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Revenue Forecasting Using Google Analytics Data

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Abstract: ***Most companies receive the majority of their revenue from a small number of users. As a result, it's necessary to comprehend who these clients are and how to reach them. Google Merchandise Store (GStore) offers customer records that include details about previous transactions. This information can be used to generate predictive models that forecast each customer's future sales. This information can be used to better target marketing campaigns and allocate your marketing budget. For example, you can direct your marketing efforts on the 20% of clients who are most likely to create income. Predicting each customer's future sales is a regression problem because you are trying to forecast a continuous value (sales) based on the customer's other attributes. Regression problems are often addressed by machine learning models. These models are trained using a historical data set containing both the input attributes and the output values (revenue). Once trained, the model can forecast revenue for new clients even in the absence of past data.***
Keywords: Google merchandise, dataset, transaction, revenue, regression, historical data, features, predict.

I. INTRODUCTION

In today's profoundly competitive commerce world, precise income determining is basic for firms to form taught choices, shrewdly apportion resources, and explore dubious conditions within the showcase. Customarily, income determining has depended on deals information, showcase patterns, and subjective gauges. In any case, with the fast development of advanced innovation and the exponential rise of information, organizations presently have get to to gigantic sums of data, which may altogether improve estimating exactness and understanding generation.

Google Analytics, Google Advertisements, and Google Patterns serve as three illustrations of profitable information sources. These frameworks offer firms point by point data approximately client behavior, advertise patterns, and publicizing viability.

The goal of this post is to look into how Google data analysis may be used to forecast sales for businesses. First, we examine the existing literature on sales forecasting methodologies, emphasizing the limitations of traditional approaches and the importance of advanced analytical tools. Next, we'll look at how Google data analytics can help address these issues and enhance prediction accuracy.

Our process entails creating predictive models with past data from Google Analytics and other sources. We use a range of techniques to capture complicated correlations and patterns in your data, such as time series analysis, machine learning algorithms, and predictive modeling. A case study is utilized to demonstrate the approach's accuracy in predicting sales patterns over a certain time period.

II. RELATED WORK

Google Analytics revenue prediction involves utilizing machine learning algorithms to analyze

Google Analytics data and forecast future revenue for an online business or website. This valuable information can aid in making informed decisions regarding marketing strategies, sales efforts, and product development. A variety of machine learning algorithms have been successfully employed for Google Analytics revenue prediction, including:

1) *Linear Regression:* This methods finds the relationship between a single dependent variable(revenue) and one or more independent variables (Google Analytics data).
2) *Random Forests:* Similar to gradient boosting trees, random forests also combine multiple decision trees for classification and regression tasks, including revenue prediction.
3) *Neural Networks:* Inspired by the structure of the human brain, neural networks can effectively capture complex relationships between input data and output targets ,making them suitable for revenue prediction.

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Before training a machine learning model for revenue prediction, careful data preparation is crucial. This often involves:

a) *Data Cleaning and Preprocessing:* Managing lacking values, eliminating outliers, and converting specific variables are all essential steps in records preparation.
b) *Feature Engineering:* Creating new features from existing data can significantly improve the predictive power of your model.
c) *Data Scaling:* Normalizing feature values ensures they are on the same scale, preventing numerical features from dominating the model.

III. OBJECTIVE

The major goal of revenue forecasting with Google Analytics data is to use the platform's extensive insights into website traffic, user activity, and conversion metrics to accurately estimate and strategize future revenue streams. Businesses want to generate informed estimates that account for the various aspects influencing sales performance by leveraging the huge array of data points supplied by Google Analytics, such as demographics, geographic dispersion, referral sources, and device usage trends. This involves combining Google Analytics data with other relevant sources such as sales numbers, marketing campaign performance measurements, and market trends to construct a comprehensive forecasting model. Businesses may use this integrated strategy to make data-driven decisions, optimize marketing tactics, discover hidden development opportunities, and proactively minimize potential hazards.

Furthermore, revenue forecasting utilizing Google Analytics data allows for better resource allocation, budgeting, and strategic planning processes. It allows businesses to find opportunities for improvement in their marketing tactics, website design, product offerings, and customer interaction initiatives, ultimately increasing total income generation capabilities. Furthermore, the ability to monitor real-time data updates in Google Analytics enables organizations to adjust their estimates in reaction to changing market dynamics and consumer behaviors, ensuring agility and responsiveness in revenue management plans. Finally, revenue forecasting utilizing Google Analytics data is an essential tool for firms looking to achieve long-term growth, maximize profitability, and preserve competitiveness in today's dynamic business environment.

IV. METHODOLOGY

The suggested system uses gradient boosting algorithms such as CatBoost, XGBoost, and LightGBM to forecast whether or not a consumer would visit the business and estimate their expected earnings. The system separates the data into train and test frames based on a cooling period gap and classifies customers based on their appearance in both frames. The categorization model predicts whether a consumer will visit the store, but the regression model forecasts their revenue. The system combines the projections and revenue estimates to provide a complete assessment of the customer's potential value. The models are deployed in a production environment and constantly monitored to ensure correctness and react to changing client behavior and trends. The predicted consequences include increased consumer segmentation, focused marketing techniques, and optimized resource utilization. The following is the step wise implementation .

1) UploadDataset():The UploadDataset() module uploads the dataset which is collected from kaggle competition “Google analytic revenue prediction” which is collected from Google Merchandise Store.It contains customer dataset and no.of transactions per customer.
2) Data Preprocess():The DataPreprocess() module handles the cleaning and preparation of the uploaded GoogleAnalytics data. This involves handling missing values,removing outliers, transforming categorical variables, and normalizing numerical features. Proper data preprocessing ensures that the machine learning algorithm receives high-quality input data, leading to more accurate predictions.
3) RunMLalgorithm(): This module trains the machine learning algorithm with preprocessed Google Analytics data. The algorithm used is determined by the data's specific requirements and qualities. Gradient boosting trees, random forests, and neural networks are three common revenue forecast algorithms. The module entails configuring hyperparameters, training the model, and assessing its performance using metrics such as Root Mean Squared Error.
4) UploadtestData(): This module uploads a separate dataset of recent Google Analytics data that will be used to test and evaluate the trained machine learning model. To avoid overfitting, do not use this dataset for training. The module consists of uploading the test data to the same cloud storage service as the training data.
5) Predict():The Predict() module utilizes the trained machine learning model to predict the revenue for each user in the test dataset. It processes each user's data through the model, generating a predicted revenue value. The module may also involve calculating additional metrics like prediction confidence

6) The Deploy() module puts the taught machine learning model into the production environment, allowing for real-time income estimates for new customers. This might mean making the model into a web service or integrating it with existing business intelligence tools.The deployment process guarantees that the model's predictive skills are ready for usage.

V. RESULTS AND DISCUSSIONS

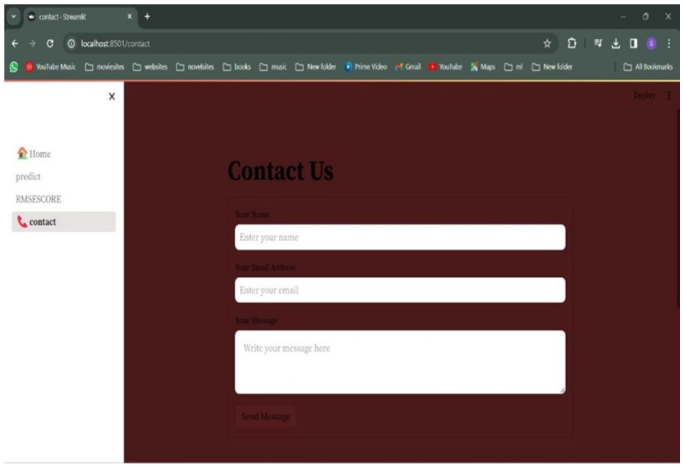


Fig.1.This is the home page of our model. If you click on predict you will have the following page on your screen

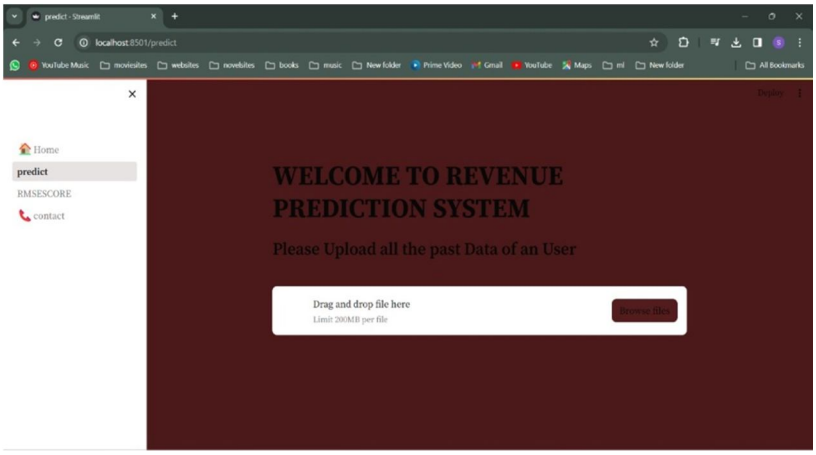


Fig.2. Select the file that contains the past data of user to know the revenue that is going to generate in future by that customer.

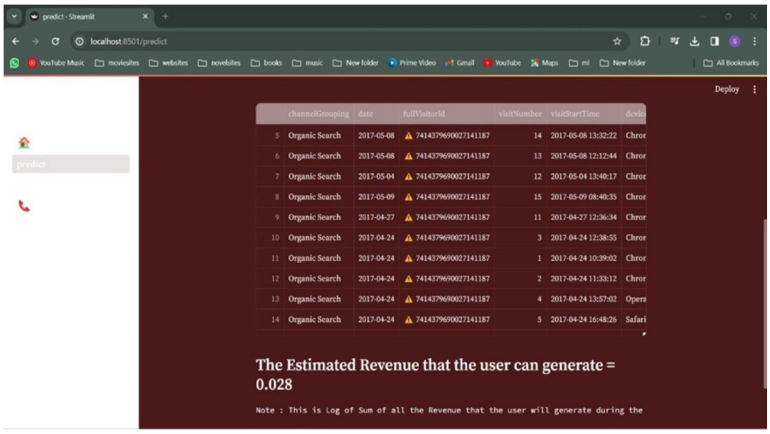


Fig.3. The file is uploaded and we can see the revenue generated by that customer is 0.028 .

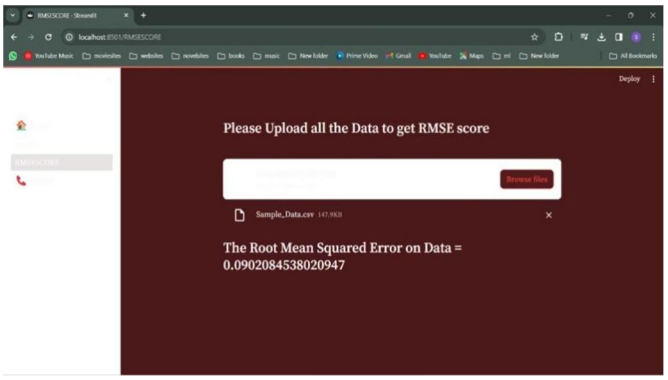


Fig.4. The RSME score of our model is 0.09020 which is lgbm model .

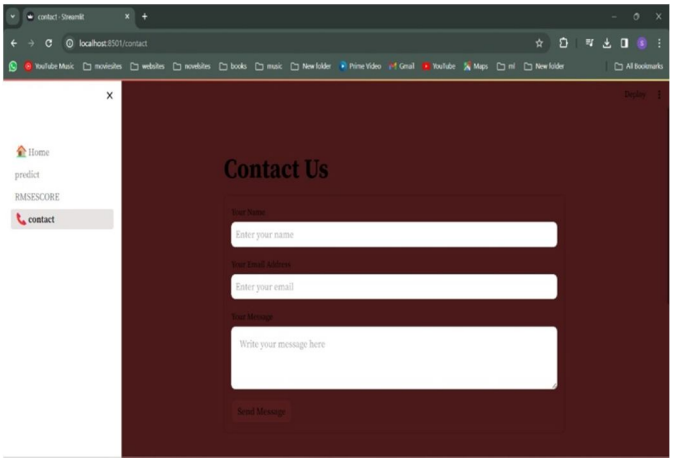


Fig.5(a)This is a Contact page ,you can contact u by sending messages to us through this form.

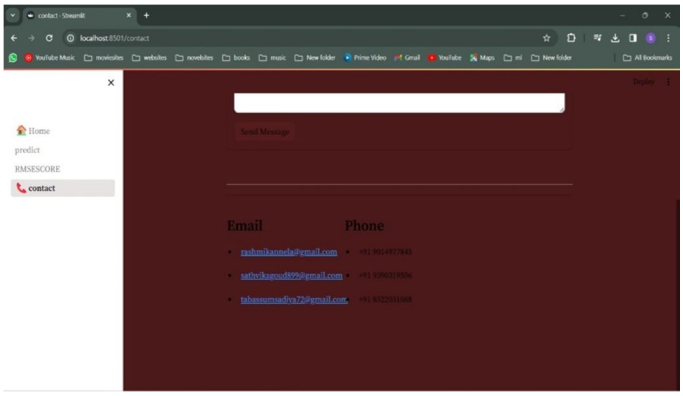


Fig.5(b).You can contact us by sending message directly to our gmail or mobile number.

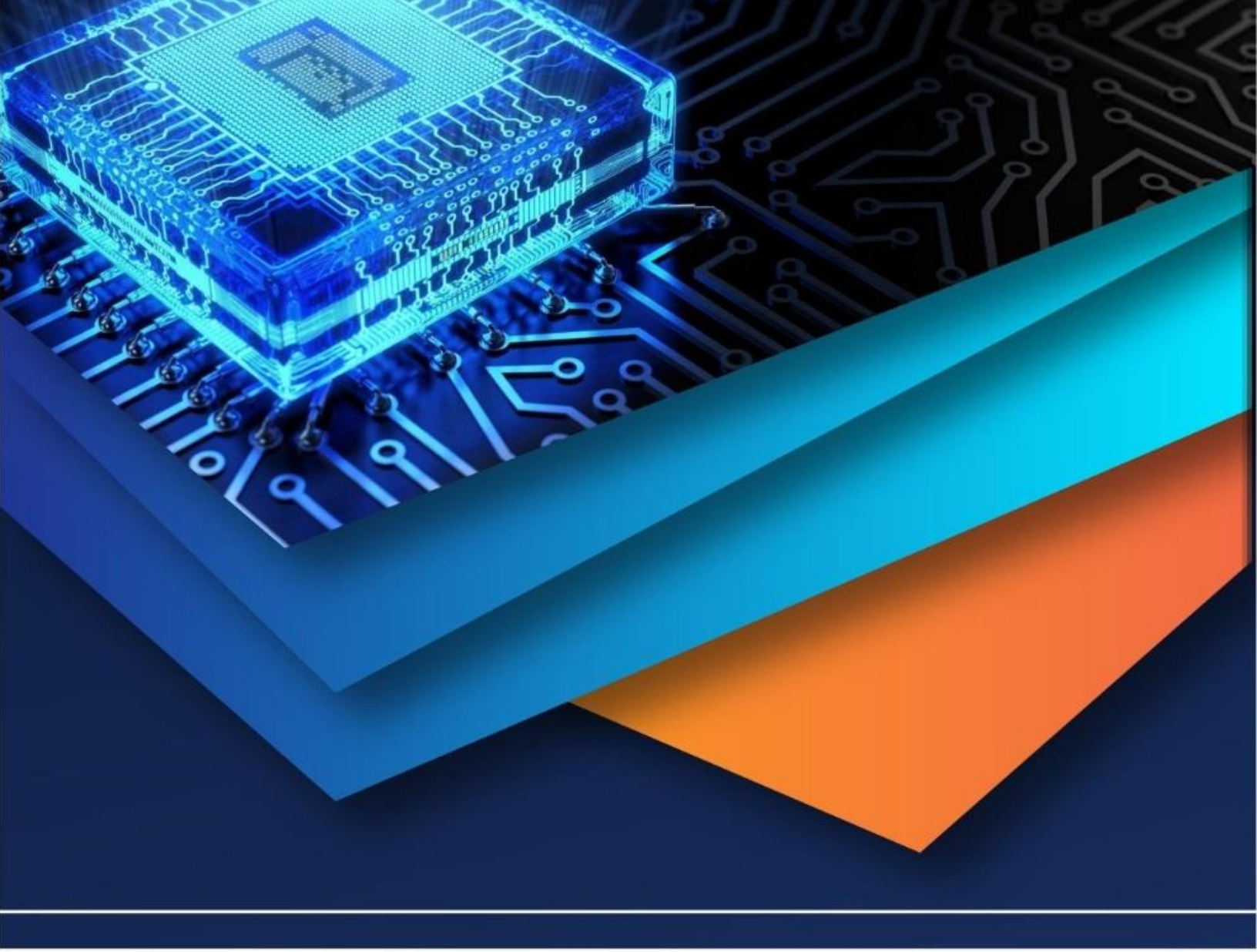
VI. CONCLUSION

In addition to revenue forecasting, using Google Analytics data provides businesses with a holistic approach to improving performance and driving growth. Beyond understanding consumer behavior and forecasting income streams, organizations can use this abundance of data to fine-tune marketing campaigns, improve user experience, and capitalize on new trends. Companies may find areas for development within their online platforms by looking into detailed analytics such as bounce rates, session lengths, and page interactions, resulting in higher conversion rates and, eventually, income. Furthermore, using Google Analytics data allows firms to perform in-depth segmentation analysis, allowing them to create targeted marketing campaigns for certain audience segments. This level of detail not only optimises marketing budget, but also fosters deeper client relationships through personalised interaction.

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