MTN Mobile Money Transaction Analytics

Title: MoMo Data Analysis – Group 32
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1. Introduction

The objective of our project was to process and analyze XML-formatted Mobile Money (MoMo) data to derive insights and build a frontend interface for visualization. The project integrated backend data parsing, data cleaning, storage in a relational database, and frontend development.

2. Project Approach

a. Data Extraction and Cleaning

- We used Python with **`xml.etree.ElementTree`** to parse ~1600 XML-based SMS messages.
- Key information extracted: **`amount`**, **`date`** and **`transaction_id`**.
- Regular expressions were applied to clean and normalize data.

b. Data Categorization

- Messages were categorized into:
    - Deposits
    - Withdrawals
    - Payments
    - Transfers
    - And others
- Categorization was based on keyword matching (e.g., "sent", "received", "buy", "deposit").

c. Database Design

- Used MySQL to create structured tables.
- SQLAlchemy was used for ORM integration with Python.

d. API and Frontend

- Created a Flask API for backend processing.

- Frontend built using HTML, CSS, JavaScript, and Chart.js for data visualization.

3. Challenges Encountered

- Some messages had missing or malformed fields; we had to write fallback parsers and validation checks.
- We implemented transaction ID checks to prevent duplication in the database.
- Dates came in multiple formats and required standardization using Python's `datetime` module.
- Coordinating file versions via Git was initially tricky. We resolved this by using Git branches and regular merge reviews.

4. Key Decisions

- **Modular Codebase:** We split the project into modules: extraction, transformation, API, frontend.
- **Regex-based parsing:** Chosen for flexibility over simple split methods.
- **Use of Flask:** Lightweight and easy to integrate with frontend and database.
- **Frontend Simplicity:** Focused on core visualizations like line charts and bar graphs to display transaction trends clearly.

5. Conclusion

The project was a valuable learning experience in handling real-world data, building full-stack applications, and collaborating as a team. Despite challenges, our solution successfully cleans, stores, and visualizes MoMo transaction data, enabling clear insights from unstructured SMS logs.

6. Appendix

- GitHub Repository: https://github.com/mutabazi-bruno/MoMo-Data-Analysis-Summative-Group-32