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An Automated College Prediction Model Using Machine Learning

Prof. R. L. Pardhi[1], Yash Patne[2], Meenal Shekokar[3], Ajit Thakare[4], Maitrideep Popatkar[5], Shrutika Bijawe[6]

[1]*Assistant Professor, Sipna College of Engineering and Technology, Amravati, Maharashtra, India*

[2, 3, 4, 5, 6]*Undergraduate Student, Sipna College of Engineering and Technology, Amravati, Maharashtra, India*

Abstract: *The Maharashtra State Government administers the MHT-CET, also known as the Common Entrance Test, every year. The Directorate of Technical Education oversees its operation. This entrance exam focuses primarily on the degree programme offered by the following streams: engineering, pharmacy, law, and management. In 2019, the test is administered in an online format for the first time. The syllabus and scoring system for the computer-based test (CBT) were made public by the State Common Entrance Test Cell, Maharashtra. In this project, we suggest creating a machine learning model that will be able to forecast the college based on the MHT-CET score. We utilized a dataset we made for this. Name, MHT-CET score, application college, branch, and assigned college are all taken into consideration. Based on the outcomes of the college entrance exams, the prediction results demonstrate that the support Nave Bayes Classifier can predict college course performance with accuracy. Then, by providing performance indicators to the model, we anticipate the college based on the score from prior years. Self-driving cars and chatbots are just a couple of the new uses that machine learning (ML) has made possible. ML can process enormous amounts of data to draw conclusions from the data. These insights can be used to inform decisions. One application of machine learning is prediction. Predictive analytics uses data, statistics, and machine learning algorithms to make predictions based on historical data. Beyond understanding what has already happened, the goal is to better predict what will happen in the future.*

Keywords: *College Prediction Process, Machine Learning, Dataset, Decision-Making, Naïve Bayes Classifier, Predictions, Past Data, Predictive Analytics, Future.*

I. INTRODUCTION

In recent years, the industry has experienced a sharp rise in competition. Problems brought on by increased competitiveness include job loss and a strong need for new skills. Students should enroll and pursue their education at the institution that best suits them in this competitive atmosphere. This will assist students in developing their abilities to meet industry standards and guarantee appropriate placement. So, a student's future is greatly influenced by their ability to get into the top colleges. Technology improvements and data analysis have significantly changed the educational landscape in recent years. Academic performance is a staged evaluation of the student's learning condition and a fundamental criterion for assessing the quality of the teacher's instruction. Learning is the responsibility of every student.

More and more educational academics are beginning to concentrate on the analysis and mining of educational data as a result of the rapid development of data science. In order to enhance educational results, researchers have resorted to machine learning and other data-driven methodologies as digital data and tools for data analysis become more widely available. The MHT-CET college prediction system is a platform that makes it easier for students to obtain advice about which colleges to apply to.

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The method predicts the various courses provided by various colleges based on the results students received on the MHT-CET exam. Both students and colleges can utilize the system easily thanks to its user-friendly layout. Based on their MH-CET scores and rank, students can register on the portal and apply to numerous colleges and courses. Based on the students' MHT-CET scores and rank, the system utilizes an algorithm to analyze their applications automatically and determine which colleges they should attend. The MHT-CET-based college prediction method is an effective, open, and equitable process that guarantees students are able to enroll in the courses and schools of their choice.

II. LITERATURE REVIEW

A brief overview of existing work in various papers, which have referred for implementation.

Mishra, Sushruta, Soumya Sahoo, Brojo Kishore Mishra, and Santosh Satapathy, "A quality based automated admission system for educational domain" [1]. The authors of this work conducted research from a university perspective to forecast the possibility that a student will enroll in the university after inquiring about courses there. They utilised the K-Means algorithm to group pupils based on feedback, family income, family occupation, parent education, parent motivation, etc. to determine whether or not the student would enroll in college. The pupils were divided into clusters based on how similar their traits were, and decisions were made. The model's goal was to increase the number of students enrolled in the university.

Pushpa, S. K., T. N. Manjunath, T. V. Mrunal, Amartya Singh, and C. Suhas, "Class result prediction using machine learning" [2]. In this study, machine learning is used to predict a class's outcome. Before taking the final test, a student's performance from the previous semester is taken into account, along with the results of internal exams from the current semester, to determine whether the student will pass or fail. To calculate the outcome, the author used SVM, Naive Bayes, Random Forest Classifier, and Gradient Boosting. A variety of learning algorithms are combined in the ensemble learning algorithm known as "boost" to improve prediction performance.

Jamison, Joseph, "Applying machine learning to predict Davidson College's admissions yield" [3]. In this study, machine learning techniques were used to estimate the yield of college admission. The rate at which students who have been admitted by the institution actually enroll in the course is known as the yield rate. In order to develop the model, many machines learning techniques, including Random Forest, Logistic Regression, and SVM, were utilised. The models were compared based on their performance and accuracy, and Random Forest performed better than the other models with 86% accuracy. Also underlined were the elements that have been shown to be crucial in foretelling successful applications.

2021 JETIR, “Machine Learning Model for Prediction of Post Graduate Admissions”, July 2021, Volume 8, Issue 7 [4]. This essay aims to assist students in narrowing down universities based on their personal profiles. The anticipated results offer them a good indication of their prospects of admission to a particular university. Students who are now preparing for their higher education should also benefit from this analysis. In the current system, students must speak with consultants using their MH-CET scores in order to receive advice and reach a decision. In the second step, information was gathered from the internet and universities were chosen using an online search procedure. A student's entire career may be destroyed if they choose the incorrect path. This programme uses machine learning techniques to forecast college names and anticipate changes to predictions. The student completes the MH-CET form by providing information about his schooling and test results. The application then uses trained machine learning models to check the data and makes a prediction. The system

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then shows the student's prospects of admission to a university based on his test results, educational background, and employment history, if any.

Mohana Bangale, Shubham Bavane, Akshay Gunjal, Rohit Dandhare, Sudhir D. Salunkhe, “A Survey on Placement prediction system using machine learning” [5]. To overcome the issues with the current manual system in use, "College placement Prediction using Machine Learning" is developed in this work. The difficulties that the current system faces are supported by this programme, which can sometimes even lessen them. Additionally, this system is created to meet a business's desire for efficient and seamless functioning. To fill their roles, the majority of businesses are concentrating on university recruitment. Before students finish their studies, the corporations find talented and skilled professionals. The best technique to work with the correct resource at the right moment to land good firms at the start of their careers is through this method.

III. IMPLEMENTATION

Naïve Bayes Classifier

The Nave Bayes algorithm is a supervised learning method for classification issues that is based on the Bayes theorem. It is mostly employed in text categorization with a large training set. The Naive Bayes Classifier is one of the most straightforward and efficient classification algorithms available today. It aids in the development of quick machine learning models capable of making accurate predictions. Being a probabilistic classifier, it makes predictions based on the likelihood that an object will occur. Spam filtration, Sentimental analysis, and article classification are a few examples of Naive Bayes algorithms that are frequently used.

The Naïve Bayes algorithm is comprised of two words Naïve and Bayes, which can be described as:

Naïve: It is called Naïve because it assumes that the occurrence of a certain feature is independent of the occurrence of other features. Such as if the fruit is identified on the bases of color, shape, and taste, then red, spherical, and sweet fruit is recognized as an apple. Hence each feature individually contributes to identify that it is an apple without depending on each other.

Bayes: It is called Bayes because it depends on the principle of Bayes' Theorem.

Bayes Theorem:

Bayes' theorem is also known as Bayes' Rule or Bayes' law, which is used to determine the probability of a hypothesis with prior knowledge. It depends on the conditional probability.

The formula for Bayes' theorem is given as:

$$P(A|B)=\frac{P(B|A)P(A)}{P(B)}$$

Where,

P(A|B) is Posterior probability: Probability of hypothesis A on the observed event B.

P(B|A) is Likelihood probability: Probability of the evidence given that the probability of a hypothesis is true.

P(A) is Prior Probability: Probability of hypothesis before observing the evidence.

P(B) is Marginal Probability: Probability of Evidence.

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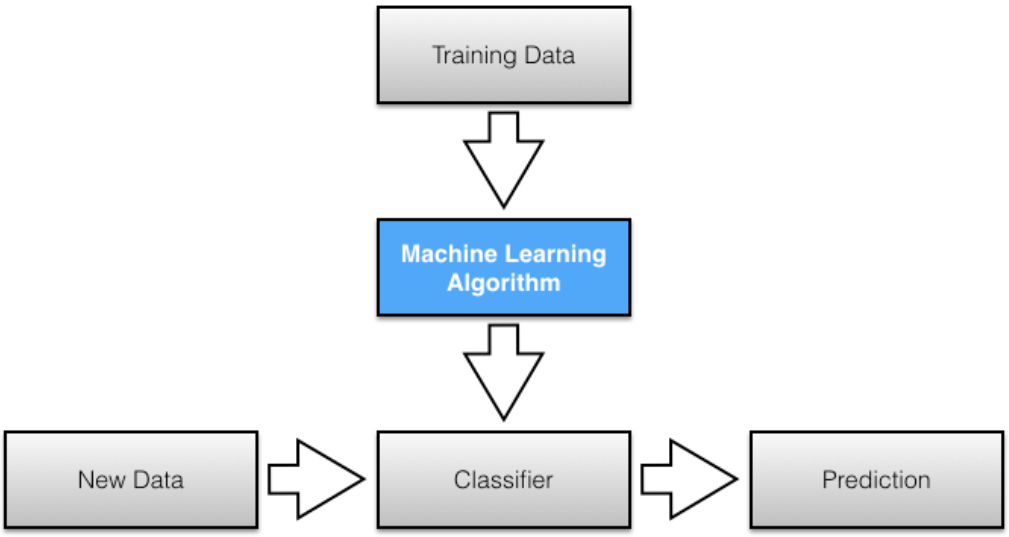
Naïve Bayes and Text Classification:

1. The Naïve Bayes algorithm is one of the most popular and simple machine learning classification algorithms.
2. It based on Bayes theorem for calculating probabilities and conditional probabilities.
3. It works on Bayes theorem of probability to predict the class of unknown dataset.



IV. TECHNOLOGY USED

Programming Language: NodeJS

I. Libraries Used:

- Scikit-learn
- Pandas
- TensorFlow
- NumPy
- Flask
- Plotly.js
- Sequelize
- Express

II. Algorithms/ Tools/ Techniques/ Classes:

- Naïve Bayes Classifier
- Bayes Theorem

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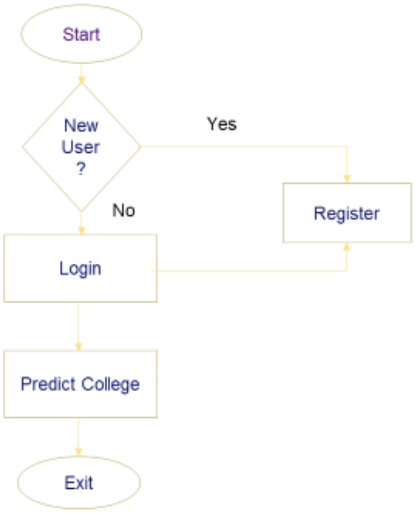
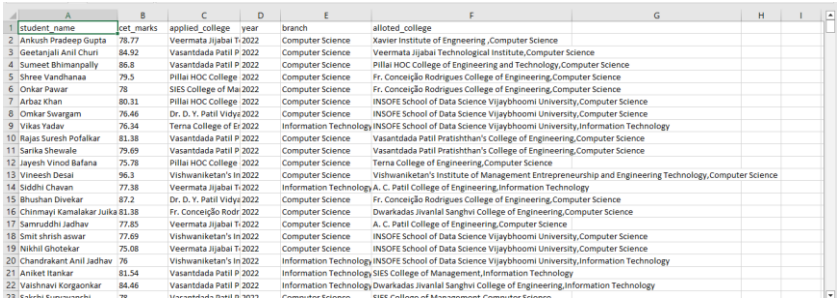
IV. DATA FLOW DIAGRAM



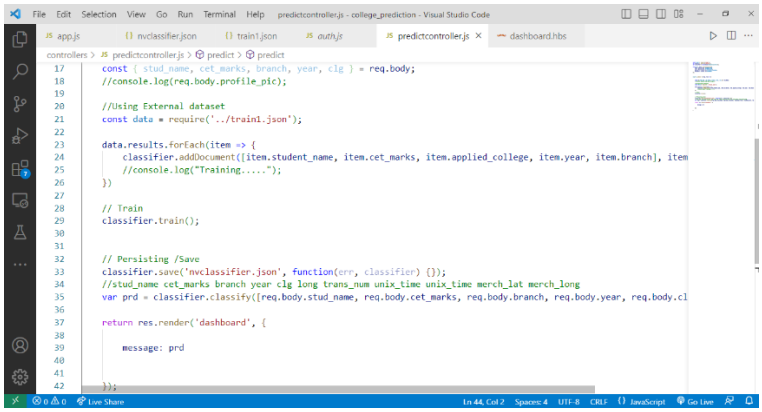
IV. RESULT

Dataset: We built the dataset with parameters of name, MHT-CET scores, applied colleges (minimum two), branch, and allotted college in Excel and created a csv file. Then we convert the csv file into JSON and train it, which will help predict certain college courses for students. We built around 500 rows into the dataset.



	student_name	cet_marks	applied_college	year	branch	alloted_college
2	Ankush Pradeep Gupta	78.77	Veermata Jijabai Te	2022	Computer Science	Xavier Institute of Engneering ,Computer Science
3	Geetanjali Anil Churi	84.92	Vasantdada Patil P	2022	Computer Science	Veermata Jijabai Technological Institute,Computer Science
4	Sumeet Bhimanpally	86.8	Vasantdada Patil P	2022	Computer Science	Pillai HOC College of Engineering and Technology,Computer Science
5	Shree Vandhanaa	79.5	Pillai HOC College	2022	Computer Science	Fr. Conceição Rodrigues College of Engineering,Computer Science
6	Onkar Pawar	78	SIES College of Ma	2022	Computer Science	Fr. Conceição Rodrigues College of Engineering,Computer Science
7	Arbaz Khan	80.31	Pillai HOC College	2022	Computer Science	INSOFE School of Data Science Vijaybhoomi University,Computer Science
8	Omkar Swargam	76.46	Dr. D. Y. Patil Vidya	2022	Computer Science	INSOFE School of Data Science Vijaybhoomi University,Computer Science
9	Vikas Yadav	76.34	Terna College of En	2022	Information Technology	INSOFE School of Data Science Vijaybhoomi University,Information Technology
10	Rajas Suresh Pofalkar	81.38	Vasantdada Patil P	2022	Computer Science	Vasantdada Patil Pratishthan's College of Engineering,Computer Science
11	Sarika Shewale	79.69	Vasantdada Patil P	2022	Computer Science	Vasantdada Patil Pratishthan's College of Engineering,Computer Science
12	Jayesh Vinod Bafana	75.78	Pillai HOC College	2022	Computer Science	Terna College of Engineering,Computer Science
13	Vineesh Desai	96.3	Vishwaniketan's In	2022	Computer Science	Vishwaniketan's Institute of Management Entrepreneurship and Engineering Technology,Computer Science
14	Siddhi Chavan	77.38	Veermata Jijabai Te	2022	Information Technology	A. C. Patil College of Engineering,Information Technology
15	Bhushan Divekar	87.2	Dr. D. Y. Patil Vidya	2022	Computer Science	Fr. Conceição Rodrigues College of Engineering,Computer Science
16	Chinmayi Kamalakar Julka	81.38	Fr. Conceição Rodr	2022	Computer Science	Dwarkadas Jivanlal Sanghvi College of Engineering,Computer Science
17	Samruddhi Jadhav	77.85	Veermata Jijabai Te	2022	Computer Science	A. C. Patil College of Engineering,Computer Science
18	Smit shrish aswar	77.69	Vishwaniketan's In	2022	Computer Science	INSOFE School of Data Science Vijaybhoomi University,Computer Science
19	Nikhil Ghotekar	75.08	Veermata Jijabai Te	2022	Computer Science	INSOFE School of Data Science Vijaybhoomi University,Computer Science
20	Chandrakant Anil Jadhav	76	Vishwaniketan's In	2022	Information Technology	INSOFE School of Data Science Vijaybhoomi University,Information Technology
21	Aniket Itankar	81.54	Vasantdada Patil P	2022	Information Technology	SIES College of Management,Information Technology
22	Vaishnavi Korgaonkar	84.46	Vasantdada Patil P	2022	Information Technology	Dwarkadas Jivanlal Sanghvi College of Engineering,Information Technology

Algorithm: Naïve Bayes Classifier is used. Here, input is given to the predictor.



```
const { stud_name, cet_marks, branch, year, clg } = req.body;
//console.log(req.body.profile_pic);

//Using External dataset
const data = require('../train1.json');

data.results.forEach(item => {
    classifier.addDocument([item.student_name, item.cet_marks, item.applied_college, item.year, item.branch], item
    //console.log("Training.....");
})

// Train
classifier.train();


// Persisting /Save
classifier.save('nvclassifier.json', function(err, classifier) {});
//stud_name cet_marks branch year clg long trans_num unix_time unix_time merch_lat merch_long
var prd = classifier.classify([req.body.stud_name, req.body.cet_marks, req.body.branch, req.body.year, req.body.cl

return res.render('dashboard', {

    message: prd

});
```

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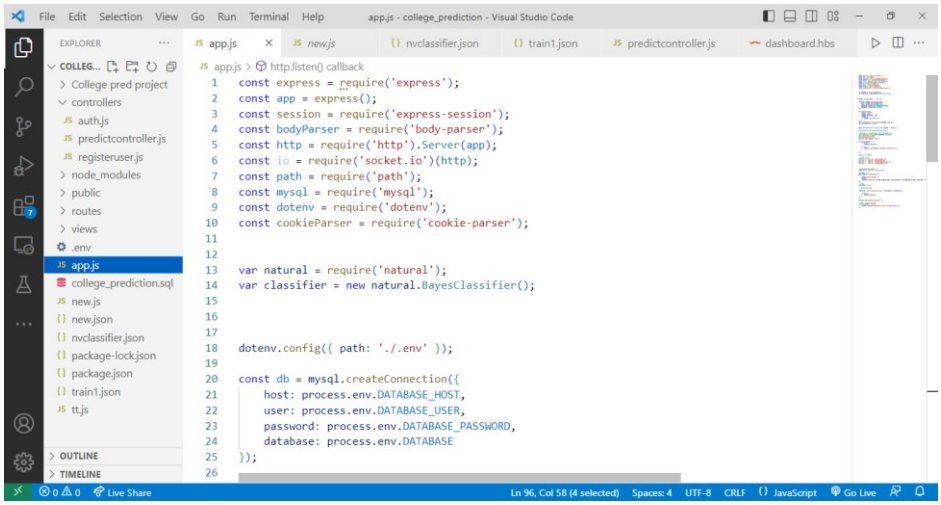
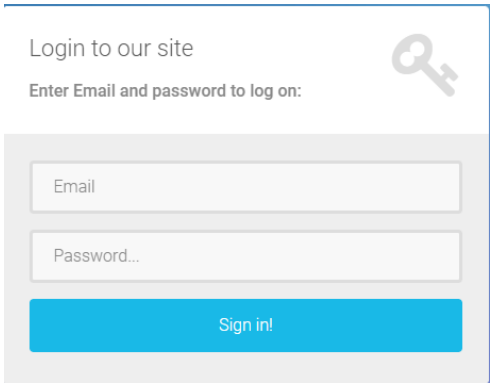
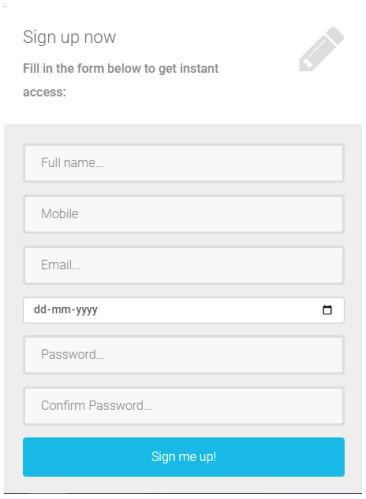
Here, Naïve Bayes Classifier is used for prediction.



Login / Signup Page: Here are the login and signup pages for basic security.





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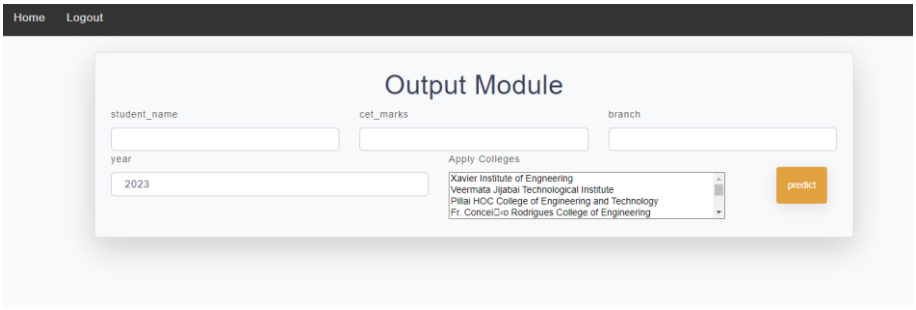
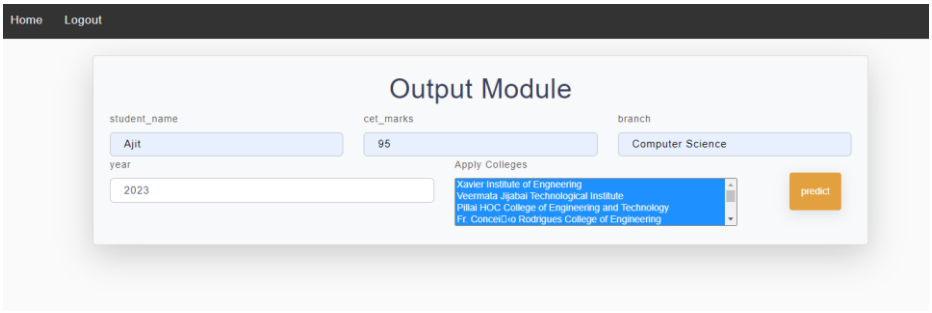
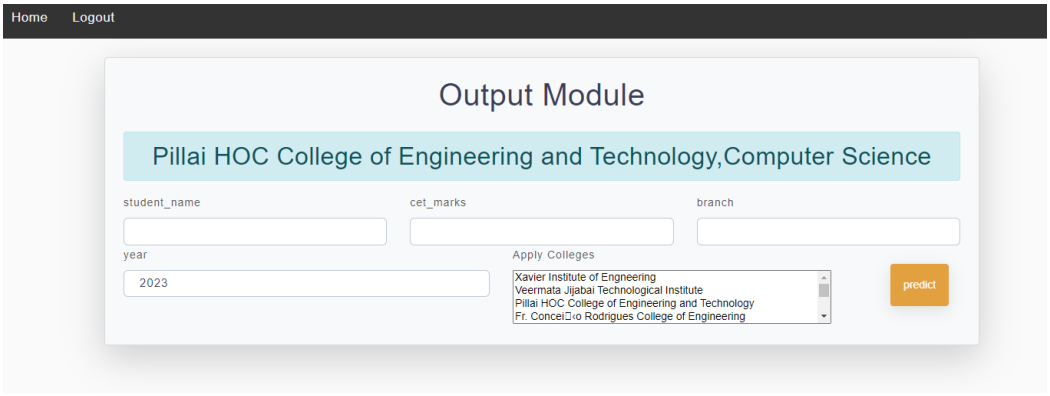
Students to Enter Details: All the students have to enter the given parameters for the prediction.



After details are entered:



Output of Model:



V. CONCLUSION

In conclusion, the MHT-CET-based college prediction system has the potential to completely transform the application process for colleges and universities. Based on a dataset of student admissions from the previous year, the system may forecast a student's college choice. Overall, the MH-CET marks-based college prediction system has the potential to be advantageous to the entire educational ecosystem, including students, colleges, universities, and the government. The predicted college may occasionally be incorrect due to poor accuracy now, which is a drawback. The method can offer a more effective, transparent, and fair procedure with proper preparation, execution, and monitoring, thereby assisting students in understanding prediction.

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