AI-Driven Route Optimization and Supply Prediction Engine for Dairy Networks

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Problem Statement:

There exist critical inefficiencies in routing milk collection and daily supply forecasting in the Indian dairy supply chain. Milk collection vehicles ply on fixed routes irrespective of real-time conditions, leading to delays, fuel wastages, spoilage, and poor farmer satisfaction.

Moreover, the supply of milk largely varies due to seasonal changes, feed availability, weather patterns, and daily fluctuations. Many dairies face sudden shortages or excess milk, which causes disturbances in the operation of chilling centres and processing plants. Despite the presence of digital systems for measurement and tracking, the existing dairy ecosystem is devoid of an AI-enabled decision-making layer that can intelligently optimize routes and accurately forecast milk supply. This leads to increased operational costs, wastage, and poor resource planning.

Proposed Solution:

1. Milk Supply Prediction Model

It is an Artificial Intelligence-based forecasting engine that analyses historical and real-time data like weather, festivals, and market trends to predict the volume of milk expected from every collection centre.

Core predictions: quantity of milk; peak/low supply time; seasonality; and day-to-day variation.
Benefit: Allows for proactive planning for chilling capacity, tanker deployment, and processing schedules.

2. Smart Route Optimization Engine

This dynamic routing system uses current data, such as GPS, traffic and road conditions, and the forecasted milk volume to compute the most efficient routes for pickups.

Core Deliverables: Optimum pickup routes, ETA at each stop, alternative routes, and routes that are fuel-efficient.
Benefit: Ensures timely collection, minimizes spoilage, and reduces logistics costs.

3. Manager Dashboard + Alerts

A unified interface gives dairy managers a broad overview and real-time operational control. Manager View: Provides next-day forecasted volume, optimized route visualizations, real-time vehicle tracking, and alerts-overload/underload and delay warnings. Communication: Sends the updated pickup timings to farmers over SMS/WhatsApp.

Tech Stack:

AI & Machine Learning
- Python
- TensorFlow / PyTorch
- Scikit-learn
- Facebook Prophet for time-series forecasting
- XGBoost / Random Forest for regression

Impact of the Solution:

The implementation of this AI-driven solution assures value from end to end in the dairy supply chain, starting with Operational Efficiency in fuel cost reductions of 15–25%, a reduction in pickup time by up to 30%, and a decrease in spoilage risk by 5–10%. This is complemented by Better Resource Planning, utilizing predictive modelling to optimize chiller and tanker capacity and prevent stock imbalances. In addition, the system enhances Farmer Satisfaction through accurate pickup timings and reduced waiting; it also provides Kriti Labs with substantial Business Benefits, including a new premium, scalable AI module that generates recurring subscription revenue and establishes a strong competitive advantage.

Why This Company Inspired Me?

Kriti Labs inspired me because they focus on real, ground-level problems in the Indian supply chain. Unlike companies that only build software, Kriti Labs creates practical AI + IoT data solutions that directly help farmers, dairy cooperatives, and rural industries.