A
Mini-Project Report on

FINANCE PREDICTION TRACKER using regression ML

Submitted in partial fulfillment of the requirements
for the degree of
BACHELOR OF ENGINEERING
IN
Computer Science & Engineering Artificial Intelligence & Machine Learning

by

Krishna Dongre (22106089)
Tanveer Angane (22106057)
Anish Gawade (22106109)
Siddharth Chaurasiya (22106060)

Under the guidance of

Prof. Kanchan Wankhede

Department of Computer Science & Engineering
(Artificial Intelligence & Machine Learning)
A. P. Shah Institute of Technology
G. B. Road, Kasarvadavali, Thane (W)-400615
University Of Mumbai 2024-2025

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CERTIFICATE

This is to certify that the project entitled “Finance Tracker” is a bonafide work of Krishna Dongre (22106089), Tanveer Angane (22106057), Anish Gawade (22106109), Siddharth Chaurasiya (22106060) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of Bachelor of Engineering in Computer Science & Engineering (Artificial Intelligence & Machine Learning).

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Prof. Kanchan Wankhede	Dr. Jaya Gupta
Mini Project Guide	Head of Department

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Project Report Approval

This Mini project report entitled “Finance Tracker” by Krishna Dongre, Tanveer Angane, Anish Gawade and Siddharth Chaurasiya is approved for the degree of Bachelor of Engineering in Computer Science &Engineering, (AIML) 2024-25.

External Examiner: _____

Internal Examiner: _____

Place: APSIT, Thane

Date:

Declaration

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Krishna Dongre	Tanveer Angane	Anish Gawade	Siddharth Chaurasiya
(22106089)	(22106057)	(22106109)	(22106060)

ABSTRACT

This project introduces a Finance Prediction Tracker designed to analyze a company's financial records and predict next year's revenue using machine learning (ML) models. The system leverages historical financial data to generate accurate revenue forecasts. Additionally, the tracker includes dynamic visualizations, such as graphs and pie charts, to clearly present financial trends and projected outcomes. By continuously analyzing company financial records and updating predictions, the tracker serves as a powerful tool for informed financial planning and decision-making. The tool is user-friendly and adaptable, allowing businesses of various sizes to tailor predictions to their specific needs. Future enhancements could further improve accuracy and expand its predictive capabilities to other financial metrics.

Keywords: Revenue Prediction, Company Finance, Data Visualization, Business Intelligence.

Index

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

In today's rapidly evolving financial landscape, accurate forecasting and effective tracking of financial performance are critical for informed decision-making and strategic planning. A Finance Tracker and Prediction system serves as an indispensable tool for businesses and investors by providing insights into past performance and projecting future financial outcomes. A Finance Tracker continuously monitors and records financial data, such as revenue, expenses, cash flow. By maintaining a comprehensive and real-time record of these variables, the system helps organizations track their financial health.

On the predictive side, a Finance Prediction system utilizes historical financial data and various analytical methods to forecast future financial performance. Leveraging statistical models and machine learning techniques, it provides projections for metrics such as next year's revenue, growth rates These predictions aid in budgeting, financial planning, and risk management, allowing stakeholders to anticipate future challenges and opportunities.

Integrating tracking and prediction capabilities, such systems offer a holistic view of financial performance. They combine real-time data with forward-looking insights, empowering businesses to make data-driven decisions, optimize financial strategies, and achieve long-term goals. As financial environments become increasingly complex, the ability to track and predict effectively is vital for maintaining competitive advantage and ensuring sustainable growth.

Key Benefits:

- Financial Tracking: Monitors real-time data on revenue, expenses, and cash flow, helping organizations assess financial health, identify trends, and detect anomalies.
- Data Visualization: Uses graphs and pie charts to present complex data in an intuitive format, enhancing quick decision-making and understanding.
- Financial Prediction: Applies statistical models and machine learning to forecast future revenue and market trends, aiding in budgeting and risk management.
- Strategic Advantages: Integrates real-time tracking with forward-looking predictions to offer a comprehensive view.

- Adaptability: Provides customizable features and user-friendly interfaces, allowing businesses to tailor the system to their specific needs and make complex data more accessible.

By seamlessly integrating these functionalities, Finance Trackers and Prediction systems empower organizations to not only manage their current financial performance but also anticipate future trends and challenges. This holistic approach enhances decision-making processes, optimizes financial strategies, and ensures sustained growth and resilience in a dynamic economic environment.

CHAPTER 2

LITERATURE SURVEY

2. LITERATURE SURVEY

2.1-HISTORY

The evolution of Finance Tracking and Prediction systems has been shaped by advancements in financial management practices and technology over the past several decades. Initially, financial management relied on manual bookkeeping and basic accounting, with forecasting based on simple extrapolation of historical trends. The 1960s brought the introduction of computerized accounting systems, which improved data processing and accuracy, while early statistical methods like regression analysis began to enhance financial forecasting.

In the 1990s, the advent of Enterprise Resource Planning (ERP) systems integrated various business processes, including finance, providing real-time data access and more comprehensive analysis. This era also saw the incorporation of more complex statistical models into financial forecasting, supported by better data availability and computing power.

The early 2000s introduced Business Intelligence (BI) tools, which improved data visualization and reporting, making financial data more actionable. Concurrently, machine learning began to be applied to financial data, offering predictive capabilities beyond traditional methods. The 2010s further advanced these systems with the integration of big data and advanced analytics, enabling real-time processing and more accurate predictions. Machine learning and AI became central to financial forecasting, capturing complex relationships in financial data.

Today, Finance Tracking and Prediction systems are highly sophisticated, integrating real-time data, machine learning, and AI to provide comprehensive insights. Current trends focus on enhancing predictive accuracy, integrating diverse data sources, and improving user interfaces. The literature reflects a clear progression from manual methods to advanced, data-driven systems that are becoming increasingly crucial for effective financial management and decision-making.

2.2. REVIEW

Machine learning techniques applied to financial market prediction

The search for models to predict the prices of financial markets is still a highly researched topic, despite major related challenges. The prices of financial assets are non-linear, dynamic, and chaotic; thus, they are financial time series that are difficult to predict. Among the latest techniques, machine learning models are some of the most researched, given their capabilities for recognizing complex patterns in various applications. With the high productivity in the machine learning area applied to the prediction of financial market prices, objective methods are required for a consistent analysis of the most relevant bibliography on the subject. This article proposes the use of bibliographic survey techniques that highlight the most important texts for an area of research. Specifically, these techniques are applied to the literature about machine learning for predicting financial market values, resulting in a bibliographical review of the most important studies about this topic. Fifty-seven texts were reviewed, and a classification was proposed for markets, assets, methods, and variables. Among the main results, of particular note is the greater number of studies that use data from the North American market. It was concluded that the research theme is still relevant and that the use of data from developing markets is a research opportunity. [1]

Financial Tracker using NLP

NLP (Natural Language Processing) is a mechanism that helps computers to know natural languages like English. In general, computers can understand data, tables etc. which are well formed. But when it involves natural languages, it's unacceptable for computers to spot them. NLP helps to translate the tongue in such a fashion which will be easily processed by modern computers. Financial Tracker is an approach which will use NLP as a tool and can differentiate the user messages in various categories. the appliance of the approach will be seen at multiple levels. But when it involves business view, loan recovery from customers becomes a really important & crucial aspect. As a business we will find the user’s messages from their inbox (after taking permission from the users). These messages are often filtered using NLP which might help to differentiate various types of messages within the user's inbox which might further be used as a content for further prediction and analysis on user’s behaviour in terms of cash related transactions. [2]

Prediction of Financial Crisis with Artificial Neural Network: An Empirical Analysis on Turkey

Prediction of economic crisis, financial distress or bankruptcy has attracted great deal of attention in financial literature and in many other fields among the researchers over the past few decades. Although there are a variety of different methods that can be used to predict the future financial crisis, due to the complexity of the existing factors, prediction of financial crisis is a very difficult case. With the advent of Artificial Neural Networks (ANNs), researchers had the chance to solve various problems in finance. ANN approach is the application of artificial intelligence, which has been improved by the simulation of cognitive learning process of human brain. In this study, a monthly dataset covering the period of 1990 and 2014 that belong to the Turkish economy will be used. The purpose of this study is to develop an early-warning system to predict financial crisis. To realize this aim, multi-layered feedforward neural networks (MLFNs) will be used. By using monthly data of 7 key macroeconomic and financial indicators of Turkish economy during 1990 and 2014, we find that predictive power of ANN is quite striking. Our outof-sample forecasts indicate that the Turkish economy remains at high risk due to major negative developments and potential political instability between 2014 and 2016. [3]

Financial indicators tracker application (FIT)

The Internet has become a source of vast range of financial information from financial institutions. The existing financial data provider such as Google finance, Yahoo finance, Bloomberg and Reuters are those leaders in providing financial data for all company in the world. Currently, these providers only provide financial data without any financial analysis. In order to do a financial analysis, users would have to browse the web sites of these providers and calculate manually the financial ratios. The ratios provided in this application will identify the financial performance of the PLCs. The requirements of this application are given by Bursa Malaysia. For the scope of the project, ten financial ratios were identified for this application. These ten financial ratios are considered as among the important ratios in determining the performance of a company. The significance of this application is that it allows users to compare financial ratios of PLCs. The application ease the users to compare these ratios and assist them in deciding which companies stocks that they want to pursue. [4]

CHAPTER 3

Problem Statement

3. Problem Statement

Businesses and investors today face substantial difficulties in accurately managing and forecasting their financial performance. Conventional forecasting methods, which often rely on static models and historical data, struggle to account for sudden market changes and new trends, leading to inaccurate revenue predictions and suboptimal financial planning. Additionally, real-time tracking of financial metrics is frequently inadequate, causing delays in identifying trends and responding to financial anomalies. The sheer volume and complexity of financial data make it challenging to derive meaningful insights, particularly in the absence of effective visualization tools. Moreover, the lack of integration between tracking and prediction systems results in fragmented insights, limiting the ability to make comprehensive and strategic decisions. Without a unified approach, businesses risk losing competitive advantage and may fail to anticipate critical financial risks. There is a clear need for a Finance Tracker and Prediction system that combines real-time financial tracking with advanced predictive analytics and intuitive visualizations, providing a comprehensive solution to these challenges.

CHAPTER 4

EXPERIMENTAL SETUP

4.1. Hardware Setup

Development Machine: Processor: Intel Core i5 or higher

RAM: 8GB minimum (16GB recommended)

Storage: 256GB SSD (512GB recommended for smoother data operations)

GPU: Not necessary but having one can aid in faster model training.

Internet Connectivity: Required for installing software libraries and accessing data sources.

Deployment Infrastructure: Cloud Server: For hosting the backend server, we use Fly.io to ensure efficient backend processing.

Frontend Deployment: The frontend is hosted using Versa for better access and interaction.

4.2. Software Setup

Programming Language: JavaScript (Node.js for the backend and React.js for the frontend), Python (for the machine learning model).

Development Tools: Node.js: For backend development.

React.js: For frontend development.

TypeScript: For ensuring type safety in JavaScript.

Redux Toolkit: For managing application state.

Material UI: For designing the frontend interface.

Regression.js: Used for implementing the regression model for financial prediction.

D3.js or Chart.js: For data visualization.

MySQL: For the database management system to store and query financial data.

Fly.io: For backend deployment.

Versa: For frontend deployment.

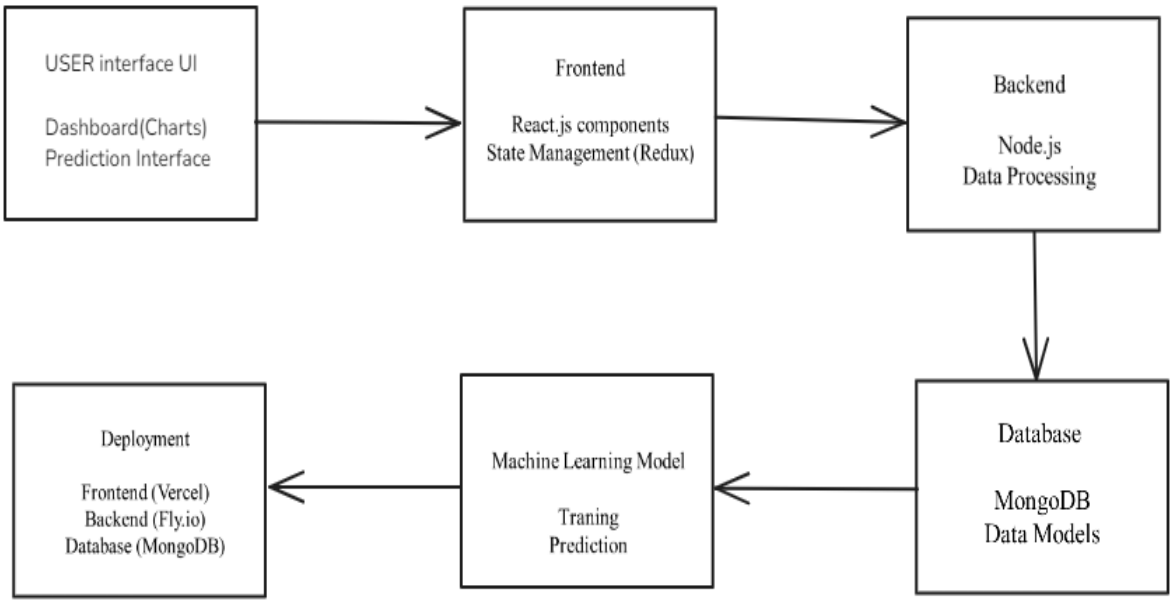
Machine Learning Tools:

Scikit-learn (Python): For regression models and data preprocessing.

CHAPTER 5

Proposed System & Implementation

5.1. Block Diagram



5.2. Description Of Block Diagram

1. User Interface (UI):

Components:

- Dashboard: Displays charts and data visualizations.
- Prediction Interface: Allows users to input data and receive predictions.
- Role: Acts as the primary interaction layer where users can access the frontend features such as viewing dashboards or inputting data for predictions.

2. Frontend:

- React.js for UI components.
- State management using Redux for handling complex UI state.
- Role: Responsible for rendering the user interface and managing the state of the application. It communicates with the backend to fetch or send data related to the machine learning predictions or dashboard displays.

3. Backend:

- Node.js for handling server-side logic.
- Role: Performs data processing by managing requests from the frontend and interacting with the machine learning model and database. It routes data to the appropriate model for predictions and stores relevant data into the database.

4. Database:

- MongoDB for managing data models.
- Role: Stores and retrieves data such as user inputs, prediction results, and historical data for further processing by the machine learning model. It acts as a central repository for both the frontend and backend services.

5. Machine Learning Model:

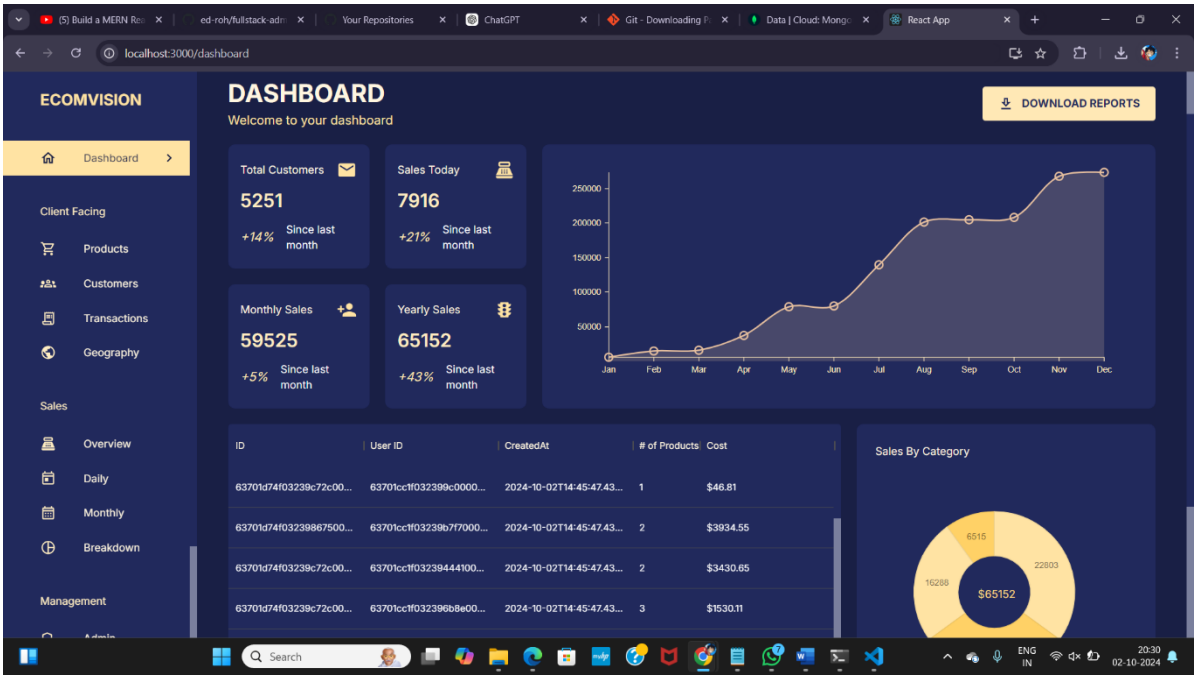
Functionality:

- Training: Responsible for training the model with the data retrieved from the database.
- Prediction: Based on user input and previously trained data, the model generates predictions.
- Role: Provides insights and predictions based on the trained data, which are displayed in the frontend's prediction interface.

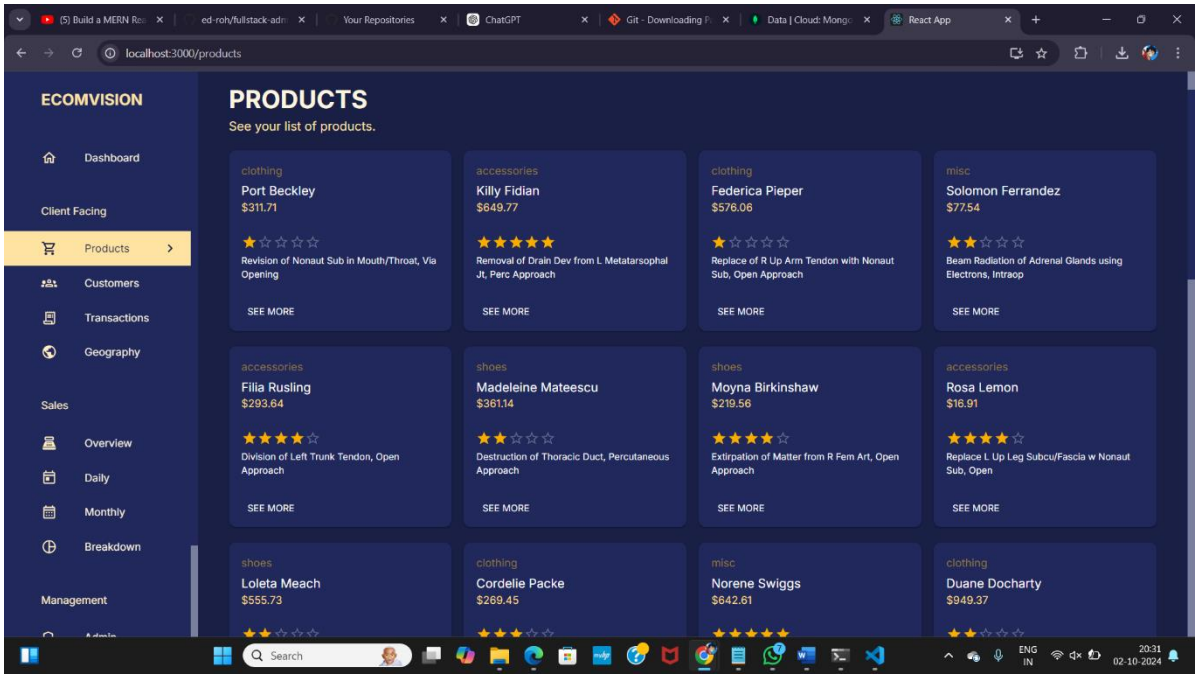
6. Deployment:

- Technologies:
  - Frontend deployed on Vercel.
  - Backend deployed on Fly.io.
  - Database hosted on MongoDB.

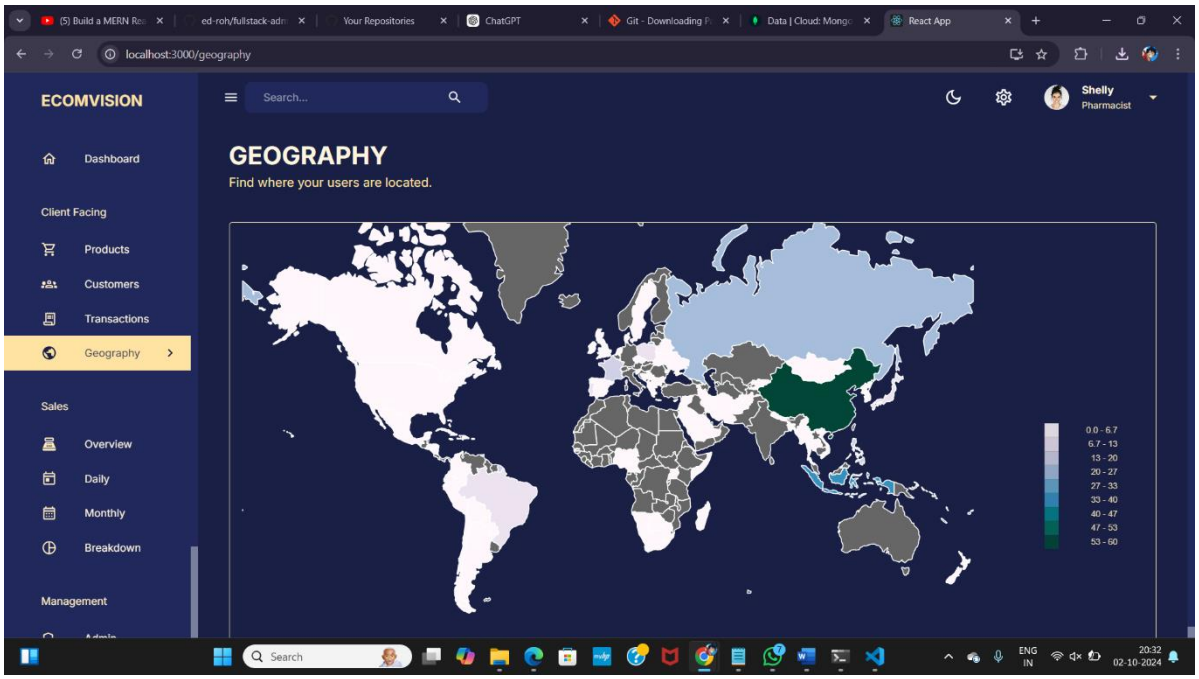
5.3. Implementation



5.3.1. Dashboard



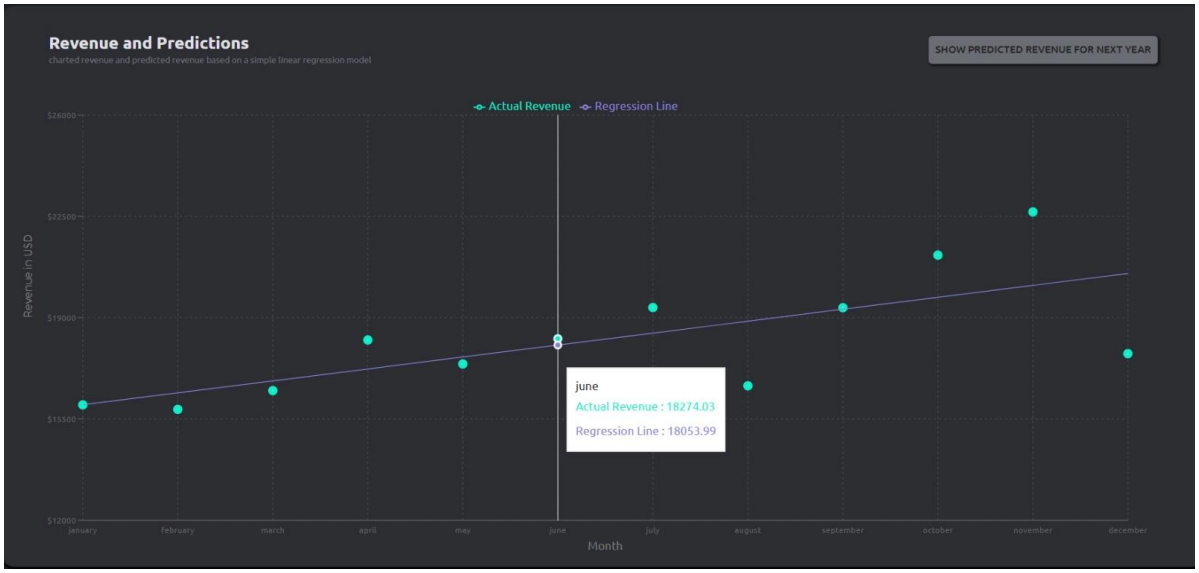
5.3.2. Products



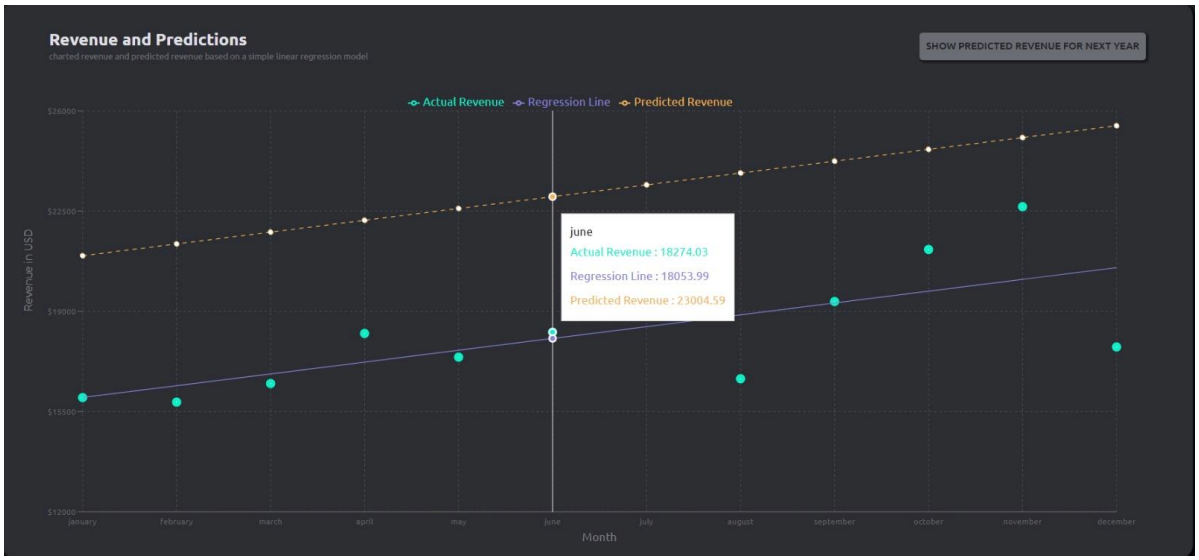
5.3.3. Number of Sales in Countries

5.3.4. Pie-chart

5.3.5. Monthly Sales Graph



5.3.6. Before Prediction



5.3.7. After Prediction

CHAPTER 6

CONCLUSION

6. CONCLUSION

The Finance Tracker project successfully integrates financial tracking with predictive analytics to provide users with valuable insights into future revenue trends. By leveraging machine learning models, the system provides accurate and dynamic predictions based on historical financial data. The use of data visualization tools enhances the user experience, making complex financial information accessible and easy to understand.

The project demonstrates the importance of real-time financial monitoring and predictive modeling for businesses. With future developments, the system could expand to include additional financial metrics and improve predictive accuracy, making it a robust tool for financial decision-making.

Future enhancements could include integrating more advanced machine learning algorithms, such as decision trees or neural networks, and incorporating other business intelligence tools to further aid financial forecasting and analysis. This project lays a strong foundation for further exploration in the realm of financial predictions and analytics using modern web technologies and machine learning.

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