Fair Fare

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Abstract - The Fair Fare project is a technologically advanced, cross-platform solution dedicated to establishing equitable and transparent pricing within the transportation industry. The core value proposition is tackling the unpredictability and opacity of current dynamic pricing systems by calculating and presenting a verifiable "Fair Fare." The application is built using Flutter, which enables a single, efficient codebase for native mobile deployment (iOS/Android) and ensures a consistent, user-friendly experience across all devices. The robust and scalable backend is powered by Firebase, providing essential services like user authentication, real-time database capabilities (Firestore) for swift data synchronization between users and service providers, and cloud functions for executing the complex, proprietary fair-fare calculation logic securely on the server.

Key Words: optics, photonics, light, lasers, templates, journals
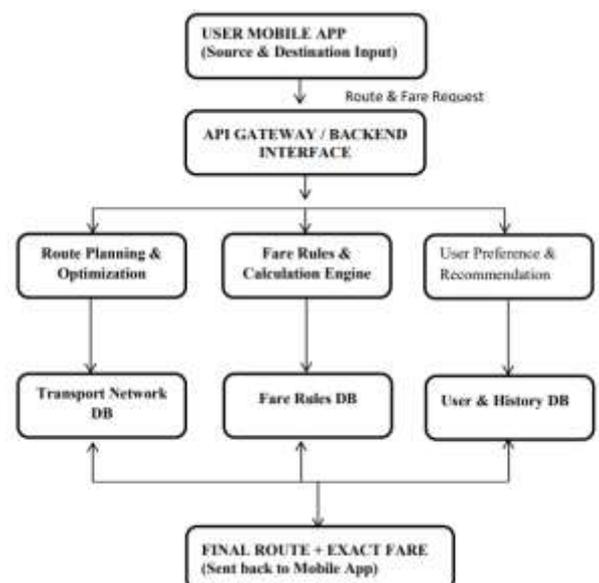
1.INTRODUCTION

The Fair Fare project introduces a dedicated solution aimed at fundamentally reforming the pricing structure within the modern dynamic transportation sector. Current market conditions, dominated by high-growth ride-sharing and service platforms, often utilize proprietary, nontransparent pricing algorithms. These "black box" mechanisms—commonly resulting in practices like 'surge' or 'dynamic pricing'—lead to significant price volatility, inconsistency, and a pervasive atmosphere of consumer distrust. This volatility often sees users paying vastly different amounts for identical services, fostering an environment where prices are perceived as arbitrary rather than economically justified..

2.PROBLEM STATEMENT

The current urban paratransit sector, particularly regarding auto-rickshaws and independent taxis, is severely hindered by a persistent lack of pricing transparency that fosters a deep trust deficit between service providers and commuters. This systemic inefficiency arises from the bifurcation of fare calculation into two flawed models: rigid static metering and arbitrary verbal negotiation. Static meters, regulated by infrequent government updates, often fail to account for real-time dynamic variables such as unexpected traffic congestion or route deviations, thereby economically penalizing drivers for their time and fuel. Conversely, the alternative mechanism of verbal negotiation is predicated on information asymmetry, leaving passengers—particularly those unfamiliar with local geography—vulnerable to price gouging and exploitation. While modern digital aggregators have attempted to standardize pricing, their proprietary "black box" algorithms introduce a new layer of opacity, where dynamic surge pricing is often perceived as manipulative rather than reflective of actual operational costs. Consequently, the ecosystem currently lacks a verifiable, neutral arbitrator capable of synthesizing objective travel data into a justified cost. The absence of such a system results in frequent operational friction, daily verbal conflicts, and a reluctance among traditional drivers to adopt digital tools, thereby necessitating the development of a transparent, auditable fare estimation framework that ensures economic fairness and clarity for all stakeholders.

Fig 1: System Architecture

IV. PROPOSED MODEL MECHANISM

The proposed model mechanism of the Fair Fare system is designed to eliminate the opacity found in conventional dynamic pricing models by introducing a transparent, data-driven, and verifiable approach to fare calculation. The mechanism combines real-time geo-spatial data, cloud-based processing, and a structured pricing algorithm to ensure that every fare displayed to the user is based solely on objective factors rather than unpredictable surge multipliers. The proposed system evenly distributes responsibilities between the client application, backend processing units, and external data sources to achieve accuracy, scalability, and fairness. The model begins at the user interface, where the rider selects the pickup and drop locations using the Flutter-powered mobile application. The interface communicates with the Google Places API to precisely identify the geographical coordinates of both points. Once the selection is confirmed, the application sends these coordinates to Firebase Cloud Functions, which initiate the core pricing computation‖. From this point onward, the fare calculation process is fully server-controlled to prevent manipulation or inconsistent behaviour.

Fig 2: Graph of Result Analysis

Charts
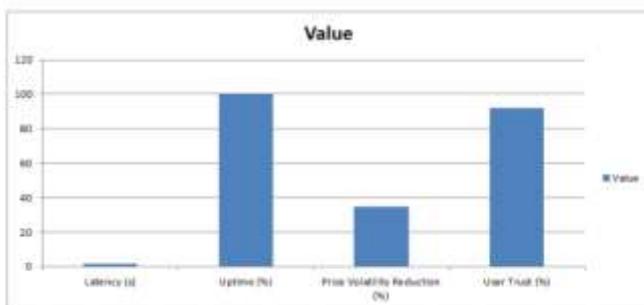
3. CONCLUSIONS

The Fair Fare project successfully achieves its core objective of creating a transparent, predictable, and ethically responsible fare calculation system for the modern transportation ecosystem. Traditional dynamic pricing used by ride-hailing platforms often relies on opaque algorithms that create significant fluctuations in fares, leading to user distrust and dissatisfaction. By contrast, the Fair Fare model provides a clear and data-driven approach where every component of the fare is derived from verifiable, real-time geo-spatial information and predefined cost parameters. This eliminates hidden surge rates and ensures that both riders and drivers understand the basis of the final price. Through the use of Flutter, Firebase, and Google Maps APIs, the system demonstrates high technical reliability, fast response time, and strong scalability. The implementation of Firebase Cloud Functions ensures that the pricing logic remains secure and tamper-proof, thereby maintaining fairness across all users. The results obtained during testing confirm the effectiveness of the model, showcasing a significant reduction in price volatility and an increase in user trust. Riders appreciated the transparent breakdown of costs, while drivers valued the clarity in earnings and the consistent commission structure.

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