

LTRC Report 722

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Artificial Intelligence and Its Role and Use Within State DOTs

Introduction

Artificial Intelligence (AI) is increasingly shaping the way state Departments of Transportation (DOTs) approach both research and daily operations. Recent advances in machine-learning, computer vision, and generative AI offer new opportunities for improving efficiency, supporting decision-making, and streamlining tasks such as document review and traffic analysis. The rapid adoption of these technologies also brings challenges, including concerns about data bias, accuracy, privacy, and reliability. This research addresses several questions frequently asked by DOT managers about AI: How is AI being applied by other transportation agencies? What policies may limit or facilitate AI adoption? What does AI adoption look like in practice?

Objective

This project aimed to:

- Enhance regional knowledge sharing of AI practices and opportunities;
- Provide a state-of-the-practice overview of AI tools and solutions that peer transportation agencies currently deploy;
- Identify best practices and barriers for AI adoption;
- Recommend strategies for broader AI integration and application; and
- Document and disseminate these findings.

Scope

This project identified and summarized AI solutions and implementations that statewide agencies use in practice. Researchers reviewed relevant state agency policies, practices, and implementation guidance currently available for AI technologies within the transportation sector. The team engaged practitioners through interviews to supplement desk research. The research team aimed to provide a broad perspective on where and how state DOTs in the STC region and beyond currently use AI, and how agencies can most effectively deploy it while setting guardrails for responsible use.

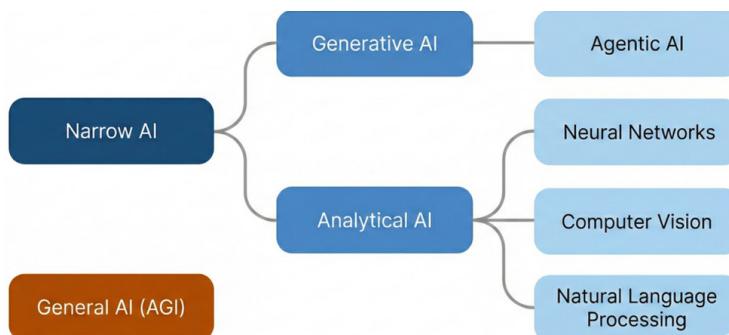


Figure 1. Artificial Intelligence (AI) Taxonomy

Principal Investigator

Mark Egge, AICP
406-548-4488

LTRC Contact

Tyson Rupnow, Ph.D., P.E.
225-767-9124

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www.ltrc.lsu.edu/publications.html

Methodology

The research team planned and executed this project in two phases. The project began with foundational research and a literature review, during which the team compiled a broad catalog of practical AI applications. A practitioner-focused phase followed, drawing out real-world insights related to AI policy and implementation.

The research team implemented a targeted approach focused on cataloging real-world AI applications that state DOTs and other public-sector transportation agencies use in practice. The team organized the literature review by agency function, emphasizing traffic operations, roadway maintenance, and engineering applications. The project report is organized into three sections: AI Policy Environment, Use Case Catalog, and Implementation Guidance.

Conclusions

The more than 60 application examples in the final report demonstrate that state Departments of Transportation across the United States already use AI widely and beneficially. Asset management, traffic operations, and maintenance are among the most common applications. Policy environments for AI use vary between states; while no states prohibit AI use, some require centralized statewide authorities to vet and approve AI-based solutions, which can inhibit smaller-scale or exploratory applications.

Most state agencies acquire AI through vendors rather than building solutions in-house, making procurement frameworks a critical governance mechanism. Where agencies have moved AI into production, AI augments rather than replaces agency staff and efficacy. Framing AI implementation as staff augmentation and emphasizing its benefits to both the agency and the public creates the strongest buy-in among the workforce and stakeholders.

Recommendations

Based on this research, transportation agencies should:

- Develop a comprehensive AI strategic plan that aligns AI adoption with organizational goals;
- Establish clear AI governance and oversight structures;
- Adopt a phased implementation approach beginning with low-risk applications;
- Prioritize workforce development and AI literacy;
- Maintain human-in-the-loop requirements for all AI applications;
- Establish clear metrics to evaluate AI effectiveness;
- Modernize procurement frameworks for AI acquisition;
- Engage in knowledge sharing and peer collaboration; and
- Prioritize transparency with staff and the public.