

Orlando, FL

November 7-8, 2024



# 2024 TRANSPORTATION SYMPOSIUM



## Emerging Technology Program Artificial Intelligence in FDOT

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TSMO Program Engineer  
District 5  
Florida Department of Transportation

# Agenda

- Introduce Emerging Technologies
- FDOT Artificial Intelligence Policy
- Transportation Use Cases
- Mini what is Artificial Intelligence
- Overview of FDOT projects using AI

# EMERGING TECHNOLOGIES



A word cloud of emerging technologies. The words are arranged in a roughly rectangular shape, with 'SAFETY' being the largest and most central word. Other prominent words include 'MULTIMODAL', 'RAIL', 'FREIGHT', 'CONNECTED VEHICLES', 'INNOVATION', 'MOBILITY', 'UAS', 'NETWORK', 'WIRELESS', 'ECONOMY', 'COLLABORATION', 'CHARGING', 'EMERGENCY', 'COMMUNICATION', 'AAM', 'SHUTTLE', and 'MICROMOBILITY'. The colors range from white to light green.

WIRELESS ECONOMY MULTIMODAL  
UAS NETWORK SAFETY MICROMOBILITY RAIL  
COLLABORATION CHARGING SHUTTLE  
EMERGENCY COMMUNICATION AAM  
FREIGHT CONNECTED VEHICLES  
INNOVATION MOBILITY

Adopting **TECHNOLOGIES** to  
improve **SAFETY** and  
advance **MOBILITY** to better  
serve the **COMMUNITIES**







*Promote*



*Inspire*



*Attract*



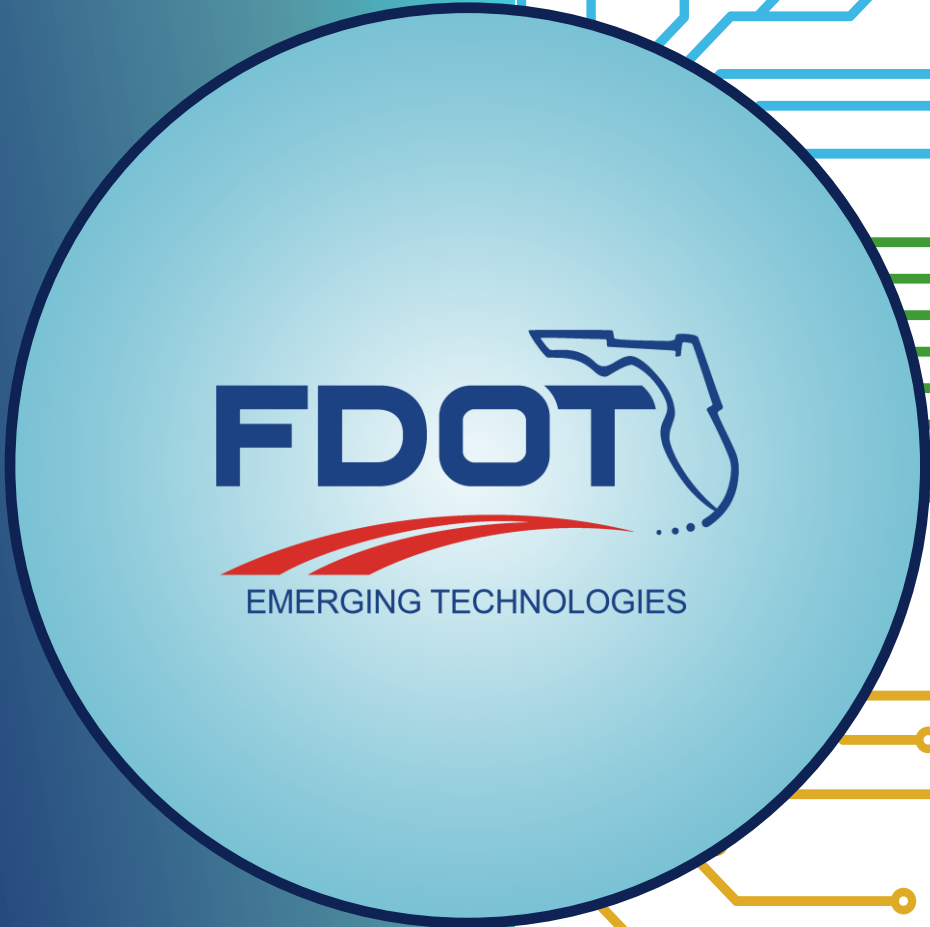
*Test*



*Implement*

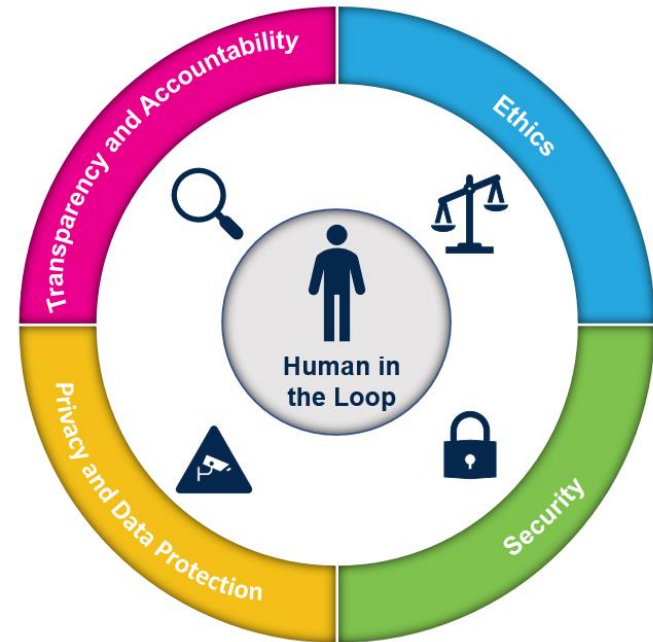


Framework  
&  
Roadmap



# Artificial Intelligence (AI) Policy

## AI Policy Themes



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Florida Department of Transportation

605 Suwannee Street  
Tallahassee, FL 32399-0450

RON DESANTIS  
GOVERNOR

JARED W. PERDUE, P.E.  
SECRETARY

### POLICY

Effective: May 21, 2024  
Office: Transportation Technology  
Topic No. 010-325-065-a

### ARTIFICIAL INTELLIGENCE (AI) POLICY

To support the mission and vision of the Florida Department of Transportation (Department), it is the policy of the Department to responsibly, transparently, and ethically use artificial intelligence (AI) with human accountability.

This policy applies to all Department-related activities, employees, vendors, consultants, and contractors that use, acquire, collect, or develop AI solutions. This policy applies to Machine Learning, Generative Language Models, and covers all embedded and standalone AI technologies/tools.

The use of AI for Department-related purposes must occur within the following boundaries:

- AI must supplement or complement the work that is primarily accomplished by a human.
- AI usage must engage humans throughout the process, with human involvement in reviews and decisions. Humans are fully responsible for the work and products involving AI.
- AI systems and decision-making processes must be ethical and comply with all applicable laws, rules, regulations, and policies.
- AI systems and decision-making processes must be transparent and disclose if the products are generated partially or fully by an AI tool.
- AI systems must protect people's privacy and comply with all applicable data protection regulations.
- AI systems must protect information that is exempt from public disclosure pursuant to Florida's public records laws, and must comply with all applicable data protection laws, rules, regulations, and policies.
- AI data and the output from all AI-related models must be validated by humans to ensure AI data and its output are free of personally identifiable information and to prevent copyright infringement and other legal challenges.
- To ensure the quality and the security of the Department's data and IT systems, employees, vendors, consultants, and contractors are prohibited from attempting to gain access to AI applications not approved by the Department when using Department's systems, networks, computers, phones, or other communication devices, when conducting business under contract for the Department, or when using the Department's data.

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SECRETARY

This AI Policy will be integrated into the Department's internal manuals, guidelines and related documents governing the Department's projects, including planning, designing, construction and operation of transportation facilities, as appropriate.

DocuSigned by:  
  
Jared W. Perdue, P.E., Secretary

www.fdot.gov

# FDOT's AI Policy Highlights

## Human in the loop

Must supplement or complement work accomplished by human

Must engage human throughout the process

Human are fully responsible for the work and product involving AI



## Transparency and Accountability

Must be transparent and disclose if the products are generated partially or fully by an AI tool



## Ethics

Must be ethical and comply with all applicable laws, rules, regulations, and policies



## Privacy and Data Protection

Must protect people's privacy and comply with all applicable data protection regulations

Human validation of the AI data and output

Must protect information that is exempt from public disclosure per FL public records laws



## Security

Employees, vendors, consultants, and contractors are prohibited from attempting to gain access to AI applications not approved by the Department





# Human in the Loop



AI must supplement or complement the work that is primarily accomplished by a human.

AI usage must engage humans throughout the process, with human involvement in reviews and decisions.

Humans are fully responsible for the work and products involving AI.

## Transparency and Accountability



AI systems and decision-making processes must be transparent and disclose if the products are generated partially or fully by an AI tool.

# Ethics

AI systems and decision-making processes must be ethical and comply with all applicable laws, rules, regulations, and policies.



# Privacy & Data Protection



AI systems must protect people's privacy and comply with all applicable data protection regulations.

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AI systems must protect information that is exempt from public disclosure pursuant to Florida's public records laws, and must comply with all applicable data protection laws, rules, regulations, and policies.

# Security



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# Common Use Cases

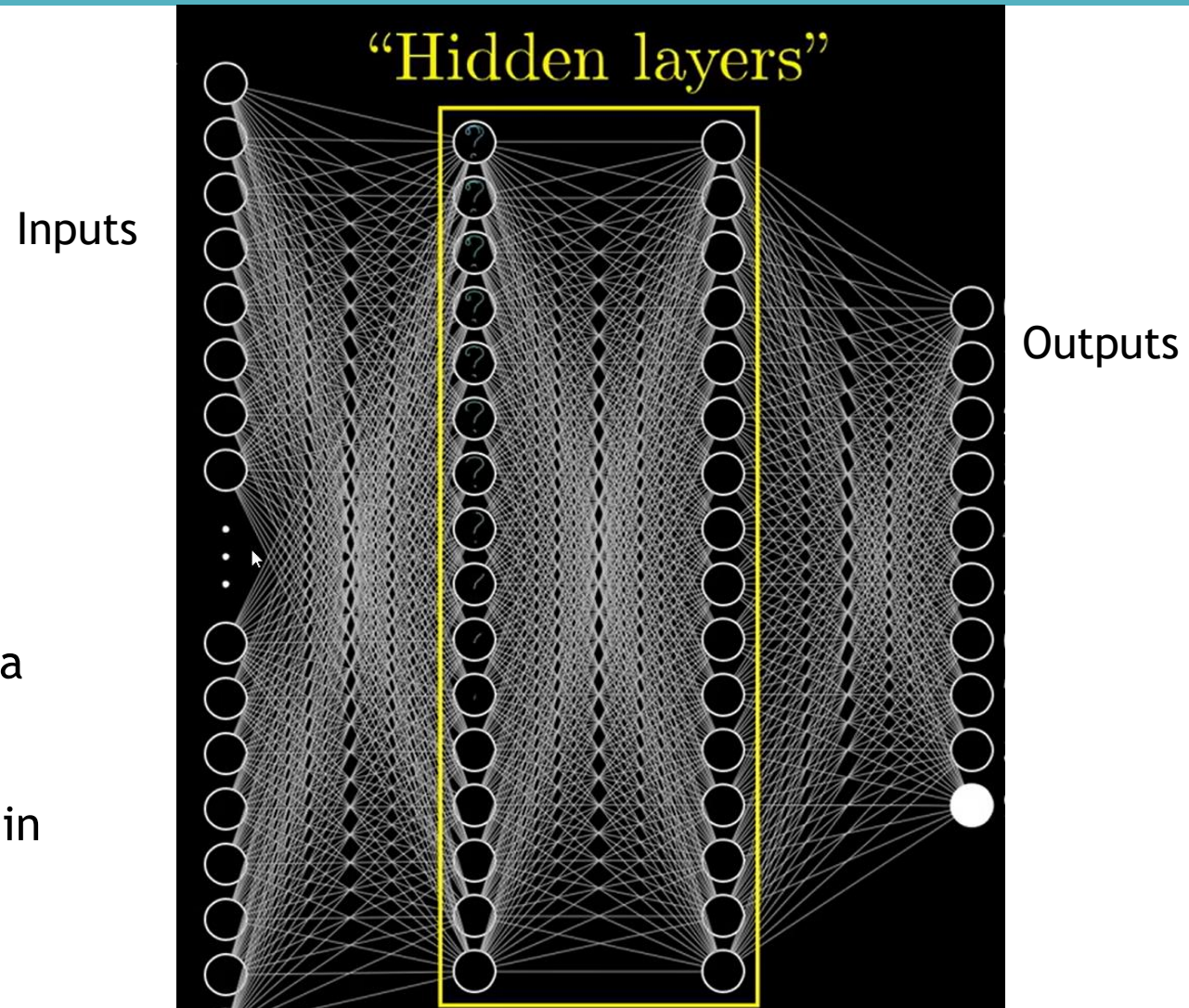
- Natural Language Models
  - Chatbots
  - Search
- Translation
- Code development
- Time Series Analysis
- Computer Vision

# Use Cases in Transportation within DOTs

- Computer Vision
  - Data Gathering
  - Traffic Control (Detection)
- Time Series
  - Data Cleaning
  - Data Completion
  - Modelling/Prediction/Management
- Signal Timing Optimization
- Predictive Maintenance

# Components of Artificial Intelligence

- Inputs
  - Source Data
- Output
  - Prediction
- Labelled Data
  - Source Data with “correct” Output
- Hidden Layers
  - Steps in between that are fit to create correct outputs
- Cost Function
  - Difference in Outputs versus Labelled Data summed
- Learning
  - Applying cost function back against steps in process to adjust their values
  - Many iterations lead to a trained model



# Important Factors to Consider

- What is the training data set?
  - Can't outperform what the model is trained to
  - Will perform with data like what it is trained on
- How large is the training dataset?
  - More well labelled data usual provides better performance

# AI in FDOT – Research Projects

## AI in Safety and TSM&O Programs

Integrated management and decision support of arterial street operations

Research on AI for data integration with state highways – RADISH

Pedestrian upfront LIDAR-based safety on edge

Traffic unification system highlighting arterial roads – TUSHER

High-definition engineering intersection data via integrative modeling

Phase III - ATTAIN: Intersection signal prediction and corridor traffic management based on big-data analytics and cutting-edge technologies

Pragmatic multi-objective planning approach for medium- and long-range projects

ML algorithms for improved network traffic signal policy optimization



# AI in FDOT – Non-Research Projects

Near-miss identification safety system

Wrong-way detection

Intersection monitoring for safety hazards

PedSafe phase II: Aim to improve ped safety

Near-miss crash identification

Bike-ped safety project

Advanced video analytics (AI-driven) for incident detection

Testing detection accuracy of AI cameras compared to road sensors

Evaluating AI solutions for post-disaster assessment

Adopting **TECHNOLOGIES** to  
improve **SAFETY** and  
advance **MOBILITY** to better  
serve the **COMMUNITIES**



# Thank You!

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[flhsmv.gov/moveover](http://flhsmv.gov/moveover)

