Data Dashbroad

Team 127

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Targeting complex data issues, our MVP empowers decision-making through insights.

Introduction

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Problem Statement

Current data landscape presents complexities hindering pattern recognition and informed decision-making.

Problem Statement

Complex Data

Managing diverse, unstructured data hampers effective pattern recognition.

Pattern Recognition

Difficulty discerning crucial patterns within complex datasets.

Dependency Understanding

Limited grasp of interdependencies among factors.

Decision Challenges

Struggles in making informed decisions due to data complexity, hindering valuable insights.

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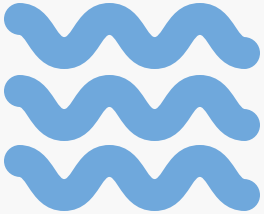
Solution Overview

Utilizing linear regression for sales prediction, correlation analysis, and AI-driven interactive models to empower dynamic visualizations and predictive insights in retail.

Solution Overview



Linear Regression for Sales Prediction

Utilizing historical data to predict future sales using linear regression models.

Benefits: Helps retailers anticipate demand fluctuations and optimize inventory levels.

Solution Overview

Correlation Analysis

Statistical technique to measure the strength and direction of linear relationships between variables.

Importance: Provides insights into how variables are related, aiding in decision-making.

AI-Powered Interactive Models

Creating interactive charts allowing users to manipulate parameters and observe real-time changes.

Innovative Features: Dynamic visualization, interactive predictions, user-friendly interface and more.

04

Methodologies

Explaining the linear regression model's architecture, components, technology stack, and training methods for accurate predictive analysis.

Methodologies

Model Architecture

Linear regression utilizes a simple yet effective structure, involving a single output variable dependent on one or multiple input variables. The model's architecture follows the linear relationship between input and output, aiming to minimize prediction errors.

Key Components

The key components encompass coefficients (weights) and the bias term, determining the linear equation's slope and intercept. These elements collectively define the model's predictive power.

Methodologies

Technologies Used

Implementation involves Python programming with libraries like NumPy, Pandas, and Scikit-learn ...

Training and Validation

The model undergoes training using historical data, adjusting weights and biases iteratively to minimize error through techniques like gradient descent. Validation involves assessing model performance on unseen data to ensure accuracy and generalization.

05

Core Functionality

Dynamically predict, visualize, and strategize for informed decision-making.

Core Functionality

Interactive Prediction

- Users can input various parameters to generate real-time predictions.
- Ability to modify input variables and observe instant changes in predicted outcomes.

Dynamic Visualization

- Presenting data and predictions through dynamic, customizable visualizations.
- Users can manipulate visualization settings for better insights.

User-Friendly Interface

- Intuitive interface design for effortless navigation and interaction.
- Prioritizing user experience by ensuring ease of use and accessibility.

Forecasting and Planning Tools

- Tools enabling users to forecast trends and plan strategies based on predictive insights.
- Providing features for scenario analysis and decision support.

Performance Metrics

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Performance Metrics encompassing prediction accuracy, user interaction, visualization effectiveness, scalability, and user satisfaction.

Performance Metrics

$$MAE = \frac{1}{N}\sum_{i=1}^{N}|y_i - \hat{y}|$$

$$MSE = \frac{1}{N}\sum_{i=1}^{N}(y_i - \hat{y})^2$$

$$RMSE = \sqrt{MSE} = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(y_i - \hat{y})^2}$$

$$R^2 = 1 - \frac{\sum(y_i - \hat{y})^2}{\sum(y_i - \bar{y})^2}$$

Where,

$\hat{y}$ – *predicted value of* y

$\bar{y}$ – *mean value of* y

Source: Link

Prediction Accuracy

MAE, RMSE, and R-squared for precision assessment.

Interactivity Metrics

Session duration, user interaction frequency.

Visualization Effectiveness

Feedback, click-through rates.

Scalability

Response time, resource usage.

User Adoption

Active users, usability feedback.

07

Timeline And Roadmap

Roadmap includes Front-end, Back-end, and Modeling stages for structured project advancement.

Timeline And Roadmap

Front-end Development

- Phase 1:
  UI/UX Design & Prototyping.
- Phase 2:
  Front-end Implementation & Basic Functionality.

Back-end Development

- Phase 1:
  Database Design & Architecture Setup.
- Phase 2:
  Back-end Development & Integration.

Modeling Implementation

- Phase 1:
  Model Selection & Initial Development.
- Phase 2:
  Model Testing, Refinement & Deployment.

08

User Interface And Interaction

User-friendly interface with customizable features for seamless interaction.

User Interface And Interaction

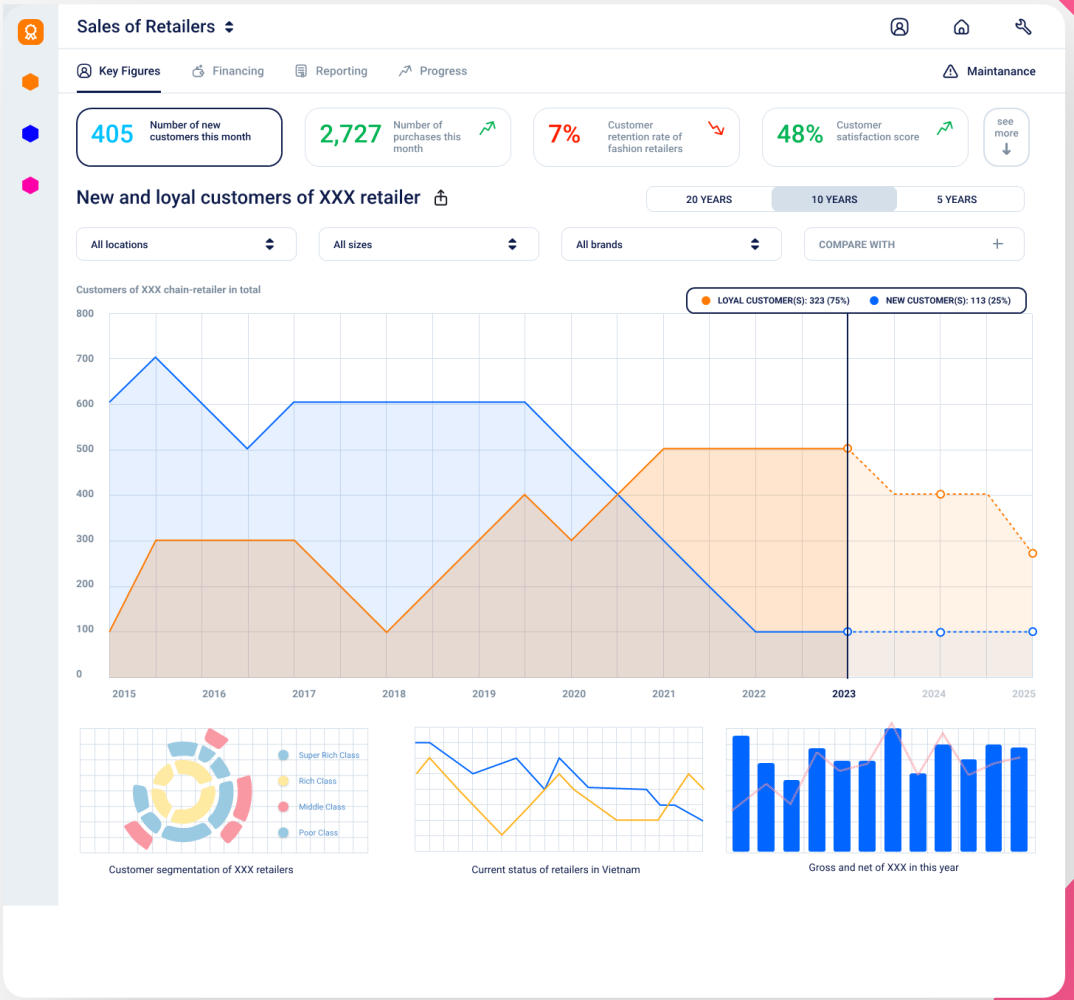
UI Design

Intuitive Layout: User-friendly design for ease of navigation.
Visual Hierarchy: Organized information hierarchy for clear understanding.
Interactive Elements: Engaging features for user interaction.

Functionality

Parameter Manipulation: Interactive tools allowing users to input, drag & drop and adjust variables.
Real-time Updates: Immediate display changes based on user inputs.
Customization Options: Ability for users to personalize views and settings.

User Interface And Interaction



09

Limitations And Future Enhancements

Enhance feature selection algorithms to overcome current limitations.

Limitations And Future Enhancements

Limitations

Integration challenges with diverse external tools.

Scope restrictions in handling extensive datasets.

Future Enhancements

Implementation of automated feature selection algorithms to identify influential variables for users.

Implementing advanced algorithms for precise feature selection.

Enhancing compatibility with a wider range of external tools.
Streamlining user experience and improving scalability.

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Conclusion

The MVP offers precise predictions, interactive functionality, and automated variable selection, promising impactful benefits for strategic optimization.

Conclusion

Summarizing key aspects, the MVP effectively tackles complex data processing challenges and facilitates data-driven decision-making. Through accurate predictions, interactive capabilities, and automated variable selection, this project establishes a robust platform for optimizing business strategies and enhancing data-driven decision-making. With continuous improvement and adaptability, the AI solution promises substantial benefits for organizations, from efficient forecasting to inventory optimization and shaping future strategies.

Thanks!

Thank you for your attention and dedication to our project's journey!