Project Proposal: Personalized Weighted Notification System for Duke Store

Project Title:
Personalized Weighted Notification System for Duke Store with Real-Time Logging

Project Description:
This project will develop a plug-and-play notification system tailored for Duke Store to deliver personalized notifications to customers. The system will leverage batch data (e.g., historical sales and product catalog data) and real-time streaming data (e.g., cart activity, search behaviour) to send timely and relevant notifications such as promotions, informational updates, clickbait content, and personalized recommendations. Notifications will be weighted based on advertisement revenue or business priorities, optimizing user engagement and monetization. Full logging of notifications and user interactions will be integrated with Elasticsearch, enabling Duke Store to monitor effectiveness and customer response in real time.

Preliminary Data Sources:

- Batch Data: Duke Store historical sales records, customer profiles, product catalog (internal store database or extracted snapshots)
- Streaming Data: Kafka streams capturing live user interactions such as cart additions, searches, and browsing behaviour
- Advertisement Revenue Data: Internal parameters tracking payment amounts related to ad placements for weighted notification prioritization

Preliminary Architecture and Steps:

1. Data Collection:
    - Import and preprocess batch data from Duke Store's transactional and product databases
    - Establish Kafka streaming for capturing real-time user interactions and generating signals for notifications
2. Notification Processing:
    - Classify notifications into promotional, informational, clickbait, and recommendation types based on user behaviour and business goals
    - Apply dynamic weighting on notifications reflecting revenue importance or strategic priorities
3. System Integration:
    - Backend APIs for notification generation, user profile management, and data processing
    - Frontend components embedded in Duke Store's web and mobile platforms for notification display
4. Logging and Analytics:
    - Continuous logging of notifications sent, user clicks, and interaction metrics into an Elasticsearch cluster

        - Real-time dashboards for monitoring notification performance and system health (via Kibana)

5. Deployment and Scaling:
    - Modular system design enabling rapid integration with Duke Store's existing infrastructure
    - Containerized deployment with Docker/Kubernetes for scalability and maintainability

Relevant Tech Stack:

- Data Streaming: Apache Kafka
- Backend: Python (FastAPI/Flask) or Node.js for APIs and notification processing
- Frontend: React.js embedded within Duke Store's web and mobile apps
- Data Storage: PostgreSQL or MongoDB for user profiles and notification metadata
- Logging/Monitoring: Elasticsearch and Kibana
- Containerization: Docker and Kubernetes for deployment

Ideal Team Member Backgrounds:

- Data Engineer: Specialized in streaming data and ETL pipelines, Kafka expertise
- Backend Developer: Experienced in scalable API development and real-time data processing
- Frontend Developer: Skilled in React.js and UI integration
- DevOps Engineer: Proficient in container orchestration and observability tools
- Data Scientist: Experience with personalization algorithms and weighted recommendation systems
- Business Analyst (optional): To align notification strategies with Duke Store marketing goals

This personalized weighted notification system will enable Duke Store to enhance customer engagement through tailored messaging while providing comprehensive logging and analytics to optimize marketing strategies and operational effectiveness.