A National Discussion on Artificial Intelligence

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MassDOT

massDOT
Massachusetts Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

Enhancing Pedestrian Safety Using AI & Aerial Mapping

Issue

- 40% of all pedestrian serious injuries or fatalities occurred within 300 feet of a bus stop

Problem

- No single, complete data set for crosswalks

Resolution

- MassDOT collaborated with with UMass Lowell to develop an AI system that used available aerial mapping to detect and inventory crosswalks

Result

- Developed a map and classification system for crosswalks across entire network; used data to inform pedestrian safety programs, shared crosswalk layer with planning for integration into road files

Pedestrians cross the street near a bus stop.

Without AI support, a month's long effort could have taken years.

Risk Analysis Using AI-Powered Video Analytics

Issue

- Heavy reliance on traditional tools – crash data, RSAs – when conducting risk analyses

Problem

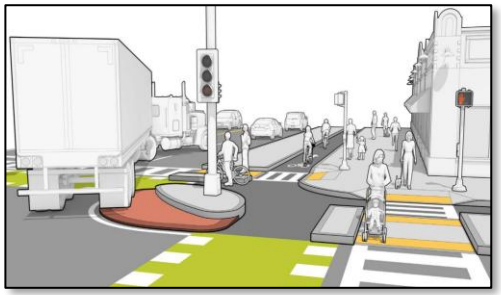
- Concerns about "invisible" risks: aggressive turns, short gaps, and vehicle conflicts

Resolution

- Testing AI video analytics that uses video to detect, identify, and report dangerous patterns

Result

- Developed a more robust risk profile, leading to design that addressed documented and observed factors



Video analytics depicting a busy intersection and crosswalk.

It's important to note that AI is an enhancement, not a replacement; engineering judgment is still essential.

AI Use in Evaluation of Sight Distance on Rural Roads

Issue

- High vehicle accident frequencies at a rural intersection

Problem

- While the intersection met design standards, its configuration "pressures" drivers to rush turns to avoid rear-end crashes

Resolution

- MassDOT's pavement management group is piloting software that uses LiDAR and AI-based analytics to gather additional data on stopping/passing sight distances and additional geometric safety conditions

Result

- Five-mile road segment resurfacing in 2026 with AI-identified improvements incorporated into design

LiDAR technologies being used to assess spatial data.

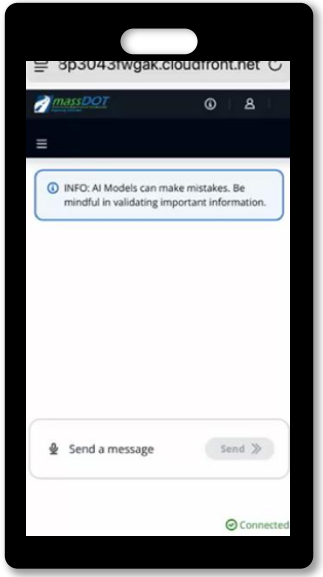
Highway Engineer Knowledge Assistant

HEKA: **Highway Engineer Knowledge Assistant**
- Developed in 2024

One of the first AI tools developed for under the Governor's AI for Impact program

Collaborative initiative between Northeastern University and MassDOT
- The AI is trained on a myriad of MassDOT SOPs, Engineering Directives, and permit documents to help staff through daily issues at MassDOT

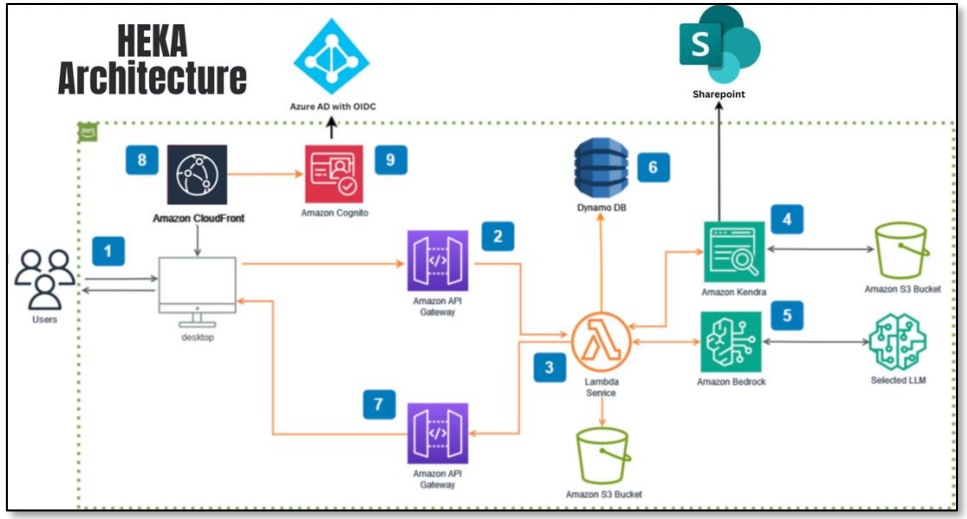
Resulted in 78% time-savings vs manual research



MassDOT AI Use Cases Across Business Units

Highway Division
HEKA
E-ZPass Virtual Assistant
Vehicle Invoice Processing System

RMV Division
AI-powered Virtual Assistant to provide information on common RMV questions



Human Resources
Mentor-Mentee Matching AI Assistant to support MassDOT Mentorship program

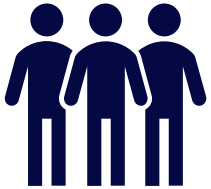
Procurement
RFI Summarizer that aims to develop a Generative AI application that provides a confidence score based on the RFI content

AI Peer Exchange: National Collaboration

MassDOT is actively participating in the broader discussion to develop a national framework for AI readiness across state DOTs. Peer exchange established three essential pillars to be addressed in future national collaboration:

Governance
There is a need for building a foundation for individual agency plans and ensuring shared standards

Data Excellence
The greatest prediction of AI success is data quality, but there is a need across most agencies for better data governance



Workforce Readiness
Agencies are facing common barriers to upskilling their workforce for AI readiness

Through hosting the 2nd AI Peer Exchange, MassDOT is helping advance the conversation with DOTs, AASHTO, TRB and FHWA around a future centralized AI framework.