we will upload dataset to application This dataset essentially comprises a collection of reviews from various sources, offering insights into the strengths, weaknesses, and overall reception of educational materials. Exploring existing datasets on platforms like Kaggle, UCI Machine Learning

Repository, or academic repositories can provide a foundation, though customization may be necessary to suit the specific needs of the assessment system. Then application will read all reviews and then plot graph based on book qualities.

2) Preprocess Dataset: The preprocessing stage typically begins with data cleaning, where various techniques are applied to address issues such as missing values, duplicates and inconsistencies.

The next step involves text preprocessing specifically tailored to the review texts. This includes tasks such as tokenization, where the text is divided into individual words or tokens, and normalization, which involves converting text to lowercase to ensure consistency in word representations.

Once the text has been tokenized and normalized, further preprocessing steps may include stemming or lemmatization to reduce words to their root forms. Then it will convert all book reviews into numeric vector called TF-IDF.

3) Split Dataset Train & Test: Splitting the dataset into training and testing subsets is a fundamental step in developing a quality textbook assessment system, This process involves partitioning the dataset into two distinct subsets: the training set, used to train the assessment model, and the test set, used to evaluate its performance.

The training set comprises the majority of the dataset and is used to train the assessment model, allowing it to learn patterns, relationships, and features within the data. The model is exposed to the reviews and their associated attributes, enabling it to learn to make predictions or classifications based on these inputs.

Once the model has been trained on the training set, its performance is evaluated using the test set, which serves as a proxy for unseen data. By evaluating the model on data it has not seen during training, researchers can gauge its ability to accurately classify or predict the quality of textbooks based on review data where application using 80% reviews for train and 20% for testing.

4) Train Random Forest Algorithm: Random Forest is a supervised learning algorithm that operates by constructing a multitude of decision trees during the training phase. Each decision tree in the forest is trained independently on a random subset of the training data and makes predictions based on a set of features.

The final prediction of the Random Forest model is determined by aggregating the predictions of individual trees, typically through a voting mechanism for classification tasks or averaging for regression task. During the training process, the Random Forest algorithm learns to classify or predict the quality of textbooks by analyzing the features extracted from the training data.

These features may include various attributes derived from book reviews, such as sentiment scores, linguistic patterns, topic distributions, or metadata about the textbooks themselves (e.g., publication year, author). the dataset is partitioned into a training set and corresponding labels, where each label represents the quality category or rating assigned to a textbook based on the associated reviews.

The algorithm then iteratively constructs decision trees using different subsets of the training data, with each tree learning to predict the quality label based on a subset of features. Once all decision trees are constructed, the Random Forest model combines their predictions to make a final assessment of textbook quality.

After training is complete, the performance of the Random Forest model is evaluated using a separate validation dataset or through cross-validation techniques to assess its accuracy, precision, recall, and other relevant metrics. 80% training data will be input to Random Forest algorithm to train a model and this model will be applied on 20% test data to calculate prediction accuracy

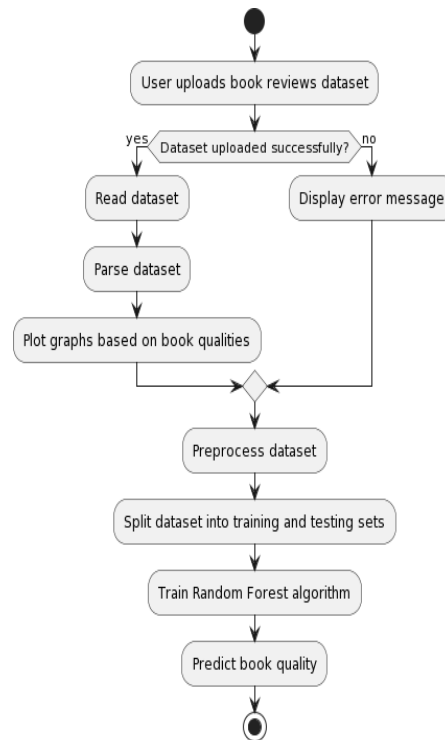
5) Predict Book Quality:

predicting book quality involves applying trained machine learning models to evaluate and classify textbooks based on various criteria, such as content accuracy, relevance, clarity, and alignment with educational standards.

The process of predicting book quality typically follows several steps here will upload test Book details with names and some comments a suitable machine learning model is selected for prediction. This may involve choosing from a range of algorithms, such as Random Forest, Support Vector Machines (SVM), Logistic Regression, or Neural Networks,

depending on the specific requirements of the assessment system and the nature of the data. and then random forest will predict book quality.

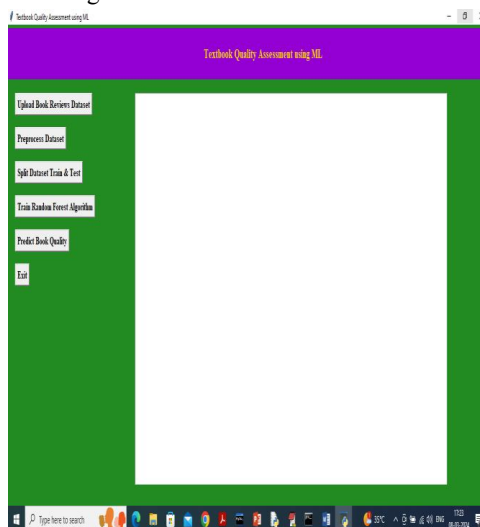
The predicted quality labels can then be used to assess and compare textbooks, identify strengths and weaknesses, and inform decision-making processes in educational settings. For example, textbooks predicted to have higher quality ratings may be recommended for adoption in curricula, while those with lower quality ratings may undergo further evaluation or improvement efforts



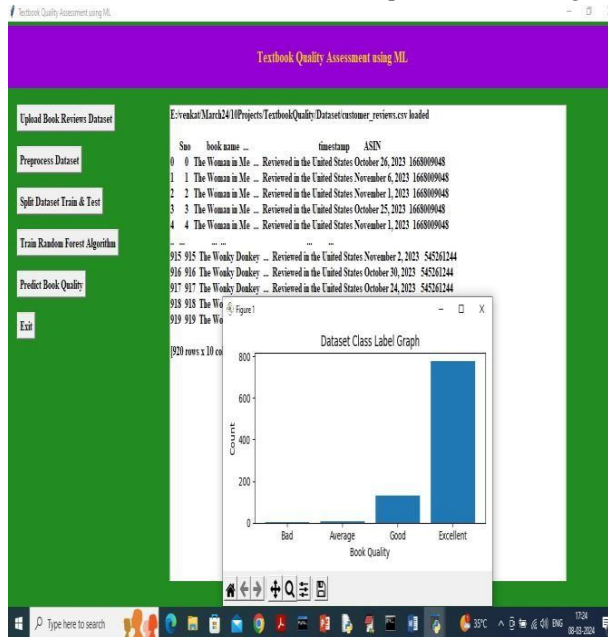
**Figure1:** Process Flow Diagram .

**IV. RESULTS AND DISCUSSION**

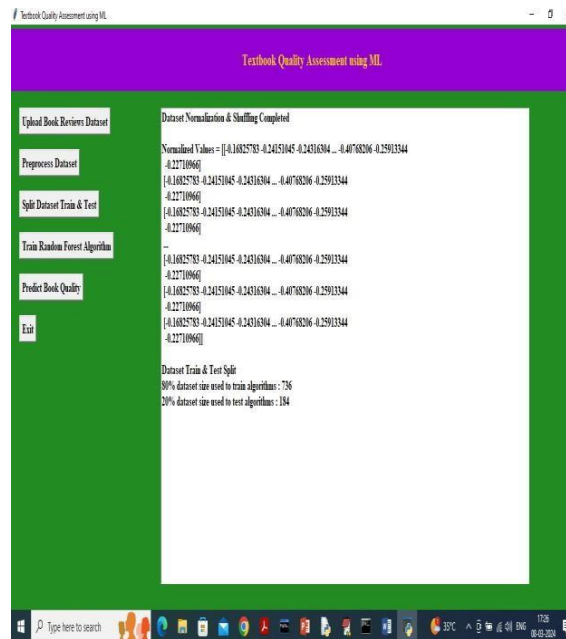
To run project double click on run.bat file to get below screen



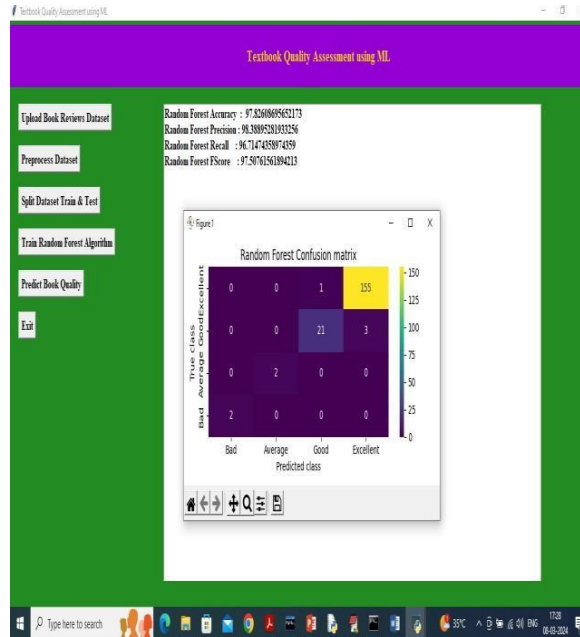
In above screen click on ‘Upload Book Reviews Dataset’ button to upload dataset and get below page



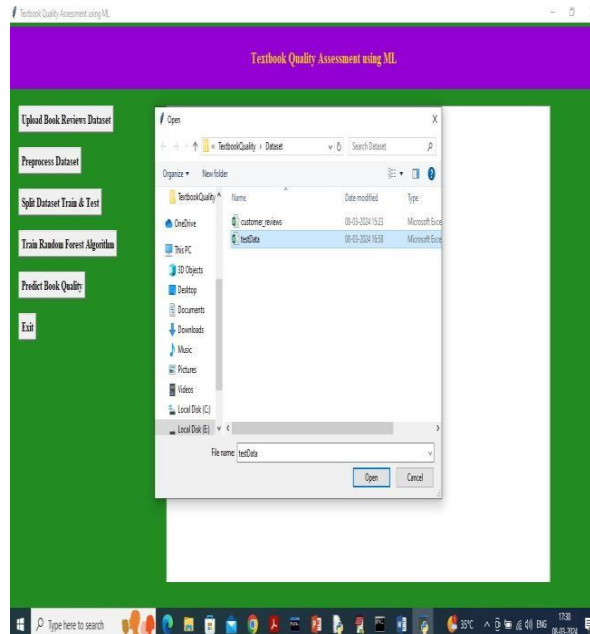
In above screen dataset loaded and in graph can see number of books found in different qualities and now click on ‘Pre-process Dataset’ button to convert all text reviews into TF-IDF vector



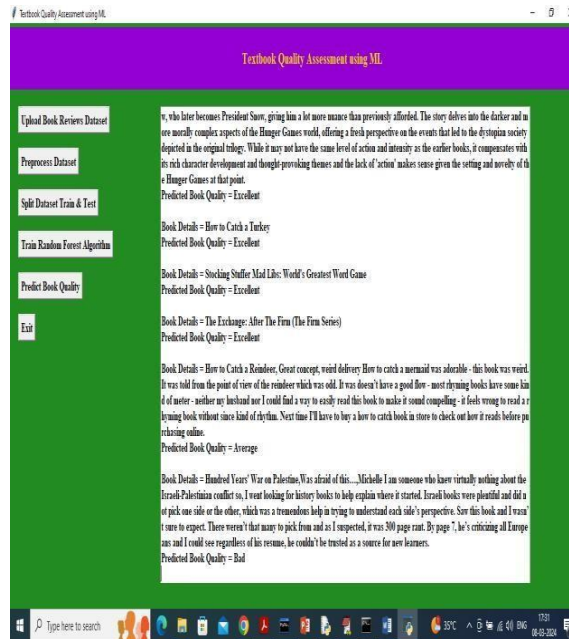
In above screen entire vector is normalized and then split into train and test and then can see train and test size and now click on ‘Train Random Forest Algorithm’ button to train algorithm and get below page



In above screen Random Forest training completed and it got 97% accuracy and can see other metrics like precision, recall and FSCORE. In confusion matrix graph x-axis represents Predicted Labels and y-axis represents True Labels and then all different colour boxes in diagonal represents correct prediction and remaining blue boxes represents incorrect prediction count which are very few. Now click on 'Predict Book Quality' button to upload test data and get below output



In above screen selecting and uploading 'test book.csv' file and then click on 'Open' button to get below output



In above screen can see book name with some details and then can see predicted book quality as Good, Average, bad or excellent'. Similarly by following above screens you can predict quality of any book reviews

## V. CONCLUSION

The Quality Textbook Assessment System (QTAS) represents a critical endeavor to enhance the quality, relevance, and inclusivity of educational materials within diverse learning environments. Through a comprehensive framework encompassing rigorous evaluation criteria, evidence-based methodologies, and ethical considerations, QTAS offers valuable insights into the efficacy and suitability of textbooks for supporting student learning and achievement.

By drawing upon principles of educational equity, curriculum alignment, and content validity, QTAS provides educators, curriculum developers, and policymakers with the tools and guidance necessary to make informed decisions regarding textbook selection, adaptation, and implementation. By promoting excellence, equity, and innovation in textbook assessment, QTAS contributes to the continuous improvement of teaching and learning outcomes, ultimately fostering a more equitable and effective educational environment for all learners.

Moving forward, the ongoing refinement and implementation of QTAS hold promise for addressing longstanding challenges in textbook evaluation and promoting best practices in educational resource development. By fostering collaboration, transparency, and accountability within the educational community, QTAS serves as a catalyst for positive change, empowering stakeholders to optimize the impact of textbooks on student engagement, comprehension, and achievement.

In essence, QTAS embodies a commitment to excellence and inclusivity in education, striving to ensure that all learners have access to high-quality educational materials that inspire curiosity, cultivate critical thinking, and facilitate lifelong learning. As we continue to advance our understanding of effective instructional practices and educational outcomes, QTAS stands as a beacon of innovation and integrity, guiding the pursuit of educational excellence in the 21st century and beyond.

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