SMARTTRAFFIC AI PROJECT

RECOMMENDATIONS AND ACTION PLAN

Based on Field Visit to Toll-Weigh Bridge Station
Date of Visit: 30th June 2025
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1. Introduction

This document outlines recommendations and a phased action plan arising from the SmartTraffic AI team's field visit to the Toll-Weigh Bridge Station. The recommendations are aimed at addressing the operational challenges observed during the visit and leveraging opportunities for smart technology integration. The action plan is intended to guide next steps for system enhancement, pilot testing, and stakeholder collaboration.

2. Summary of Key Challenges Identified

From the field study, the following operational challenges were observed:

- **Sensor latency and occasional inaccuracies**, especially during high traffic intensity periods.

- **Communication breakdowns** within the station's LAN and radio systems, affecting coordination.

- **Manual queue management** in waiting zones, resulting in inefficiencies.

- **Manual review of vehicle data and violations**, increasing the risk of human error.

- **Lack of AI integration**, limiting automation and real-time decision support.

- **Dependence on imported systems** not fully tailored to local challenges.

- **Periodic power interruptions**, though mitigated by UPS and generator backups.

3. Recommendations

3.1 Technology Enhancement

Deploy AI-powered permit verification:
Integrate AI modules to automatically verify digital permits and cross-check with real-time vehicle data, reducing manual interventions.

Upgrade queue management with AI-assisted scheduling:
Introduce smart queue management tools that can predict congestion and suggest optimal vehicle processing orders.

Implement adaptive sensor calibration algorithms:
Develop AI solutions to dynamically adjust sensor parameters in real time, reducing latency and inaccuracies under heavy traffic.

Explore use of cloud-based and edge computing solutions:
Allow processing to occur closer to the data source (edge) for faster analytics and reduce LAN dependency.

3.2 System Modernization

Modernize the static weighing scale systems:
Evaluate and procure newer weighing technologies (e.g., advanced WIM systems) that are more accurate and integrated.

Introduce AI-powered anomaly detection:
Implement modules that automatically flag unusual vehicle patterns, suspicious weights, or data anomalies for review.

Enhance communication infrastructure:
Upgrade LAN hardware and evaluate redundancy options for radio and data communication to minimize breakdowns.

3.3 Operational Improvements

Digitize manual data review processes:
Replace Excel-based manual checks with a central data validation platform that uses AI to flag likely errors for human confirmation.

Integrate real-time dashboards:
Develop comprehensive dashboards for live monitoring of all vehicle, weight, and violation data to support operational decision-making.

Introduce local system documentation and training materials:
Ensure station staff are equipped with documentation and training for any new system components.

3.4 Stakeholder Engagement

Work with KENHA and relevant agencies:
Align SmartTraffic AI developments with national standards and secure formal data-sharing agreements.

Involve local technology firms:
Partner with local companies for system customization and support, reducing reliance on imported, generic solutions.

Pilot and evaluate before scaling:
Propose a pilot at the Toll-Weigh Bridge Station or another suitable site before broader deployment.

4. Proposed Action Plan

Phase	Action Item	Timeline	Responsible Party	Notes
Phase 1	Formalize partnerships with KENHA and stakeholders	1 month	SmartTraffic AI leadership	Secure MOUs and data access agreements
	Conduct detailed system audit and requirements gathering	1 month	Technical team	Engage station officials for inputs

Phase 2	Develop prototype AI permit verification and queue management modules	2-3 months	AI/Software team	Test modules using sample data
	Design communication and LAN upgrades plan	1-2 months	IT/Network team	Include redundancy measures
Phase 3	Implement pilot solution at Toll-Weigh Bridge Station	3-4 months	Project team + station staff	Monitor KPIs (accuracy, efficiency)
	Train station personnel on new systems	During pilot	Training unit	Include documentation handover
Phase 4	Evaluate pilot results and adjust solutions	1 month	QA and analysis team	Collect feedback and refine systems
	Plan broader deployment strategy	1-2 months	Project leadership	Identify next sites for rollout

5. Expected Outcomes

If implemented successfully, the recommended actions are expected to:

- Reduce manual errors and improve data integrity.

- Improve traffic flow and reduce congestion at the station.

- Strengthen operational efficiency through automation.

- Enhance collaboration with national agencies for smarter infrastructure.

- Create a replicable model for smart traffic management at other stations.

6. Conclusion

The field visit provided invaluable insights that have shaped these recommendations and action plan. The SmartTraffic AI project is positioned to deliver meaningful, locally relevant solutions that can modernize traffic management, improve road safety, and contribute to national infrastructure goals.