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A Smart Commercial Transport Platform-Tranzo

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Abstract

The commercial transport and logistics sector faces fragmentation, opaque pricing, under-utilized fleets, and lack of reliable tracking. Existing passenger-focused ride-hailing platforms have transformed passenger mobility but do not fully meet heavy-vehicle and commercial freight needs. This survey reviews techniques and technologies relevant for building an intelligent commercial vehicle booking platform — **Tranzo** — that integrates Artificial Intelligence (AI), Machine Learning (ML), Cloud infrastructure, GPS tracking, secure payments, and recommendation/dynamic-pricing engines. We summarize related work in dynamic pricing, fleet allocation, IoT and sensor integration, blockchain-based payments, and GPS/route optimization; identify key research gaps; describe Tranzo's proposed architecture and modules; and discuss expected outcomes and comparisons with existing solutions. The survey shows that an integrated AI/ML + cloud + GPS platform can significantly improve transparency, utilization, and reliability in commercial transport.

INTRODUCTION

Commercial vehicles (trucks, dumpers, cranes, trailers, tempos) form the backbone of construction, agriculture, retail, and supply chains. However, booking and managing these vehicles is often manual, brokerdriven, and inefficient. Customers face opaque pricing and uncertain availability; vehicle owners suffer long idle times and lack demand visibility. While passenger mobility has been modernized by platforms (e.g., Ola, Uber), commercial transport remains under-digitized.

Emerging technologies provide a pathway to modernize the sector. AI/ML enables demand forecasting, dynamic pricing, and recommendation systems; cloud platforms offer scalable services and data synchronization; GPS provides real-time tracking and ETA estimates; IoT sensors and telematics enable vehicle health monitoring; and blockchain can secure payments and contracts. An integrated platform — Tranzo — aims to synthesize these capabilities to create a transparent, scalable commercial transport ecosystem.

This paper surveys prior work relevant to such a platform, identifies research gaps, and articulates a practical system design and methodology for Tranzo.

RELATED WORK

A number of studies touch components essential to Tranzo:

1. Dynamic Pricing & Reinforcement Learning — Multi-agent deep reinforcement learning methods for vehicle dispatching demonstrate adaptive pricing models responsive to supply-demand conditions; these have

primarily targeted passenger mobility but are extensible to freight markets [1].

2. Fleet Allocation & Predictive Models — ML-based fleet allocation research shows demand-aware assignment improves utilization and reduces idle time; many works, however, focus on fleet optimization without full integration into booking/payment systems [2], [8].

3. Route Optimization & Traffic-aware Routing — AI approaches that leverage historical and real-time traffic data to recommend routes reduce delays and fuel consumption; adaptation to freight requires accounting for vehicle size, load, and delivery constraints [Zhao et al., 2022].

4. IoT and Telemetry in Logistics — IoT-enabled frameworks for monitoring vehicle health and cargo conditions improve preventive maintenance and reduce downtime; many implementations emphasize hardware telemetry rather than customer-facing booking features [4].

5. Blockchain for Freight Payments — Blockchain proposals for freight payments address trust and dispute resolution but do not solve allocation or tracking challenges directly [5].

6. Cloud & Scalable Architectures — Cloud integration studies emphasize data synchronization and scalability needed to support large numbers of concurrent bookings and telemetry streams [7].

7. VANETs and V2X Messaging — Research into vehicular ad hoc networks supports message dissemination and safety use cases; these approaches are complementary to, but distinct from, freight booking and management [3].

Collectively, the literature provides building blocks (pricing, allocation, telemetry, secure payments), but few works present a single, end-to-end system addressing booking, pricing, tracking, payments, and analytics for heavy/commercial vehicles.

SYSTEM ARCHITECTURE

The architecture of the proposed Tranzo platform has been carefully designed to address inefficiencies in existing commercial transport operations by dividing the system into welldefined modules. Each module performs a distinct role but works in seamless integration with others to ensure that the overall system remains transparent, efficient, and user-friendly. The modular design allows for scalability, flexibility, and the possibility of future upgrades as new technologies emerge. The following subsections provide a detailed explanation of the primary modules incorporated within the architecture of Tranzo. 1) User and Vehicle Registration Module The foundation of the system lies in a robust registration module that authenticates both customers and vehicle owners. Customers are required to provide personal details such as name, contact information, and valid identity verification, while vehicle owners register their fleet by submitting vehicle documents, insurance proofs, and load capacity specifications. By ensuring a structured and verified registration process, the system builds a secure and trustworthy ecosystem, minimizing risks of fraud or misuse. 2) AI-Powered Booking Module The booking module forms the core of the customer experience and integrates Artificial Intelligence to simplify and enhance the process. Instead of relying on manual negotiations or static pricing, the system leverages AI-driven algorithms to recommend the most suitable vehicle for a customer's needs. 3) Secure Payment Gateway Module Financial transactions in logistics often face challenges such as delays, disputes, and lack of transparency. To address this, Tranzo incorporates a secure multi-gateway payment system that supports popular methods such as UPI, debit/credit cards, wallets, and net banking. 4) GPS Tracking Module Transparency and accountability are further strengthened through the integration of GPS-based tracking in the system. Once a booking is confirmed, customers can monitor the real-time location of their assigned vehicle. This feature provides accurate estimated times of arrival (ETA), route visibility, and assurance regarding the safety of goods in transit. AI/ML Support Across Modules AI and ML play a crossfunctional role across all the above modules. In registration, ML models can flag suspicious activity or fraudulent registrations. In booking, AI-driven recommendation systems and demand forecasting optimize pricing and vehicle allocation. In payments, anomaly detection algorithms monitor for fraudulent transactions, while in GPS tracking, predictive models forecast delays and suggest alternate routes. In summary, the modular architecture of Tranzo integrates user-centric design with advanced technological components to build a reliable and intelligent platform. Each module addresses a specific inefficiency in traditional logistics systems, but their integration creates a unified ecosystem that is scalable, transparent, and future-ready. With strong AI/ML support.

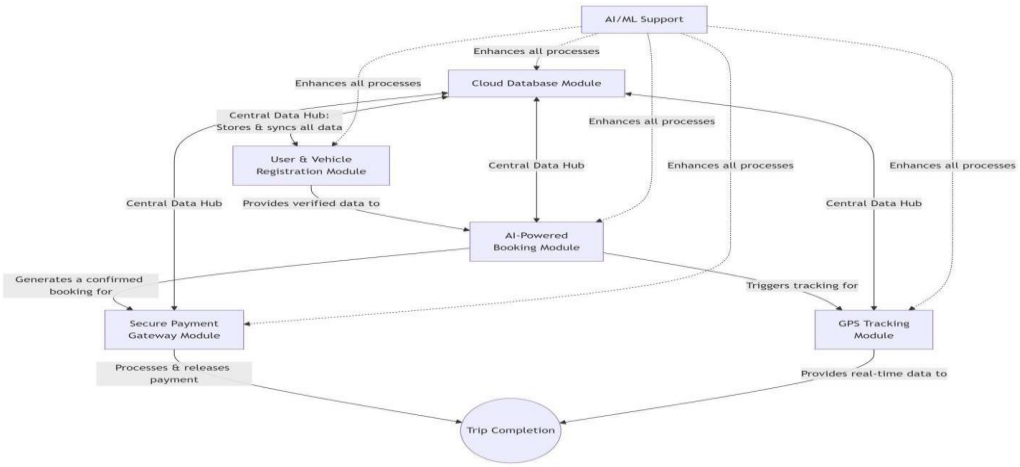

Fig. 1. System Architecture of Tranzo showing integrated modules such as Registration, AI-powered Booking, Secure Payment, GPS Tracking, Cloud Database, and AI/ML support.

CONCLUSION AND FUTURE WORK

Tranzo proposes a comprehensive platform to modernize commercial vehicle booking by integrating AI/ML, cloud services, GPS telemetry, and secure payments. The literature shows that while many component technologies exist (dynamic pricing, IoT telemetry, blockchain payments), an end-to-end system tailored for heavy and commercial freight is missing. Tranzo's modular design addresses this by combining registration/verification, AI-driven booking and pricing, robust tracking, and analytics.

Future work / research directions:

- Deploying and evaluating RL-based dynamic pricing in live markets.
- Enhancing recommendation models using richer telematics and contextual data.
- Integrating offline-capable telemetry for intermittent-connectivity regions.
- Exploring blockchain smart contracts for escrow and dispute resolution.
- Creating open datasets for commercial vehicle demand to foster benchmarking.

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