GPS ENABLED SMART BUS TRACKING SYSTEM

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ABSTRACT

An innovative approach to fare administration and commuter convenience is introduced in the field of public transportation with the creation of a smart ticketing system that integrates NFC, GPS, ESP32 microcontrollers, and GSM communication modules. By using NFC-enabled cards or devices for safe and contactless authentication, this system does away with the need for manual fare collection and paper-based ticketing. Real-time vehicle tracking and accurate fare calculation based on actual distance traveled are made possible by the GPS module. The ESP32 microcontroller reduces latency and reliance on cloud communication by processing data on-board concurrently. Reliable SMS transmission of trip reports and fare deductions to consumers is ensured by integration with GSM technology. The research addresses issues such data synchronization, hardware integration, and scalability while examining the benefits, operational flow, and practical implementation of

the suggested system. With the possibility for future improvements through mobile payments, blockchain security, and AI-based analytics, the technique offered is a reliable, scalable, and user-friendly model that can be tailored for both urban and rural transit situations.