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(57) Abstract :
An artificial-intelligence (AI)-based smart logistics and accessibility intelligence system and method are provided for predictive route-disruption management and emergency goods transportation in terrain- and connectivity-constrained regions. The system comprises a Data Acquisition Layer (10) that continuously ingests GPS vehicle tracking data (11), real-time meteorological data (12), GIS terrain data (13), and crowdsourced, geo-tagged field reports (14) captured via an offline-first mobile application. An AI Agent Layer (20) comprises a Weather-Risk Agent (21), a Terrain/Infrastructure Agent (22), a Ground-Report Agent (23), and a Route-Optimization Agent (24), whose intermediate inference outputs are reconciled by a central Orchestration Engine (30) to generate an explainable route-disruption risk score and alternate route recommendations with estimated delays. The recommendations are validated against deterministic physical constraints by a Safety-Validation Module and presented on a Human-Approval Interface (40). No alert, rerouting instruction, or dispatch action is executed autonomously without prior review and approval by an authorized human officer. Upon approval, an Alert and Dispatch Module (51) issues multilingual alerts and a Multilingual Dashboard (52) renders district-wise accessibility status, while an Audit-Logging Module feeds an active learning retraining pipeline (60).

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