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| RAZDA Co. | | |
| **Filename: [site\_analytics.py]** | | |
| **Summary***:*  This file is responsible for handling the entire analytics framework for Razda Market. By providing insights into user engagement, conversion rates, sales trends, product performance, customer retention, and traffic sources, it empowers administrators to make data-driven decisions to improve platform performance. It also supports graphical representations of the data, offering enhanced visualization of key metrics. site\_analytics.py is essential for business intelligence within Razda Market, enabling the identification of user behavior patterns, sales trends, and customer loyalty. | | |
| ***Processes*** | | |
| * **User engagement Analysis** | * **Evaluates user engagement metrics (e.g., page views, unique visitors, session durations) over specified date ranges to assess visitor activity.** | |
| * **Conversion Rate Calculation** | * **Calculates conversion rates by comparing site visits with completed orders, providing insights into how effectively visits turn into sales.** | |
| * **Sales Trends Analysis** | * **Analyzes sales trends across daily, weekly, or monthly intervals, offering insights into revenue patterns and seasonal demand.** | |
| * **Product Performace Tracking** | * **Measures the sales performance of individual products, tracking units sold, total revenue, and average selling price to gauge product popularity.** | |
| * **Top Products Identification** | * **Lists the top-selling products by revenue, highlighting the most profitable items over a specified period, aiding in product-focused strategies.** | |
| * **Customer Retention Analysis** | * **Examines customer retention rates, measuring the percentage of repeat customers, which is essential for understanding customer loyalty.** | |
| * **Traffic Source Analysis** | * **Determines traffic sources that contribute to site visits, allowing administrators to optimize marketing efforts based on source effectiveness.** | |
| * **Data Visualization** | * **Generates visual representations (line, bar, pie charts) of key metrics, enabling administrators to interpret data trends and make informed decisions.** | |
| **Files it Gets Information From:** | | **Files it Sends too:** |
| * **Environment Variables** (.env): For database credentials (DB\_HOST, DB\_USER, DB\_PASSWORD, DB\_NAME) | | * **Logging File**: Logs all analytics actions, errors, and outcomes to site\_analytics.log for audit and troubleshooting. |
| * **Database (MySQL)**: Interacts with tables such as user\_sessions, orders, order\_items, products, site\_visits for data extraction and processing. | | * **Console Output**: Displays analytics data summaries and alerts for admin review and decision-making. |
|  | | * **Image Files**: Saves generated plots (e.g., sales trends, traffic source pie charts) as PNG files for offline viewing and analysis. |
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| **Expected input into file:** | | **Expected output from file:** |
| **Environment Variables**: Access to database connection details.  ‘’’python  DB\_HOST, DB\_USER, DB\_PASSWORD, DB\_NAME  ‘’’  **User Input (CLI)**: Command-line inputs for date ranges, product IDs, and interval selection for each analytical process. | | **Logging Output**: Records all major analytics functions, like engagement analysis, conversion rates, and top products list.  ‘’’python  logging.info("Generated user engagement analytics")  ‘’’  **Database Results**: Query results from MySQL to support analytics and summaries.  **Graphical Plots**: Saves images for visualization of trends and patterns in specified formats (e.g., bar, line, pie charts). |
| **Things that need to be taking place:** | | |
| |  | | --- | | **● Database Connection: Establishes a secure connection with MySQL to pull analytics data directly from tables like user\_sessions, orders, and products.** |  |  | | --- | | **● Input Validation: Verifies dates, intervals, and other inputs to prevent invalid data entries, ensuring accuracy and consistency in analytics reporting.** |  |  | | --- | | **● Data Aggregation: Aggregates data (e.g., total revenue, page views) over time intervals, providing high-level insights without displaying raw data, which enhances data readability.** |  |  | | --- | | **● Data Visualization: Creates bar, line, and pie charts to visually represent key metrics, aiding administrators in interpreting complex data patterns.** |  |  | | --- | | **● Logging and Auditing: Logs all analytics operations and errors for traceability and post-analysis review, ensuring that the analytics process is transparent and accountable.** |  |  | | --- | | **● Error Handling: Manages database connection errors and SQL query failures gracefully, ensuring the application remains operational even if analytics retrieval fails.** |  |  | | --- | | **● Report Customization: Provides flexibility in report generation, such as choosing top-selling products or sales trends over different intervals, enabling customized insights.** |  |  | | --- | |  | | | |
| Edit log (update each time you make changes to doc or file). | | |
| Contribution to the Entire Project:  The **site\_analytics.py** file is a powerful analytical tool that supports Razda Market's data-driven strategy. Through various analyses, including user engagement, conversion rates, and customer retention, this file enables administrators to make strategic decisions aimed at improving the customer experience and increasing revenue. By tracking trends and visualizing key metrics, it offers insights into customer behavior, product performance, and market demand.  These analytics serve as a foundation for optimizing Razda Market’s operational strategies, from inventory management to marketing efforts. By identifying high-demand products, tracking returning customer rates, and understanding the most effective traffic sources, administrators can make precise adjustments to enhance the platform’s competitive edge. The graphical outputs are especially valuable for presentations and business reports, offering stakeholders clear insights into site performance. | | |
| * Oliver Smith (Razda Admin) Nov 8, 2024: Developed core analytics functions, configured database integration, and enabled data visualization for enhanced insights. | | |