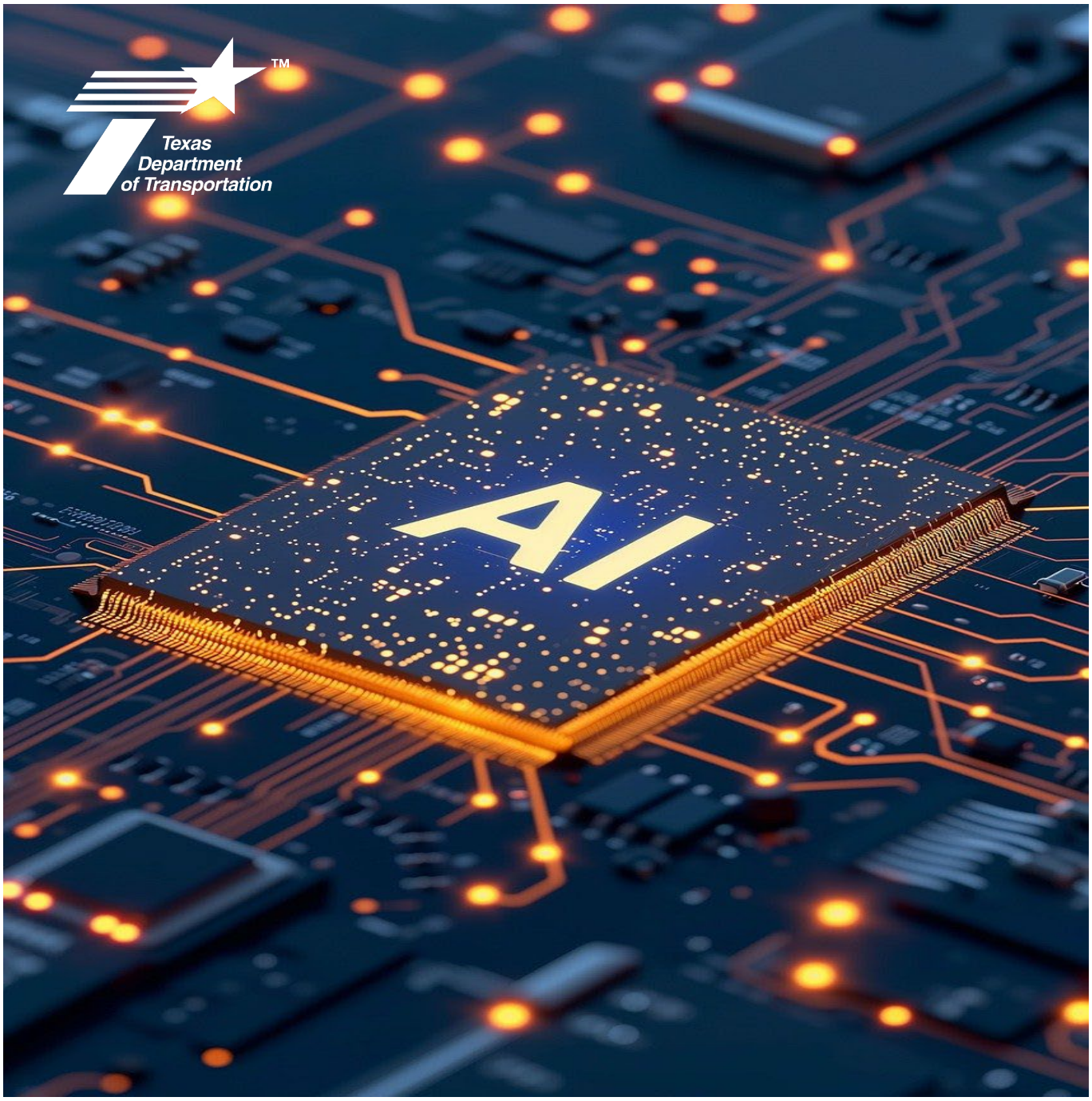
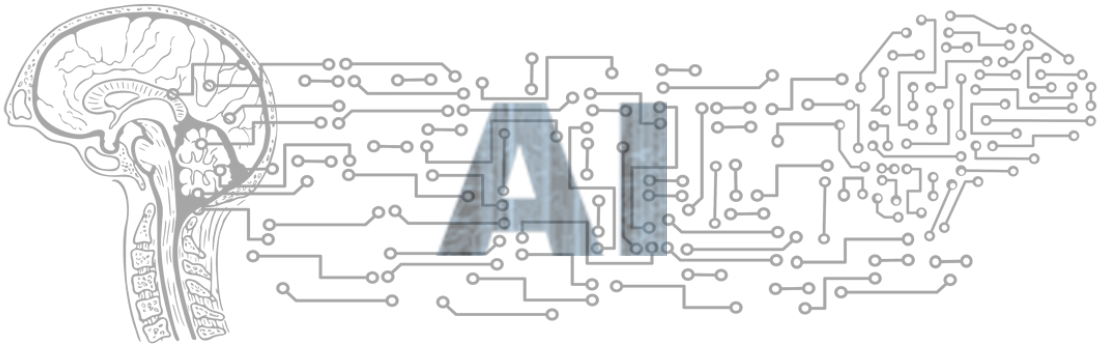


ARTIFICIAL INTELLIGENCE STRATEGIC PLAN

Fiscal Years 2025-2027


AI

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Introduction

1 INTRODUCTION

The Texas Department of Transportation (TxDOT) recognizes the transformative potential of artificial intelligence (AI) to improve the safety, efficiency, and reliability of transportation systems to optimize business operations. The AI Strategic Plan establishes a vision, principles, and roadmap to integrate advanced analytics and intelligent systems into TxDOT's operations and transportation system. The plan includes strategic priorities, use cases, best practices, and recommendations to guide TxDOT's adoption of AI over the next 3 years. The focus is on high-impact applications that enhance human decision-making, streamline processes, and provide new insights from data. While embracing innovation, the plan also emphasizes ethical and responsible use, transparency, and human-centric design. The priority will be to use AI in a secure manner that protects systems and users while also maintaining human engagement with actions and decisions. The plan will enable TxDOT to use AI responsibly to fulfill its mission of Connecting you with Texas.

2 EXECUTIVE SUMMARY

Artificial intelligence (AI) is a transformative technology that can enhance the efficiency, effectiveness, and quality of TxDOT services and operations. AI also poses challenges and risks that require careful planning and management. This plan provides a comprehensive and strategic approach to leverage AI to achieve the agency's mission and goals, while addressing the ethical, legal, social, and technical implications of AI. The plan covers the following aspects:

- An overview of AI, major AI types, and their definitions and uses.
- AI adoption and usage guiding principles.
- The current state of AI readiness and adoption within the agency, including the technology. foundation, governance, organizational capabilities, and in flight and completed AI projects.
- Recommended foundational capabilities to enable the effective and responsible use of AI.
- A 3-year roadmap for implementing recommendations, achieving desired outcomes, and serving as a guide and reference, while harnessing the potential of artificial intelligence.
- Identified business use cases for AI adoption, aligned with the agency's goals and objectives.

The plan is intended to serve as a guide and a reference for the TxDOT's leadership, management, and staff, as well as external stakeholders and partners, to foster a culture of innovation and collaboration, and to harness the potential of AI for the public good.

3 DEFINITION OF ARTIFICIAL INTELLIGENCE

According to the Oxford Dictionary, Artificial Intelligence is the theory and development of computer systems able to perform or assist with tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

AI is a mix of mature and emerging technologies, disciplines, and focus areas. In many cases organizations and society are just beginning to realize the potential applications and benefits of applying AI. Figure 1 depicts the different kinds of AI that TxDOT may use to achieve its goals.

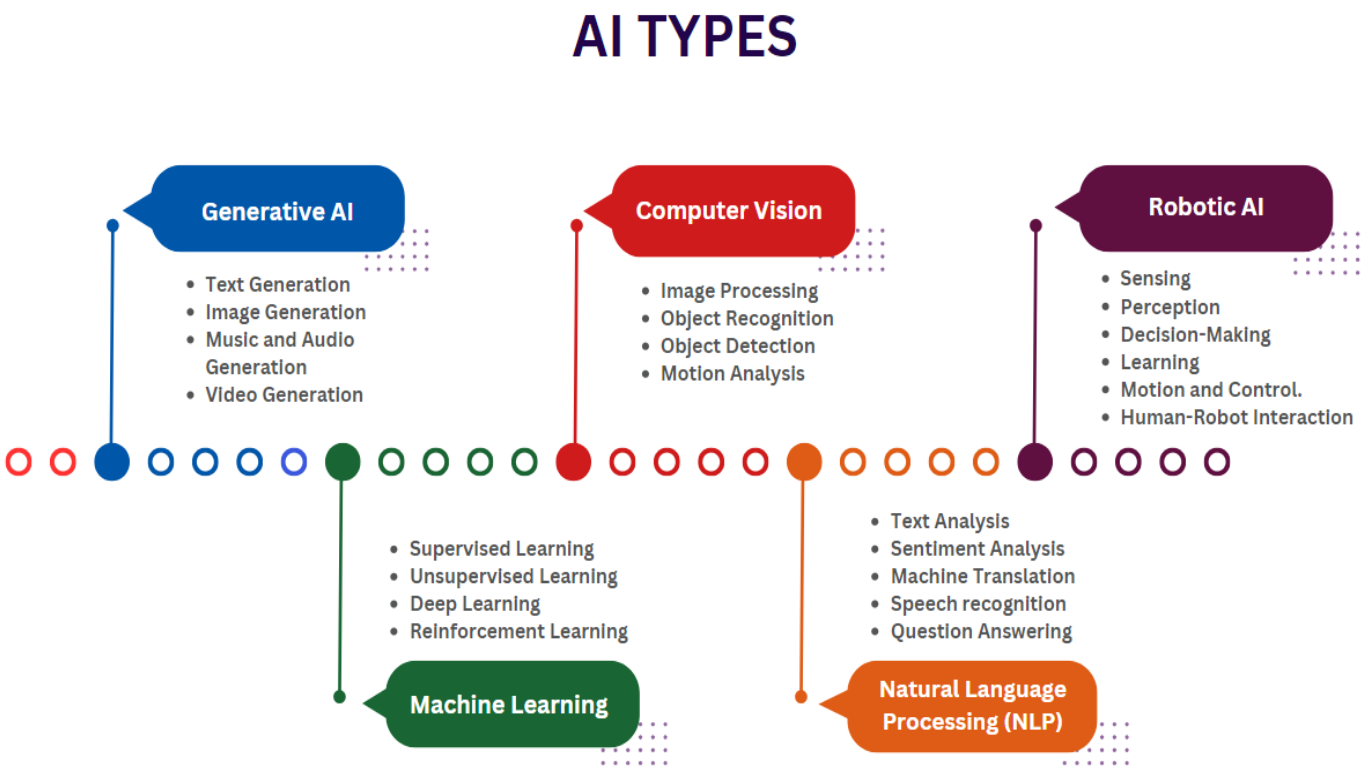


Figure 1 AI Types

AI Definitions:

AI Type	Definition
Computer Vision	A field of AI focused on enabling computers to interpret, understand, and make or inform decisions based on visual data from the world. It involves developing algorithms and models that can process and analyze images and videos to extract meaningful information, recognize objects, track movements, and performs other tasks related to visual perception.
Generative Artificial Intelligence	A field of AI focused on systems that can generate new, original content based on the data they have been trained on. This content can include text, images, music, videos, and other forms of media.
Machine Learning	A field of AI that focuses on the development of algorithms and statistical models that enable computers to learn and make or inform decisions from data without being explicitly programmed for each specific task.
Natural Language Processing	A field of AI focused on the interaction between computers and human (natural) languages. The main goals of Natural Language Processing (NLP) are to enable computers to understand, interpret, and generate human languages in a way that is both meaningful and useful.
Robotic Artificial Intelligence	The integration of AI with robotics, enabling robots to perform tasks autonomously, intelligently, and interactively. This field combines the physical capabilities of robots with the cognitive capabilities of AI to create systems that can perceive their environment, make or inform decisions, learn from experiences, and perform complex actions.

4 AI GUIDING PRINCIPLES

AI adoption and usage principles must align with TxDOT's overarching goals and with its commitment to mission-focused, transparent, and responsible governance.

The following AI Usage Guiding principles, including those defined in TxDOT's Acceptable Use of Artificial Intelligence Policy, provide the framework for the acceptable deployment, use and management of AI at TxDOT:

SECURITY

AI systems should be designed, tested, and deployed to ensure security as part of the function and performance of the application. Staff should be aware of threats, risks, and security benefits and trade-offs should be critically evaluated. The confidentiality, integrity, and availability of TxDOT data should be safe guarded with any tool implementation.

TRANSPARENCY

AI applications must be transparent about how data is used and must provide users and key stakeholders insights into how decisions and outcomes are produced.

ACCURACY

AI applications must produce verifiable results. Users must provide clear communication regarding uncertainties and take appropriate measures to rectify inaccurate data.

ACCOUNTABILITY

TxDOT must establish governance, oversight, and monitoring of AI systems to ensure that they are operating as intended and not causing unintended harm. This includes ensuring there is human responsibility in reviewing and approving AI recommendations that impact internal and external stakeholders.

TRUSTWORTHY

AI applications must include checks and balances to ensure results are unbiased and that there is fair representation across users.

PRIVACY

AI applications must respect user privacy. Data must not be used outside of agreed upon terms and must be compliant with TxDOT's privacy policies and applicable state or federal requirements to which TxDOT must adhere.

SAFETY

TxDOT Prioritizes the well-being of the public, partners, and employees through dependable, trustworthy AI technologies that enhance infrastructure integrity and service quality.

5 CURRENT AI CAPABILITIES

TxDOT progresses in its adoption and application of AI capabilities to better achieve its mission and goals. This section provides an overview of TxDOT's current foundational capabilities to enable AI, along with a representative list of in-progress and completed AI projects and solutions.

5.1 DATA FOUNDATION

TxDOT understands the importance of a well-managed data foundation necessary to implement AI solutions. AI solutions require high-quality and non-biased data to make accurate, effective, and ethical predictions and decisions. Data must be collected from across the agency and transportation system, curated and cleansed, and made available to stakeholders for AI and analytics solutions.

TxDOT recognizes the need to automate data collection from internal and external sources with the implementation of an Enterprise Data Platform (EDP).

The primary goal of the ongoing EDP initiative is to consolidate and curate existing standalone data sources into accessible and well-managed data marts. The EDP helps TxDOT maximize capabilities to leverage meaningful, high-quality data for AI advancements and solutions. TxDOT, through EDP, is actively integrating data from various business units, digitized historical records, and external sources. This involves transforming data into a common format using standardized definitions. The EDP follows an iterative approach, continually incorporating new data sets and maintaining existing ones, allowing TxDOT to prepare for evolving data needs and technological advancements.

The following describes the steps that are being implemented to enable the EDP for successful data accessibility management.

1. **Data accessibility and collection**: Identifying existing data sources across different business units *and* implementing mechanisms (such as APIs or data connectors) to collect data from these sources.
2. **Data transformation and standardization**: Preparing data for analysis by transforming it into a common format.
3. **Data quality assessment and improvement:** Enhancing data quality to ensure accuracy and reliability. Conducting data profiling to identify anomalies, missing values, and outliers. Collaborating with data stewards to review and validate data quality.

4. **Establish guidelines for responsible data governance:** Defining roles and responsibilities, developing data governance policies, monitoring compliance, and addressing any violations.
5. **Iterative improvement:** Continuously enhancing data management processes. Regularly reviewing and updating data standards. Staying informed about industry best practices.

By having a robust data foundation through the EDP, TxDOT can better support AI solutions, whether it's predictive modeling, anomaly detection, or decision-making. Success of the EDP relies on collaboration across teams, adherence to data governance practices, and ongoing improvements.

5.2 AI GOVERNANCE

Technology initiatives will follow existing information technology governance processes leading to project approval and prioritization. In addition, TxDOT has established the following AI governance components to manage AI risk and ensure the responsible and ethical use of AI solutions:

AI Policy

TxDOT developed an Acceptable Use of Artificial Intelligence Policy to provide guidance on the appropriate uses and application of AI capabilities and solutions. TxDOT will continue to develop and communicate AI-related policies and usage standards to ensure TxDOT and its staff use AI in a responsible and ethical manner.

AI Risk Management Workgroup

TxDOT is establishing an AI Risk Management Workgroup to foster a culture of risk management. The AI Risk Management Workgroup will develop a framework that will document, identify, assess, and manage the risks associated with AI systems and projects.

The AI Risk Management Workgroup is comprised of representatives from the Information Technology Division (ITD), Strategic Initiatives and Innovation Division (STR), General Counsel Division (GCD), Human Resources (HRD), and the business owner. Additional membership will be considered based on the project in review.

AI Risk Management Framework

TxDOT's AI Risk Management Framework aims to mitigate negative impacts and maximize opportunities associated with AI systems. TxDOT will leverage the framework, based upon the AI Risk Management Framework from the National Institute of Standards and Technology (NIST)[1], to coordinate activities to map, measure, and manage risk associated with AI systems and projects, specifically highlighting those proposing automated decision systems. Risk management should be continuous, timely, and performed throughout the AI system or project's lifecycle. The framework aims to establish the context of an AI system or project to manage risks and ultimately deploy trustworthy automated decision systems

The AI Risk Management Workgroup, as the governing body, will implement the pillars of the risk management framework: map, measure, and manage.

Map: The AI Risk Management Workgroup, along with the business owner, will provide a cumulative description of the risk they predict may be associated with the AI system or project.

Measure: The AI Risk Management assessment will be integrated into larger ITD applications, such as the Request for Solution (RFS) service in TxDOTNow. Using the existing RFS workflow, the business owner will indicate if any Artificial Intelligence technology is anticipated to be used in the solution. If AI technology is anticipated, the AI Risk Management Workgroup will review the project details provided in the RFS process and begin the risk assessment with the business owner. For each risk described in the map, the AI Risk Management Workgroup will assign a risk impact and likelihood score following Figure 2: Risk Matrix. This score will be used to manage the risk through prioritization and mitigation strategies.

Likelihood: What is the probability the risk will happen?	Impact: How severe would the outcomes be if the risk occurred?				
	Negligible	Minor	Moderate	Major	Critical
	1	2	3	4	5
Almost Certain	Medium	Medium-High	High	High	High
5	5	10	15	20	25
Probably	Low	Medium	Medium-High	High	High
4	4	8	12	16	20
Possible	Low	Medium	Medium	Medium-High	High
3	3	6	9	12	15
Rare	Low	Low	Medium	Medium	Medium-High
2	2	4	6	8	10
Exceptionally Rare	Low	Low	Low	Low	Medium
1	1	2	3	4	5

Figure 2: Risk Matrix

Manage: The AI Risk Management Workgroup will document and assess the overall risk rating to prioritize and mitigate risks, as necessary. The AI Risk Management Workgroup will accept the risks associated with the AI system and develop mitigation plans as necessary or reject the risk and place the project on hold. High-risk projects will be expedited to existing review boards for final determination on TxDOT's desire to accept the risk. The AI Risk Management Workgroup will also establish the cadence of periodic reviews for each AI system and associated risks. Projects will be reviewed throughout their lifecycle to consider laws and regulations as they are developed.

5.3 TxDOT AI and Automation Community of Practice

TxDOT has implemented an AI and Automation Community of Practice to enable the implementation and application of AI and automation capabilities. The community of practice is an avenue for all TxDOT staff to share experiences, knowledge, ideas, expertise, learning avenues, and best practices. TxDOT employees can develop their AI awareness and learn about other AI initiatives though this community of practice. The community of practice is open to all agency employees.

5.4 Current and Completed AI Projects at TxDOT

TxDOT has begun implementation of several AI solutions and capabilities. The following are representative examples of these TxDOT AI solution deployments.

1. **PSCAMS Contract and Invoice Comparison**

   The invoice verification process for TxDOT's engineering-related services was a manual, labor-intensive, and time-consuming process involving the review of more than 100 pages per invoice and complicated approval routing. The Transportation Programs Division (TPD) conducted a proof of concept using AI to streamline line-item verification. The solution significantly reduced turn-around time. The next step for this effort is full-scale development and implementation.

2. **Engineer's Estimate Bid Item Unit Price Estimation**

   A pilot project has been defined to use AI to estimate prices for bid items on construction and maintenance projects. The historical bid item values are linked to commodity information and inflation rates to produce a current value based on project classification, location, and size. The output will be in Tableau dashboards.

3. **Austin District Automatic Detection of Incidents on Roadways**

   This traffic management platform pilot led by the Austin District leverages data from agency road sources such as ITS cameras and sensors, as well as external data sources from navigation solutions and telematics to create a rapid and holistic view of traffic patterns on the roadway. The machine learning technology normalizes disparate data sets to enhance incident detention to enable rapid response and resolution, amplifying transportation operations and situational awareness. The solution supports existing workflows and efficient collaboration on incident management operations to enhance safety, transparency, reduced congestion, and travel time reliability.

4. **Robotic Process Automation (RPA) for On Boarding and Off Boarding Employees**

   Information Technology Division's (ITD's) implementation of RPA, specifically using UiPath, has significantly improved the efficiency of TxDOT's user access management process. The solution leverages Intelligent Robotics, which includes artificial intelligence and machine learning algorithms in the robotic system, enabling the automatic performance of onboarding and offboarding tasks with a high degree of decision-supporting outputs. The Intelligent Robotics span multiple systems including Peoplesoft ERP, ServiceNow CRM, and user profile attributes.

   The automation of tasks such as user account provisioning, security group management, drive mapping, and account removal has reduced previously labor-intensive and time-consuming operations to mere seconds. In a commitment to continuous optimization and operational excellence, ITD employs a combination of methodologies including process optimization, business process engineering, Lean & Six Sigma principles, and process design.

6 Recommended Future State

The following next steps enable TxDOT to implement a robust and sustainable AI ecosystem. It also identifies the highest priority and impactful use cases for AI across the agency's functions and domains, based on staff's view of current and future needs and opportunities.

6.1 Future State Data Foundation

Utilizing the following actions, TxDOT will enhance its data management, governance, and analytics capabilities to better enable AI enterprise solutions. This approach equips TxDOT staff with advanced tools and training, essential for effective, data-driven decision-making. In some cases, AI capabilities are also infused into TxDOT's data management foundation. The outlined initiatives will need to go through governance and approval processes to ensure adequate funding and resource availability.

1. **Create a metadata front-end for the central data hub:** Create and publish a data-catalog which lists all available data elements including raw data and information derived from processing of raw data in a user-friendly and easily accessible format. This will improve the discovery and access of key enterprise data sets. TxDOT has begun researching data catalog tools to provide this capability.
2. **Continue to support the growth of the central data hub**: Continue to augment the EDP platform integrating data from diverse sources for easy access by stakeholders.
3. **Continue to digitize historical data**: Continue to convert historical documents and records into digital formats (e.g., plan sets).

4. **Finalize data governance policy**: Finalize development of a TxDOT data governance policy, community of practice, data council, data standards. Implement AI-driven data cleansing and validation for consistent and accurate datasets.
5. **Enable advanced data search**: Develop advanced natural language search capabilities for more effective data retrieval and analysis.
6. **Improve data analysis and visualization with AI analytics capabilities**: Employ AI for insightful reporting, trend analysis, and visual data representation.
7. **Detect data inconsistencies**: Train AI to identify data gaps, discrepancies, and errors, enhancing data reliability.
8. **Enhance the data quality, consistency, and reliability of data efforts** at TxDOT with executive level messaging and support.

6.2 Future State Technology Foundation

By implementing an iterative technology infrastructure review and enhancement foundation, TxDOT will lead in the implementation of AI capabilities and solutions. Recommendations include:

1. Build out Machine Learning and **AI architecture, tools, systems, cloud platforms, and services**.
2. **Promote collaboration and innovation** by building partnerships with AI vendors and research institutions to enhance AI innovation.
3. **Develop guidelines** for AI use in vendor-supplied solutions.
4. **Continue to review the marketplace for leading AI vendors and solutions** and determine how they might be applied to address TxDOT needs.

6.3 Future State AI Governance

Establishing AI governance and oversight through established enterprise risk management and governance processes and through the creation and launch of the AI Risk Management Workgroup provide TxDOT with a consistent and risk-based process to evaluate and implement AI capabilities and solutions.

Over the next three years Leadership and ITD's AI Program should advance AI and data science to enable change, transform TxDOT and keep pace with ever-evolving technology.

Other AI governance recommendations include:

1. **Identifying, documenting, and enforcing AI policies as needed.**
2. **Creating an inventory of ongoing AI initiatives** across the agency.
3. **Adopting and implementing governance and risk management frameworks** to understand the risk with evolving AI practices and mitigate risk for TxDOT and its stakeholders.
4. **Enhancing data management and security** by strengthening protocols for data protection and anonymization to balance privacy with analysis.

6.4 Future State Implementation Support

TxDOT should develop the capabilities and support structures to identify, design, pilot, and deploy AI capabilities and solutions across the agency. Recommended actions include:

1. **Supplement the AI and Automation Community of Practice with AI Champions.** These champions will help TxDOT drive AI adoption. These ambassadors will aid TxDOT staff in adopting new AI capabilities, identify adoption challenges, and will evangelize the value that AI solutions will create for TxDOT, its staff, and TxDOT's stakeholders.
2. **Implement AI use cases,** testing pre-built and custom AI solutions in real-world scenarios.
3. **Improve outreach** across the enterprise for awareness of ongoing AI initiatives.
4. **Update strategic plans** in response to evolving AI technologies and organizational needs.

6.5 Recommended AI Training and Upskilling

TxDOT's journey into the age of Artificial Intelligence (AI) demands a strategic investment in training and upskilling staff to harness AI solutions and capabilities. Training should focus on the following areas:

- Foundational AI concepts, including prompt engineering
- TxDOT governance procedures and the ethical and responsible use of AI
- Data literacy and analytics
- Data science

The specific AI training curriculum may vary based on staff roles and responsibilities. An AI Training Plan will be defined to describe the recommended training curriculum for each of these staff roles.

Cultivating a collaborative environment and agile experimentation will be key. Projects, built upon adherence to and improvement of data standards, will inspire innovation and shared learning, empowering employees to embrace AI as a collaborative partner in their daily tasks. TxDOT will further empower its workforce through comprehensive training. Accessible, tailored programs, coupled with AI-assisted support, will streamline data-related tasks, and unlock new efficiencies. Trainings will be evaluated on a regular basis to ensure the agency is benefiting from the training and metrics will be tracked to gauge increase AI literacy at TxDOT.

By prioritizing internal upskilling and fostering a culture of learning, TxDOT will ensure its workforce is as talented as external candidates. With a clear understanding that success encompasses various career paths, the agency will offer lateral moves, cross-training opportunities, and competency development options alongside traditional advancements. Frequent career conversations to discuss staff members' aptitude and interest in AI-related training and job roles and engaging training programs will serve as powerful draws, attracting and retaining top talent in the increasingly competitive transportation landscape.

By making this strategic investment in its workforce, TxDOT will not only navigate the AI revolution but emerge as a leader, equipped to utilize this transformative technology to build a safer, more efficient, and future-proof transportation system for the state of Texas.

7 AI Use Case Implementation Roadmap

AI solutions can enhance the transportation systems to be safer. These solutions can also make TxDOT's business operations more efficient and effective. This section lists potential AI use cases that could be further explored and adopted on an Implementation Roadmap. These proposed use cases were identified through working sessions with TxDOT districts and divisions throughout the state of Texas. Working session participants identified potential AI projects and then voted on their priorities which led to the comprehensive list of use cases.

The use case solutions will be initiated using the agency's application request process enhanced to include review of AI components. Implementation of the proposed use cases will be dependent on available resources by districts and divisions.

Descriptions of each use case category and the individual use cases are included in the Appendix.

Note: Implementation of this roadmap will be dependent on available resources of all key divisions and districts impacted.

The following AI Use Case Implementation Roadmap outlines three key milestones for each use case:

Key Milestones:

Use Case Topics:

A. Bridging the Physical and Digital: AI-Powered Infrastructure Analysis for TxDOT
B. Investing in the Future: Strategic Project Prioritization at TxDOT with AI Insights
C. AI in PS&E Review: Ensuring Quality and Precision
D. Objective Bid Item Estimation: Optimizing TxDOT Project Analysis with AI Insights
E. Smarter Signals, Smoother Journeys: TxDOT's AI-Powered Approach to Traffic Flow Management
F. Building a Culture of Safety: TxDOT Embraces AI for Data-Driven Crash Hotspot Mitigation
G. From Reactive to Predictive: Empowering TxDOT with AI-Enabled Decision Support for Emergencies
H. Building for Tomorrow's Needs: AI-Driven Traffic Analysis Guides TxDOT's Efficient Infrastructure Investments
I. Data-Driven Routes, Reduced Delays: TxDOT Embraces AI to Enhance Traveler Experience and Efficiency
J. Minimizing Risks Through Real Time Data: TxDOT Optimizes Road Safety with AI-Powered Incident Analysis
K. Unlocking Savings, Enhancing Sustainability: Data-Powered Optimization of TxDOT Utility Usage

L. Empirical Safety, Optimized Flow: TxDOT Leverages AI for Strategic Speed Limit Evaluation

M. Predicting Maintenance, Extending the Lifespan: TxDOT Prioritizes Roadway Health with AI-Enabled Maintenance

N. Streamlining Reimbursements, Saving Time: AI-Powered Efficiency for TxDOT Travel and Expenses

O. Empowering Efficiency, Empowering People: AI-Enabled Process Automation at TxDOT

P. GenAI Enabled Document Generation: Streamlining Content Creation

Q. Smarter Contracting: TxDOT's AI-Powered Contract Management

R. Investing in People: TxDOT's AI Upskilling and Knowledge-Sharing Initiative

S. GenAI for Efficient Document Summarization: Elevating Information Management

T. Connecting with Stakeholders, Empowering Employees: TxDOT's AI Powered Virtual Assistant

U. Building a Smarter Workforce, Building a Better Future: TxDOT Leverages AI for Strategic Talent Management

V. Automating Mundane Tasks: TxDOT Leverages AI for Personal Productivity

W. Optimizing Resource Allocation for Equipment and People: Data-Driven Insights with TxDOT AI

X. Matching Needs with Solutions: Streamlining TxDOT's Tool Selection Process with AI

Y. Proactive Security, Enhanced Trust: Safeguarding TxDOT with AI-Driven Fraud and Threat Detection

Z. Building Resilience from the Start: TxDOT Prioritizes Project Success with AI-Enabled Risk Identification

AA. Ensuring Right Materials, Right Time: AI-Powered Optimization for TxDOT's Stockpile Efficiency

BB. Maximizing Uptime, Minimizing Costs: TxDOT Streamlines IT Infrastructure with AI Powered Optimization

CC. Predictive Planning, Streamlined Delivery: TxDOT Leverages AI for On-Time Project Completion

DD. Smart Rides, Optimized Fleet: AI-Powered Vehicle Management for TxDOT Efficiency

8 CONCLUSION

Over the next three years, TxDOT plans to enhance its processes, policies, and responsible management of Texas' transportation investments by embracing AI. The recommendations in the AI Strategic Plan to enable capabilities and AI use cases will prepare TxDOT for upcoming innovations in technology that will change how the agency works. The plan emphasizes optimizing infrastructure, improving data-driven decision-making, enhancing the stakeholder experience, and unlocking workforce potential. ITD's AI Program will oversee use case implementation, furthering a culture of innovation, developing data governance frameworks, fostering strategic partnerships, and ensuring ongoing stakeholder collaboration. This AI Implementation Roadmap commits TxDOT to purposeful implementation while ensuring safe and reliable AI use, and prioritizing transparent AI with human accountability, all while upholding the highest standards of responsibility and ethics.

As TxDOT implements solutions, the AI workgroup will implement a portfolio of AI capabilities relative to the strategy and roadmap.

APPENDIX: AI USE CASES

A. Using AI to Analyze TxDOT's Infrastructure

Challenge: TxDOT faces significant and ongoing challenges in collecting and managing diverse roadway data, including utility maps, sign inventories, traffic signals, and pavement metrics. Traditional manual methods lead to data inconsistencies and inaccuracies, impacting effective planning, safety, and asset management. There's a lack of a cohesive system for organizing and analyzing this critical information, and innovative data collection methods remain largely untapped.

1. **Intelligent Utility Mapping and Conflict Detection:** As a TxDOT utility coordinator, I want an AI tool that integrates utility mapping data from various sources, such as Subsurface Utility Engineering (SUE) and Utility Investigation Reports (UIR), to create a comprehensive, project-specific utility map, identifying potential conflicts and reducing the risk of utility-related delays and safety hazards during construction.
2. **AI-Assisted Bridge Inspection and Deterioration Prediction:** As a TxDOT bridge inspector, I want an AI tool that leverages drones, computer vision, and machine learning to automate bridge inspections, identifying structural issues, corrosion, and deterioration patterns, and predicting future bridge conditions, so that TxDOT can prioritize bridge maintenance and repair activities, ensuring the safety and longevity of its bridge inventory.

3. **AI-Driven Sign Inventory and Compliance:** As a TxDOT sign maintenance supervisor, I want an AI tool that uses computer vision and machine learning to automatically inventory signs, assess their condition, reflectivity, and compliance with spacing and height standards, so that TxDOT can efficiently manage its sign assets, prioritize maintenance activities, and ensure that all signs meet safety and visibility requirements.
4. **Automated Survey Data Collection and Processing:** As a TxDOT surveyor, I want an AI system that leverages drones, LIDAR, and computer vision to automatically collect and process survey data, generating accurate 3D models and measurements for design projects, right-of-way analysis, and asset management, reducing the need for manual field measurements and improving the efficiency and safety of survey operations.
5. **AI-Powered Environmental Impact Assessment:** As a TxDOT environmental specialist, I want an AI tool that analyzes data from various sources, including satellite imagery, drones, and field sensors, to assess the environmental impact of right-of-way activities on wildlife habitats and sensitive areas, enabling TxDOT to make informed decisions, minimize environmental disruptions, and ensure compliance with regulations.
6. **Intelligent Inventory Management and Maintenance:** As a TxDOT warehouse manager, I want an AI system that automatically tracks and manages inventory levels for equipment, materials, and spare parts, predicting demand, optimizing stock levels, and alerting staff when items need to be reordered or replaced, ensuring that TxDOT can efficiently manage its inventory and minimize downtime due to equipment failures or material shortages.
7. **AI-Assisted ITS Device Monitoring and Troubleshooting:** As a TxDOT Intelligent Transportation Systems (ITS) technician, I want an AI tool that continuously monitors the health and performance of ITS devices, such as cameras, dynamic message signs, and fiber optic networks, identifying potential issues, and providing guidance on troubleshooting and repair activities, minimizing downtime and ensuring the reliability of TxDOT's ITS infrastructure.
8. **Predictive Material Testing and Quality Control:** As a TxDOT materials engineer, I want an AI system that analyzes historical material testing data, along with environmental and project-specific factors, to predict the likelihood of material failures and optimize testing frequencies, enabling TxDOT to proactively identify and address potential quality issues, reduce testing costs, and ensure the durability and performance of its infrastructure materials.
9. **AI-Powered Pedestrian and Bicycle Data Collection and Analysis:** As a TxDOT active transportation planner, I want an AI tool that leverages computer vision and sensor data to automatically detect, count, and analyze pedestrian and bicycle traffic, providing valuable insights into usage patterns, safety concerns, and infrastructure needs, enabling TxDOT to make data-driven decisions and prioritize investments in pedestrian and bicycle facilities.

B. Strategic Project Prioritization at TxDOT with AI Insights

Challenge: TxDOT continually optimizes resource allocation for critical infrastructure projects. Through continuous improvement processes, the flexibility to re-prioritize selection criteria by integrating a data-driven strategy, TxDOT increase agility as strategic objectives or resources shift.

1. **Project Prioritization:** As a TxDOT portfolio manager, I want an AI powered tool to assist with prioritization of projects based on a wide variety of user and program factors, including current and predicted road and bridge conditions, safety remediations and enhancements, road growth, improvement requests, and available funding, so that TxDOT can allocate resources more effectively, efficiently and expeditiously.
2. **Funding Optimization and Allocation:** As a finance manager, I want the AI system to analyze spending patterns, project outcomes, and funding constraints to identify areas where budget adjustments or reallocations could improve overall ROI, so TxDOT can make the most of available resources.

3. **Planning for Portfolio Resilience:** As a planning director, I want an AI-powered budgeting tool that allows me to run "what-if" scenarios with different funding allocations, project mixes, and economic forecasts, so I can assess long-term impacts and optimize the use of TxDOT funds.
4. **Predictive Maintenance Planning:** As a TxDOT maintenance supervisor, I want an AI system that can predict maintenance needs, prioritize tasks, and generate optimized maintenance schedules based on asset conditions, performance data, and historical information, so that TxDOT can proactively address issues and extend infrastructure lifespan.
5. **Automated Workflows and Documentation:** As a TxDOT project engineer, I want an AI-assisted system that can automate repetitive tasks, generate required documentation, and reduce the

manual effort involved in submitting project forms and reports at various stages, so that I can streamline processes and focus on high-value activities.

6. **Optimizing Facilities and Resources for Truck Needs**: As a logistics planner, I want AI to identify optimal facilities for truck demands, utilizing historical data and available materials to improve transportation infrastructure and parking solutions.
7. **AI-Powered Conflict Analysis for Construction:** As a construction manager, I want AI to perform conflict analysis for utilities and permits, including analyzing roadway alignments and maintenance schedules, to avoid project delays and streamline the construction process.
8. **Infrastructure Design and Land Acquisition Predictions**: As a design engineer, I want AI to predict potential construction or land acquisition sites based on current and future needs.

C. AI in Plans, Specifications, and Estimates (PS&E) Review

Challenge: TxDOT's plan review and road design processes face limitations due to reliance on manual methods and traditional analysis, leading to inconsistencies, errors, suboptimal choices, and missed optimization opportunities. By integrating AI tools, TxDOT aims to streamline the design process, ensure accuracy and adherence to standards across complex design documents, improve decision-making, and promote data-driven design practices, ultimately reducing costly change orders and leveraging AI-assisted approaches for design excellence.

1. **Design Verification & Error Detection:** As a TxDOT engineer, I want an AI system to review design documents, cross-referencing TxDOT and federal manuals to accurately verify alignment data, superelevation, sign spacing, and other critical elements for rapid error identification.
2. **Safety Optimization:** As a TxDOT safety engineer, I want to use AI to analyze design plans against safety best practices and standards, recommending improvements to enhance the safety and efficiency of my designs.
3. **Document Clarity & Consistency:** As both an author and reviewer of plans, I want AI assistance to check for typos, formatting issues, and grammatical errors. I also want the AI to ensure consistent diction and alignment with TxDOT style standards, improving plan clarity and communication.

4. **Quality Assurance & Insights:** As a plan reviewer, I want the AI to track recurring comments and design issues to streamline my reviews, enhance project consistency, and proactively address common problems.
5. **Expert Support:** As a senior plan reviewer, I want the AI to serve as a second set of eyes, flagging potential issues in plans so I can prioritize complex design assessments.
6. **Data-Driven Design:** As a project manager, I want the AI to identify design elements based on limited data and indicate how those elements might be impacted if additional data becomes available.
7. **Long-Term Design Viability:** As a design engineer, I want the AI to evaluate the long-term viability of my designs, considering factors such as traffic projections and maintenance needs, minimizing the risk of costly future redesigns.
8. **Pavement Optimization**: As a pavement engineer, I want an AI system that analyzes pavement condition data, traffic patterns, and lifecycle cost models to recommend the most suitable pavement treatments and designs for specific projects, so I can make informed decisions that optimize performance and longevity.
9. **Statewide Best Practices and Design Standardization**: As a standards coordinator, I want an AI system that analyzes design outcomes and project data across the state to identify best practices

and optimize PS&E packages, facilitating the adoption of uniform design standards that align with safety improvements and driver expectations.

10. **Design Refinement & Best Practices:** As a project manager, I want an AI system that mines successful project data (PS&E packages) across the state, identifies common design elements contributing to positive outcomes, and recommends best practices tailored to the specific conditions of my projects.
11. **3D Modeling & Data-Driven Design:** As a road design engineer, I want an AI-powered 3D modeling tool that integrates survey data, terrain information, and design standards to generate initial road designs. This will streamline the creation of preliminary models and allow me to focus on more complex design aspects.

D. Objective Bid Item Estimation: Optimizing TxDOT Project Analysis with AI Insights

Challenge: Project cost and timeline projections are susceptible to economic fluctuations, regional variances, and supply chain disruptions. Enhancements to the bid evaluation system and processes are needed for analyzing bids, selecting vendors, and managing change orders.

1. **AI-Powered Bid Prediction and Estimation:** As a TxDOT project manager, I want an AI system that analyzes historical bid data, commodity prices, and market trends to provide accurate and reliable bid predictions and cost estimates for construction and maintenance projects, considering regional variances and potential supply chain disruptions, so that TxDOT can make informed decisions about estimates, budgets, and vendors.
2. **Intelligent Bid Comparison and Vendor Selection:** As a TxDOT procurement officer, I want an AI tool that compares vendor bids, evaluates their terms and prices against other public procurements, and recommends the best vendor based on factors such as past performance, pricing, and quality, so that TxDOT can ensure fair and competitive bidding processes while maximizing value for money. (consider for R – contracting)
3. **AI-Assisted Change Order Management:** As a TxDOT contract administrator, I want an AI system that assists in the change order process by analyzing bid item pricing, finding exact items and descriptions based on project needs, and providing cost data to support price negotiations, so that TxDOT can effectively manage change orders, minimize cost overruns, and ensure project success.
4. **Predictive Models for Accurate Bid Pricing and Estimation:** As a TxDOT estimator, I want AI-powered prediction models that leverage historical cost data, market trends, and project-specific factors to generate accurate bid prices and estimates for engineering, survey, and science contracts, so that TxDOT can negotiate fair prices, reduce guesswork, and improve overall project budgeting and planning.

5. **Automated Bid Analysis and Validation:** As a TxDOT bid reviewer, I want an AI system that automatically checks bids for mathematical accuracy, identifies unbalanced bids, and provides recommendations on bid item pricing and scheduling changes, so that TxDOT can streamline the bid review process, ensure compliance with specifications, and make data-driven decisions during bid evaluation and award.

E. TxDOT's AI-Powered Approach to Traffic Flow Management

Challenge: The Texas Department of Transportation (TxDOT) is focused on improving traffic flow management through AI-powered traffic signal optimization. Existing traffic signal systems require significant manual intervention for adjustments and fail to adapt optimally to real-time traffic conditions, leading to inefficiencies and safety concerns. TxDOT's objective is to implement AI solutions capable of dynamically adjusting signal timing and phasing in real time, tailored to actual traffic volumes, varying times, and events. This initiative aims to minimize manual adjustments, enhance traffic signal operations standardization, and promote smoother, safer travel experiences across the state.

1. **AI-Powered Signal Timing Optimization**: As a traffic management engineer, I want an AI-powered system that optimizes signal timing across various corridors, dynamically adjusting to real-time traffic conditions to enhance traffic flow, minimize delays, and improve safety.
2. **Shortened Green Light Phases When Unneeded**: As a traffic analyst, I want an AI-powered system to intelligently shorten the green light phase at intersections when no vehicles are present or approaching, ensuring efficient movement, and reducing idle times.
3. **Dynamic Signal Phasing for Daily High-Volume Traffic**: As a city traffic engineer, I require an AI-powered solution that changes signal timing and phasing dynamically at high-volume intersections, tailored to daily peaks, unexpected reroutes, and special events, to optimize flow and decrease bottlenecks.
4. **AI-Powered Signal Timing for Special Events**: As a city traffic engineer, I desire an AI-powered solution for dynamically adjusting signal timing and phasing at high-traffic intersections around special events, using historical traffic data for seamless coordination with adjacent jurisdictions and reducing congestion.
5. **AI-Powered Incident Response:** As a traffic operations manager, I need an AI-powered solution that can analyze real-time incident data (location, severity, type and number of vehicles involved, type and number of injuries, and lane closures), traffic flow, and weather conditions to predict the potential impact on traffic patterns. The AI should recommend dynamic adjustments to signal timing and phasing, as well as suggest alternative routes, to minimize congestion and delays while ensuring efficient response for emergency vehicles.
6. **AI-Powered Traffic Management Solutions**: As a TxDOT infrastructure engineer, I seek integrated AI-powered traffic management field solutions that integrate with existing sensors, streamline smart intersection operation, implement signal optimization, and simplify infrastructure.
7. **Data-Driven Safety and Infrastructure Insights**: As a traffic safety engineer, I want the AI-powered system to analyze traffic data and imagery to identify safety hazards and infrastructure needs, recommending physical and timing adjustments to enhance safety for all road users, including the separation of cyclists and vehicles.

8. **AI-Assisted Analysis for Complex Traffic Solutions**: As a senior traffic analyst and planner, I want the AI-powered system to analyze traffic trends and identify scenarios where optimization solutions do not converge stably, recommending areas for human intervention to apply complex reasoning and develop stable solutions.
9. **AI-Informed Design Standard Improvements**: As a traffic operations manager, I seek AI analysis of traffic flow and management practices to suggest updates to design standards and best practices for more efficient and safer roadways.
10. **AI-Optimized Communication Strategies for Traffic Management**: As a state traffic operations coordinator, I want the AI to utilize the most effective communication strategies for traffic management, including system integrations and alerts to personnel. This AI functionality should adapt communication methods in real-time based on their effectiveness, ensuring efficient traffic flow and cooperation across agencies during normal operations and events.

F. AI for Data-Driven Crash Hotspot Mitigation

Challenge: Effectively identifying high-risk crash locations and developing targeted countermeasures is a complex task. Current methods, relying on manual analysis of disparate data sources, are time-consuming and prone to overlooking critical trends. TxDOT aims to address these challenges by implementing AI solutions that enhance hotspot identification, prioritize interventions, provide comprehensive crash data analysis (inclusive of all road users), and detect near-miss incidents.

1. **AI-Driven Hot Spot Detection:** As a safety analyst, I want an AI system that integrates CRIS, SKID, wet surface history, roadway geometry, weather patterns, and traffic volumes to accurately predict high-risk locations and potential crash hotspots. This will enable me to prioritize safety investigations and proactively address risks.
2. **Comprehensive Crash Data Analysis:** As a safety data analyst, I want an AI system that performs in-depth analysis of crash data, extracting contributing factors, driver behaviors, and other relevant details from unstructured narratives. This will provide a deeper understanding of crash causation and inform TxDOT's safety strategies.
3. **Automated Countermeasure Evaluation:** As a roadway engineer, I want an AI system that automates the identification of safety issues and suggests appropriate countermeasures (roadway design changes, signage, enforcement, etc.), providing supporting evidence and potential impact assessments to aid in decision-making.
4. **Crash Data Screening and Anomaly Detection:** As a data scientist, I want AI tools to assist in analyzing crash data, identifying anomalies and patterns across all crash reports, including those involving low-volume rural roadways, pedestrians, cyclists, and other vulnerable road users. This will enable the development of targeted safety improvements.
5. **Privacy-Compliant Problem Driver Identification:** As a data scientist, I want the AI system to enable complex queries across multiple data sources (crash data, driver records, vehicle registration, etc.) while strictly maintaining data privacy. This will support the identification of high-risk driver groups, locations, times, and events.
6. **Safety Measure Effectiveness Analysis:** As a senior traffic safety engineer, I want AI assistance in identifying safety standards that may require updating based on real-world crash data.

G. AI-Enabled Decision Support for Emergencies

Challenge: TxDOT aims to transform its emergency response capabilities from reactive to proactive through the strategic implementation of AI solutions. The challenge lies in leveraging AI to predict the impact of weather events and incidents, optimize resource management, enhance emergency situational awareness, and streamline coordination. TxDOT can prioritize safety and minimize disruptions across the state's transportation network during disruptive events by developing AI-powered tools for decision support, weather forecasting, asset tracking, and dynamic emergency planning.

1. **AI-Powered Resource Optimization for Disruptive Events:** As a logistics manager, I want an AI system to predict and optimize the allocation of resources (such as brine for ice treatment) across the state, ensuring materials are used efficiently and transferred to where they are most needed without wastage.
2. **Weather Monitoring and Asset Vulnerability Prediction:** As a maintenance planner, I want an AI system to monitor incoming weather events and predict which roads and assets will be most impacted, allowing for preemptive actions to mitigate negative effects on the transportation network.
3. **Emergency Fleet Optimization Pre-Event:** As a fleet manager, I want AI to use weather predictions to preplan and preplace the TxDOT fleet for emergency responses, ensuring optimal readiness and response times for any weather event.
4. **Weather-Related Closure Recommendations:** As a district safety officer, I want an AI tool to recommend school and business closures based on severe weather forecasts and historical accident data, aiming to prevent fatalities and ensure community safety.
5. **Tornado Detection via Weather System Tracking:** As a weather analyst, I want AI to utilize real-time feeds for early tornado detection, enabling quicker emergency alerts and responses to protect road users and infrastructure.
6. **Real-Time Treatment Strategy Effectiveness Monitoring:** As an operations manager, I want AI to provide live feedback on the effectiveness of ice and snow treatments during winter weather events, enabling immediate adjustments to ensure road safety.
7. **Wrong-Way Driver Alert System Development:** As an operations manager, I want an AI-powered system to develop and deploy wrong-way driver alerts, enhancing driver awareness and reducing the risk of accidents.
8. **Emergency Route Coordination Using AI:** As an emergency response coordinator, I want AI to analyze current and historical data and previous actions to identify optimal evacuation routes and detours, enabling swift, informed decisions that enhance safety and mobility during emergencies.
9. **Incident Response Planning for Planned and Unplanned Corridor Events:** As a traffic management center operator, I want AI assistance in responding to both planned and unplanned corridor incidents, utilizing real-time data to manage traffic effectively and minimize disruptions.

10. **AI-Enhanced Traffic Management Centers:** As a rural district traffic manager, I want AI to supplement ad hoc traffic management efforts, providing insights for both rural and urban areas to improve emergency traffic flow and safety.
11. **Real-Time Situational Awareness:** As a communications specialist, I want an AI-powered tool that monitors social media and emergency communication channels during a disruptive event to identify areas of concern, infrastructure malfunctions, and potential misinformation, so I can address issues proactively and provide accurate public updates.
12. **Emergency Coordination & Collaboration:** As an emergency response coordinator, I want an AI-supported communication platform that facilitates information sharing among TxDOT, local authorities, and emergency services, providing a common operating picture and enabling coordinated response actions.

H. AI-Driven Traffic Analysis Guides TxDOT's Infrastructure Investments

Challenge: TxDOT faces the challenge of proactively planning infrastructure investments to address future traffic demands and changing mobility patterns. Current methods often rely on historical data and manual analysis, which may not fully account for complex factors such as population growth, economic shifts, and emerging transportation technologies. The goal is to implement AI-driven traffic analysis solutions to enable predictive insights, optimize resource allocation, and ensure TxDOT's infrastructure aligns with future needs.

1. **Predicting Traffic Demand for Informed Infrastructure Investments:** As a TxDOT planner, I want an AI-driven system that predicts future traffic demands on facilities by analyzing various datasets, including population growth, economic shifts, land development patterns, and emerging mobility technologies. This will enable me to identify potential bottlenecks, prioritize infrastructure investments, and allocate resources efficiently to accommodate future needs.

2. **Strategic Demand Forecasting for Proactive Planning and Budgeting:** As a TxDOT executive, I want an AI tool that monitors economic indicators, population trends, and development patterns to forecast major changes in transportation demand. By incorporating these insights into the Unified Transportation Program (UTP), TxDOT can proactively plan, program, and budget for future needs, ensuring that infrastructure investments align with long-term strategic goals.

3. **Proactive Highway Capacity Planning with AI Insights:** As a TxDOT highway planner, I want an AI tool that compares land growth projections with existing roadway capacities to identify areas where expansion projects are most critical. By predicting future traffic trends and pinpointing strategic locations for infrastructure development, I can proactively plan highway improvements that accommodate growing demands and optimize resource allocation.

4. **Traffic Simulation for Infrastructure Planning**: As an infrastructure engineer, I want a traffic simulation tool powered by AI to take traffic counts at intersections and plan lane configurations or bridge needs, ensuring that TxDOT infrastructure meets future traffic demands efficiently.

5. **Public Transit Demand Prediction:** As a TxDOT transit planner, I want an AI system that can predict public transit demand based on demographics, trip data, and routing analysis, so that I can optimize transit services and ensure they effectively serve the needs of the community.

I. AI-Optimized Route Suggestions

Challenge: TxDOT faces the challenge of optimizing traffic flow and improving travel experiences in an increasingly complex transportation landscape. Current routing and traffic management systems often rely on limited data sources and manual adjustments. AI-driven solutions are needed to analyze diverse real-time data, empower travelers with better route suggestions, and enable proactive traffic management that accommodates emerging technologies.

1. **AI-Integrated Traffic Management System:** As a Traffic Management Center (TMC) operator, I want an AI-integrated traffic management system that collects and analyzes high-resolution data from autonomous vehicles (AV), connected vehicles (CV), traffic signals, and other sources, so that I can make informed decisions to optimize traffic flow and reduce congestion in real-time.
2. **AI-Assisted Traffic Management for Autonomous Vehicles:** As a traffic manager, I want an AI system that can effectively manage and integrate self-driving vehicles into the overall traffic flow, predicting their behavior, optimizing their routing, and ensuring a smooth transition as autonomous vehicle adoption increases, ultimately improving road safety and efficiency.

3. **Real-Time Traffic Alerts and Routing:** As a road user, I want to receive real-time traffic alerts and AI-optimized routing suggestions enabling me to avoid congested routes and reduce travel time.
4. **Personalized Carpool and Rideshare Suggestions:** As a commuter, I want an AI-powered system that provides me with personalized carpool and rideshare matching suggestions based on my travel patterns, preferences, and real-time traffic conditions, so that I can save time, reduce my carbon footprint, and contribute to more efficient road usage.
5. **Optimized Transit Routing and Scheduling:** As a transit user, I want an AI-driven system that optimizes routing and scheduling for intercity transit, providing me with accurate, up-to-date information on arrival times, connections, and potential disruptions, so that I can plan my trips more efficiently and reliably.
6. **Intermodal and Intramodal Trip Planning:** As a traveler I want an AI tool for intermodal trip planning that recommends the best combination of transportation modes for my journey, considering time, cost, and convenience, to enhance my overall travel experience.

J. Optimized Road Safety with AI-Powered Incident Analysis and Response

Challenge: TxDOT faces the challenge of quickly detecting, responding to, and mitigating the impact of traffic incidents, crashes, and work zone hazards on Texas roadways. Current incident management systems often rely on manual reporting, leading to delayed response times and increased risk of secondary accidents. The goal is to leverage AI technologies to enable real-time incident detection, rapid public notification, and proactive measures to prevent collisions and secondary crashes, ultimately enhancing road safety and minimizing the overall impact of incidents on traffic flow.

1. **AI-Powered Crash Detection and Secondary Crash Prevention:** As a traffic management center operator, I want an AI system that can detect crashes in real-time using data from traffic cameras, sensors, and connected vehicles, and automatically trigger notifications to emergency responders and nearby vehicles to help prevent secondary crashes.
2. **Proactive Work Zone Safety Monitoring:** As a work zone safety manager, I want an AI-powered system that continuously monitors work zones using video analytics and sensor data to detect potential hazards, such as vehicles entering restricted areas or workers in dangerous positions and alerts me in real-time so I can take proactive measures to ensure worker and driver safety.
3. **Intelligent Incident Detection and Public Notification:** As a public information officer, I want an AI tool that can quickly detect highway accidents and work zone incidents, and automatically generate and disseminate clear, timely notifications to the public through various channels (e.g., mobile apps, dynamic message signs, social media) to help drivers avoid affected areas and reduce the risk of further accidents.
4. **Real-Time Traffic Incident Impact Assessment:** As a traffic operations manager, I want an AI system that can analyze real-time traffic data, historical incident patterns, and contextual information to assess the potential impact of a detected incident on traffic flow, predict the duration of the disruption, and recommend optimal response strategies and detour routes to minimize congestion and delays.
5. **AI-Assisted Incident Response Coordination:** As an incident response coordinator, I want an AI-powered platform that facilitates seamless communication and collaboration among multiple agencies (e.g., TxDOT, law enforcement, emergency services) during incident response, providing real-time data sharing, unified command support, and intelligent resource allocation recommendations to ensure a swift, well-coordinated response.

K. Data-Powered Optimization of TxDOT Utility Usage

Challenge: TxDOT faces challenges in effectively managing and analyzing utility data, including tracking rates, asset performance, and identifying inefficiencies such as zero use accounts. The goal is to leverage AI technologies to streamline utility data management, identify inefficiencies, and provide actionable insights that enable TxDOT to reduce utility costs, enhance energy efficiency, and promote sustainable practices across its operations.

1. **AI-Powered Utility Data Analysis and Monitoring:** As a TxDOT facility manager, I want an AI system that can continuously analyze and monitor utility data, including rates, asset locations, and performance metrics, so that I can easily track utility consumption, identify trends, and make data-driven decisions to optimize utility usage and reduce costs.
2. **Automated Utility Outage Compilation and Reporting:** As a TxDOT operations manager, I want an AI tool that automatically compiles and reports utility outages across TxDOT facilities, providing me with real-time alerts and insights into the impact of outages on operations, so that I can quickly respond to incidents, coordinate with utility providers, and minimize disruptions.

3. **Intelligent Utility Meter Tracking and Mapping:** As a TxDOT asset manager, I want an AI-powered system that can accurately track and map all utility meters, including temporary meters, across TxDOT facilities, even in the absence of addresses or coordinates, so that I can maintain a comprehensive inventory of TxDOT utility assets and ensure accurate billing and reporting.
4. **Zero Use Account Detection and Optimization:** As a TxDOT financial analyst, I want an AI tool that can automatically analyze TxDOT utility bills and identify accounts with zero usage, so that I can investigate these accounts, eliminate unnecessary expenses, and optimize the TxDOT utility budget.
5. **Predictive Utility Cost Forecasting and Budgeting:** As a TxDOT budget manager, I want an AI system that can predict future utility costs based on historical data, weather patterns, and facility usage trends, so that I can accurately forecast TxDOT utility expenses, allocate resources effectively, and identify opportunities for cost savings.

L. Leverage AI for Strategic Speed Limit Evaluation

Challenge: TxDOT faces the challenge of setting appropriate speed limits across its network of roadways, balancing safety and efficient traffic flow. The current process of conducting speed studies and responding to public complaints is time-consuming and relies on limited data, leading to suboptimal decisions and inefficient resource use. The goal is to use AI to streamline speed limit evaluation, enable data-driven decisions, and optimize speed limits based on real-world conditions, enhancing safety and improving traffic flow.

1. **AI-Powered Speed Limit Optimization**: As a TxDOT traffic engineer, I want an AI system that continuously analyzes data from connected vehicles, road geometry, and historical traffic patterns to recommend optimal speed limits for each road segment, so that I can make data-driven decisions that balance safety and traffic flow, and proactively adjust speed limits based on real-world conditions.
2. **Automated Speed Study Analysis**: As a TxDOT transportation planner, I want an AI tool that can automatically perform speed studies, calculate 85th percentile values, and identify areas where speed limits are consistently exceeded or underutilized, so that I can quickly prioritize locations for further investigation and potential speed limit adjustments, without relying on manual data collection and analysis.
3. **Data-Driven Speed Limit Safety Analysis**: As a safety analyst, I want an AI tool that continuously monitors connected vehicle data to detect patterns of hard braking or sudden speed reductions within existing speed zones. This information will help me pinpoint potential safety hazards related to speed limit zone transitions and infrastructure design.
4. **AI-Assisted Complaint Validation and Prioritization**: As a TxDOT customer service representative, I want an AI system that can validate and prioritize public complaints about speed limits by cross-referencing them with connected vehicle data and historical traffic patterns, so that I can quickly identify legitimate concerns, focus on the most relevant issues, and allocate resources efficiently to address the most pressing speed limit concerns.

M. Prioritize Roadway Health with AI-Enabled Maintenance

Challenge: TxDOT faces the challenge of effectively maintaining and preserving its roadway infrastructure to ensure long-term performance and safety. The current process of conducting roadway checks, verifications, and inspections is labor-intensive and often reactive, making it difficult to prioritize maintenance activities and allocate resources efficiently. The goal is to leverage AI technologies to predict how weather conditions and other factors impact road health, enable proactive maintenance planning, and optimize resource allocation, ultimately extending the lifespan of TxDOT's roadway infrastructure and improving overall resiliency.

1. **Predictive Road Health Monitoring:** As a TxDOT maintenance engineer, I want an AI system that continuously analyzes data from weather patterns, traffic volumes, and road sensor networks to predict how these factors impact the health and degradation of roadways over time, so that I can proactively identify at-risk areas, prioritize maintenance activities, and allocate resources efficiently to extend the lifespan of the TxDOT infrastructure.
2. **AI-Assisted Inspection Scheduling and Prioritization:** As a TxDOT maintenance supervisor, I want an AI tool that optimizes the scheduling and prioritization of roadway inspections based on predicted deterioration rates, historical maintenance data, and available resources, so that I can ensure teams are focusing on the most critical areas, minimizing unnecessary inspections, and maximizing the effectiveness of TxDOT maintenance efforts.

N. Streamlining Reimbursements: AI-Powered TxDOT Travel and Expenses

Challenge: TxDOT employees often find the travel expense reporting process to be time-consuming and complex, requiring manual data entry from receipts, calculation of taxes, and adherence to various policies and regulations. This complexity can lead to delays in reimbursements, increased workload for staff, and variance in expense report reviews. The goal is to leverage AI technologies to automate and streamline the travel expense reporting process, enabling employees to quickly and accurately submit their expenses, reduce administrative burden, ensure consistency in reviews, and facilitate timely reimbursements.

1. **Personalized Expense Reporting Assistance:** As a TxDOT employee, I want an AI-powered virtual assistant that can guide me through the expense reporting process, answer common questions, and provide personalized recommendations based on my specific travel details and the agency's policies, so that I can efficiently complete my expense reports and avoid potential errors or omissions.
2. **AI-Powered Expense Report Automation:** As a TxDOT employee, I want an AI-powered system that can scan my travel receipts, automatically populate the expense report, and accurately calculate taxes and totals, so that I can quickly and easily submit my travel expenses without the need for manual data entry or complex calculations.
3. **Seamless Hotel Expense Integration for Travelers:** As a TxDOT employee, I want the AI-powered expense reporting system to automatically integrate with Hotel Engine so that my hotel expenses, including the detailed breakdown of taxes, are seamlessly transferred to my expense report without the need for manual data entry.
4. **Intelligent Expense Report Review and Approval:** As a TxDOT manager, I want an AI-assisted tool that can review submitted expense reports for accuracy, completeness, and compliance with regulations, flagging issues or inconsistencies for further review, so that I can minimize the need for resubmittals.
5. **Streamlined Reimbursement Processing:** As a TxDOT finance officer, I want an AI system that can automatically process approved expense reports, integrate with the agency's financial systems, and initiate reimbursement payments to employees, so that I can reduce the administrative burden on finance staff and ensure timely payment of travel expenses.
6. **Predictive Analytics for Travel Budget Management:** As a TxDOT budget manager, I want an AI system that can analyze historical travel expense data, identify patterns and trends, and provide predictive insights into future travel costs and budget requirements, so that I can make data-driven decisions, optimize travel policies, and ensure effective allocation of financial resources.

7. **Intelligent Tax Reconciliation and Reimbursement for Finance Managers:** As a TxDOT financial expense manager, I want the AI-powered expense reporting system to intelligently handle the complex tax rules and reimbursement processes associated with hotel expenses, considering factors such as employee tax exemption status and hotel location, so that I can ensure accurate reconciliation of expenses and efficient processing of reimbursements from the state.

O. AI-Enabled Process Automation at TxDOT

Challenge: TxDOT faces challenges with process inefficiencies stemming from manual workflows, repetitive tasks, and disconnected systems across various departments. These inefficiencies can lead to delays, increased workload, and potential for errors. The goal is to leverage AI technologies to streamline and automate administrative processes, improving efficiency, saving time, and allowing employees to focus on higher-value work.

1. **AI-Driven Process Optimization and Automation:** As a TxDOT process improvement specialist, I want an AI system that continuously analyzes TxDOT's policies, procedures, and processes, identifying bottlenecks, recommending optimizations, and automating repetitive tasks through plain language inputs, so that TxDOT can streamline its operations, reduce manual effort, and improve overall organizational efficiency.
2. **Intelligent Systems Integration and Data Synchronization:** As a TxDOT IT manager, I want an AI solution that enables seamless integration and data synchronization between various systems, such as HCRS, Lonestar, PeopleSoft, and FNAV, reducing the need for manual data entry and ensuring consistency across platforms, so that TxDOT can optimize its IT infrastructure and improve overall operational efficiency.
3. **Automated Policy and Procedure Updates:** As a TxDOT policy manager, I want an AI system that monitors changes in regulations, industry best practices, and internal processes, automatically generating updates to relevant policy manuals and procedures, and flagging potential conflicts or inconsistencies for review, so that TxDOT can ensure its policies remain up-to-date and compliant.
4. **AI-Driven Workflow Optimization:** As a TxDOT process owner, I want an AI tool that analyzes existing workflows, identifies inefficiencies, and generates optimized workflow proposals based on plain language inputs, leveraging systems integrations so that TxDOT can continuously improve its processes and adapt to changing requirements.
5. **Automated Advanced Funding Agreement (AFA) Management:** As a TxDOT project manager, I want an AI-powered system that streamlines the AFA process by automating document workflows, tracking approvals, and providing easy access to AFA information for all relevant stakeholders, so that TxDOT can efficiently collaborate with other agencies and reduce delays caused by manual processes.
6. **Intelligent Maintenance Operations and Inspection Integration:** As a TxDOT maintenance supervisor, I want an AI system that automatically links maintenance operations expenses to relevant projects in the Nighttime Inspection App, updating the app with real-time status information as work orders are processed, so that TxDOT can have a more accurate and efficient way to track and manage maintenance activities.
7. **Automated Open Records Request Processing:** As a TxDOT records manager, I want an AI system that automates the processing of open records requests by intelligently categorizing, prioritizing, and

routing requests to the appropriate teams, generating necessary documentation, and tracking progress, so that TxDOT can promptly and efficiently respond to public information inquiries.

8. **AI-Assisted Materials Testing and Analysis:** As a TxDOT materials engineer, I want an AI system that automates the bulk analysis of test results, identifies trends and anomalies, and generates insights and recommendations for materials management, so that TxDOT can optimize its materials testing processes, ensure quality, and make data-driven decisions.
9. **AI-Powered Survey Contract Linking:** As a TxDOT survey coordinator, I want an AI system that automatically links survey requests submitted through the TxDOT Connect form to the corresponding survey contracts, extracting relevant information and populating the necessary fields, so that TxDOT can streamline the survey request process and reduce manual data entry.
10. **AI-Enhanced IT Ticketing and Support:** As a TxDOT employee, I want an AI-powered IT ticketing system that intelligently categorizes, prioritizes, and assigns tickets to the appropriate teams or representatives, providing quick and accurate resolutions to common issues and reducing the time spent on manual ticket triage, so that TxDOT can improve its IT support efficiency and minimize downtime for employees.
11. **Automated Specification Program Management:** As a TxDOT specification coordinator, I want an AI system that automates the SPEC program by generating memos, emails, and other communications based on changes to test procedures or specifications, ensuring that all relevant stakeholders are promptly informed and reducing the manual effort required to manage the program, so that TxDOT can maintain up-to-date and consistent specifications across its projects.

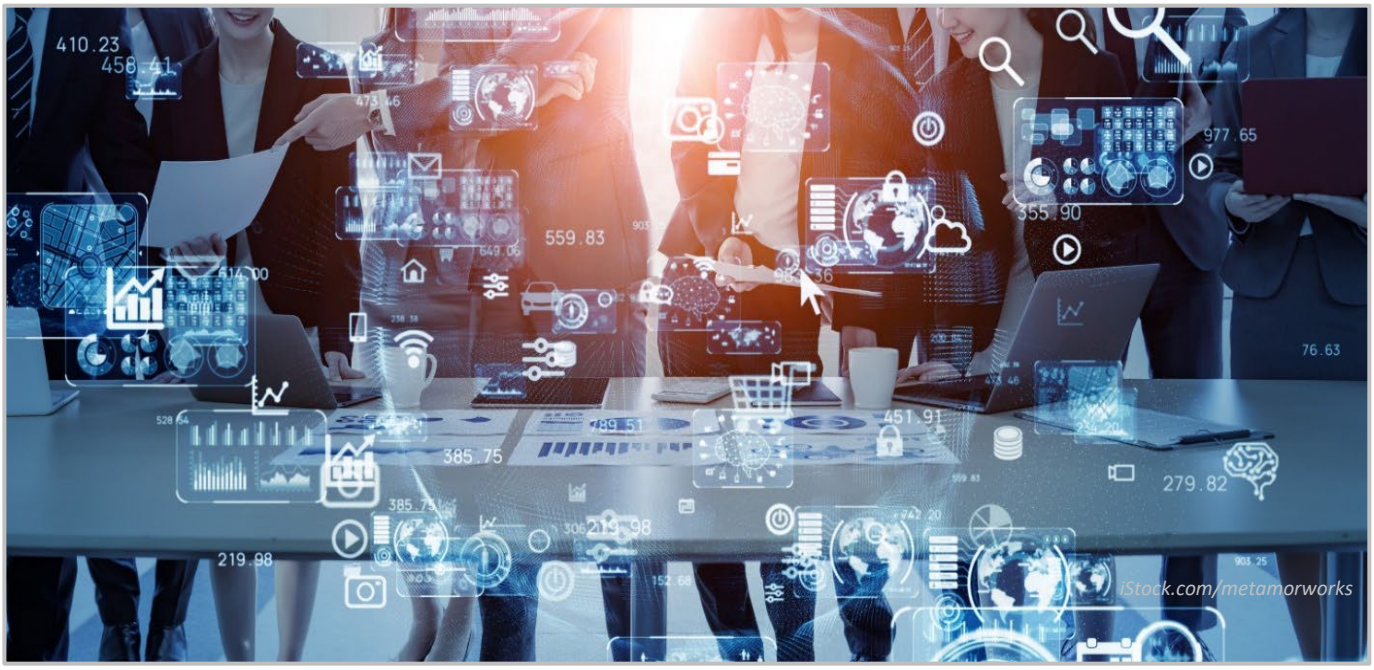
P. GenAI Enabled Document Generation

Challenge: TxDOT faces the challenge of streamlining and automating the creation, generation, and management of various documents, reports, and content across multiple divisions and projects. The current processes often involve manual data entry, repetitive tasks, and time-consuming formatting, leading to inefficiencies and potential inconsistencies. The goal is to leverage AI technologies, particularly Generative AI (GenAI), to automate document generation, streamline content creation, and ensure compliance with brand standards and regulatory requirements, ultimately improving productivity, consistency, and quality of TxDOT's documentation and communication efforts.

1. **AI-Assisted Damage Claim Reimbursement:** As a TxDOT claims specialist, I want an AI system that automatically identifies crash incidents, extracts relevant information from police reports and work orders, and compiles the necessary documentation for damage claims, so that TxDOT can streamline the reimbursement process, reduce manual effort, and ensure timely submission of claims to the appropriate entities.
2. **Intelligent Project Application Development:** As a TxDOT grant writer, I want an AI tool that assists in developing project applications for local funding by generating templates, auto-populating data, and providing recommendations based on past successful applications, so that TxDOT can create compelling and data-driven project proposals while reducing the time and effort required for manual preparation.
3. **Automated Right-of-Entry Letter Generation:** As a TxDOT right-of-way agent, I want an AI system that automatically generates right-of-entry letters for property owners, populating the letters with accurate parcel data, addresses, and project details, so that TxDOT can efficiently obtain the necessary permissions for survey work and streamline the right-of-way acquisition process.
4. **AI-Powered Survey Parcel Description Review:** As a TxDOT surveyor, I want an AI tool that reviews and writes parcel descriptions, identifying potential errors and inconsistencies based on learned patterns and best practices, so that TxDOT can improve the accuracy and quality of its survey documentation while reducing the time spent on manual review.
5. **Intelligent Content and Brand Compliance:** As a TxDOT communications specialist, I want an AI system that enforces content and brand standards across various materials, including presentations, scripts, and publications, automatically checking for consistency, accessibility, and compliance with guidelines, so that TxDOT can maintain a cohesive and professional brand image across all communications.
6. **AI-Assisted Storyboard and Script Generation:** As a TxDOT media producer, I want an AI tool that generates storyboards and scripts based on voice or text input, providing creative ideas and ensuring alignment with TxDOT's messaging and goals, so that TxDOT can streamline the production process and create engaging content more efficiently.
7. **Automated Federal Reporting Package Preparation:** As a TxDOT compliance officer, I want an AI system that assists in preparing federal reporting documents and packages, auto-populating

templates with relevant data, and ensuring compliance with regulatory requirements, so that TxDOT can streamline the reporting process, reduce errors, and ensure timely submission of required documentation.

8. **AI-Powered Environmental Report Generation:** As a TxDOT environmental specialist, I want an AI tool that generates environmental reports and studies, automating data entry, analysis, and formatting, so that TxDOT can accelerate the environmental review process, ensure consistency across reports, and support informed decision-making for transportation projects.
9. **Intelligent Manual and Process Document Updates:** As a TxDOT process owner, I want an AI system that assists in updating manuals and process documents, identifying areas requiring changes based on new policies, regulations, or best practices, and suggesting appropriate revisions, so that TxDOT can maintain up-to-date and accurate documentation while reducing the manual effort required for updates.
10. **AI-Enhanced Illustration and Graphic Creation:** As a TxDOT graphic designer, I want an AI tool that assists in creating illustrations and graphics for various purposes, such as presentations, reports, and public outreach materials, providing suggestions and automating repetitive tasks, so that TxDOT can enhance the visual appeal and effectiveness of its communications while saving time and effort.
11. **Intelligent Customer Service and Question Answering:** As a TxDOT customer service representative, I want an AI system that assists in answering common questions from the public, providing accurate and relevant information, and guiding users to appropriate resources, so that TxDOT can improve the efficiency and quality of its customer service while reducing the workload on staff.
12. **AI-Powered Safety Campaign Idea Generation:** As a TxDOT safety program manager, I want an AI tool that generates creative ideas and suggestions for safety campaigns, such as "End the Streak," based on analysis of past successful campaigns, public feedback, and emerging trends, so that TxDOT can develop impactful and engaging initiatives to promote road safety and reach a wider audience.



Q. AI-Powered Contract Management

Challenge: TxDOT's contract management processes encompass a wide range of activities, from procurement and contract development to invoice processing and compliance monitoring. Many of these processes are time-consuming, involve manual data handling, and have limited insights into overall performance. The goal is to leverage AI technologies to streamline contract management workflows, improve accuracy and efficiency, reduce contract disputes, and enable data-driven evaluations of contractors.

1. **AI-Enhanced Spend Tracking:** As a TxDOT financial analyst, I want an AI-powered dashboard that automatically tracks function code spending, integrating data from various sources such as PSCAMS and consultant reports, so that TxDOT can have real-time visibility into project expenses and make informed budget decisions.
2. **Automated Invoice Processing and Compliance Checking:** As a TxDOT accounts payable specialist, I want an AI tool that automatically reviews invoices, verifying mathematical accuracy and checking for non-reimbursable expenses, while also ensuring compliance with contract terms, so that TxDOT can process payments quickly and accurately, reducing the risk of disputes and errors.
3. **AI-Assisted Contract Development and Issue Resolution:** As a TxDOT contract manager, I want an AI system that analyzes historical contract data, identifies common issues and redundancies based on project types, and recommends improvements to contract language and structure, so that TxDOT can develop more effective contracts and proactively resolve potential problems.

4. **Intelligent Procurement Optimization:** As a TxDOT procurement officer, I want an AI tool that evaluates vendor pricing, availability, compliance, and risk factors, providing recommendations for optimal procurement strategies and automating the requisition-to-delivery process, so that TxDOT can achieve greater transparency, speed, and value in its procurement activities.
5. **Continuous Contract Compliance Monitoring:** As a TxDOT compliance manager, I want an AI system that continuously monitors contracts for compliance with key requirements, automatically flagging potential violations and providing a comprehensive compliance library, so that TxDOT can ensure adherence to standards, minimize disputes, and maintain strong vendor relationships.
6. **AI-Driven Vendor Performance Management:** As a TxDOT vendor manager, I want an AI tool that automatically tracks and evaluates vendor performance based on contract terms, delivery metrics, and other key indicators, providing insights into vendor strengths, weaknesses, and overall return on investment, so that TxDOT can make informed decisions about vendor selection and management.
7. **Proactive Change Management:** As a TxDOT project manager, I want an AI dashboard that tracks project progress against schedule and budget, uses predictive analytics to predict potential delays, budget overruns, or changes, and recommend proactive measures to keep projects on track, so that TxDOT can minimize disruptions and deliver projects successfully.
8. **Predictive Project Monitoring:** As a TxDOT construction inspector, I want an AI-powered image and video analysis tool that compares drone footage of construction sites against project plans and automatically flags potential discrepancies or quality issues.

R. TxDOT's AI Upskilling and Knowledge-Sharing Initiative

Challenge: TxDOT is committed to empowering its workforce through an AI upskilling and knowledge-sharing initiative, addressing the need for widespread AI literacy, effective use of technology, and cross-functional collaboration across the organization. The current challenge is the variability in AI and technology proficiency among employees, limited access to training resources, and a lack of platforms for sharing insights and best practices. By investing in comprehensive AI education, practical training, and collaborative tools, TxDOT aims to enhance staff capabilities, foster innovation, and ensure that all employees can leverage AI tools and data-driven processes efficiently, thereby supporting the agency's future objectives and projects.

1. **AI Literacy Training Program:** As a TxDOT employee, I want access to a comprehensive AI literacy training program that covers the fundamentals of AI, its applications in transportation, and best practices for using AI tools, so that I can develop the necessary skills and knowledge to effectively leverage AI technologies in my role and contribute to TxDOT's AI transformation.
2. **AI-Powered Knowledge Sharing Platform:** As a TxDOT employee, I want access to an AI-powered knowledge sharing platform that facilitates cross-functional collaboration, enables the exchange of ideas, algorithms, and success stories, and provides a centralized repository of AI projects and lessons learned, so that I can learn from others' experiences and contribute to the collective knowledge of the organization.
3. **AI-Assisted Training and Support:** As a TxDOT employee, I want access to AI-assisted training and support tools, such as interactive job aids, chatbots, and voice-to-text capabilities, that can help me quickly learn and troubleshoot software and AI applications, so that I can improve my productivity and effectively utilize AI technologies in my daily work.
4. **Tailored AI Training for Key Roles:** As a TxDOT manager, I want tailored AI training programs for key roles, such as EITs, maintenance technicians, supervisors, and district commissioners, that focus on the specific applications and benefits of AI in their respective areas, so that TxDOT can ensure the workforce has the necessary skills and knowledge to drive the successful adoption of AI technologies across the organization.
5. **AI Champion Network:** As a TxDOT district staff member, I want to be part of an AI Champion Network, where knowledgeable individuals from each district can provide feedback, share use cases, and act as a bridge between the districts and the central AI team, so that TxDOT can ensure the successful implementation and adoption of AI technologies across the organization.
6. **AI Innovation and Idea Management:** As a TxDOT employee with an innovative AI idea, I want a streamlined process and support system that helps me develop, refine, and implement my idea, connecting me with the necessary resources, expertise, and stakeholders, so that TxDOT can foster a culture of innovation and continuously improve its AI capabilities.

7. **Interstate DOT Collaboration for AI Training and Best Practices:** As a TxDOT AI program manager, I want to collaborate with other state DOTs to share AI training resources, best practices, and use cases, enabling the establishment of a multi-state AI knowledge-sharing network, so that TxDOT and its partner DOTs can learn from each other's experiences, avoid duplication of efforts, and accelerate the adoption of AI technologies in the transportation industry.
8. **AI Impact Communication:** As a TxDOT executive, I want a comprehensive communication plan that regularly shares the successes, benefits, and potential job impacts of AI technologies with employees, stakeholders, and partners, so that TxDOT can build trust, understanding, and support for its AI initiatives and address any concerns or misconceptions.

S. GenAI for Efficient Document Summarization

Challenge: TxDOT faces the challenge of efficiently managing, analyzing, and summarizing large volumes of information from various sources, such as job applications, resumes, policies, procedures, videos, and legislative documents. The current processes often involve manual review, data entry, and interpretation, which can be time-consuming, prone to errors, and may result in missed opportunities for capturing valuable insights. The goal is to leverage Generative AI (GenAI) technologies to automate document summarization, improve information retrieval, and enhance decision-making processes across multiple functions within TxDOT, ultimately streamlining operations, reducing manual effort, and enabling data-driven strategies.

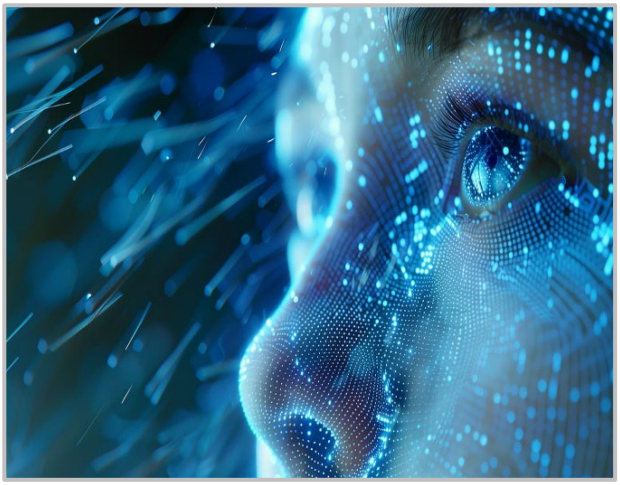
1. **AI-Assisted Job Application and Resume Screening:** As a TxDOT hiring manager, I want an AI system that automatically reviews job applications and resumes, providing summaries and key insights, so that TxDOT can streamline the initial screening process, identify the most promising candidates, and make informed hiring decisions more efficiently.
2. **Intelligent Policy and Procedure Analysis:** As a TxDOT policy analyst, I want an AI tool that filters through policies, procedures, and newly passed laws, identifying relevant updates, changes, and potential impacts on TxDOT's operations, so that TxDOT can stay compliant, adapt its processes, and make informed decisions based on the latest regulatory landscape.
3. **Automated Video Captioning and Translation:** As a TxDOT communications specialist, I want an AI system that automatically captures and captions videos and live streams and provides interpretive translations for content such as highway plans and studies, so that TxDOT can improve the accessibility and reach of its video content, particularly for individuals with low English proficiency.
4. **Intelligent Photo Metadata Generation:** As a TxDOT archivist, I want an AI tool that automatically generates metadata for TxDOT's extensive portfolio of photos, including relevant tags, descriptions, and context, so that TxDOT can improve the discoverability, organization, and utilization of its visual assets, enabling easier access to historical information and insights.
5. **AI-Powered Video Content Segmentation:** As a TxDOT videographer, I want an AI system that automatically segments and indexes video content based on topics, themes, or specific assignments, such as footage of flowers or construction projects, so that TxDOT can enhance the discoverability and usability of its video assets, enabling more efficient content creation and analysis.
6. **Intelligent Meeting Idea Capture:** As a TxDOT project manager, I want an AI tool that helps capture and summarize the best ideas, action items, and key takeaways from meetings with external partners and stakeholders, so that TxDOT can ensure valuable insights are documented, tracked, and leveraged for continuous improvement and collaboration.
7. **Automated Legislative Bill Analysis:** As a TxDOT government affairs specialist, I want an AI system that automatically analyzes proposed legislation, provides summaries, and identifies similar or

identical bills from previous sessions, so that TxDOT can stay informed about potential legislative impacts, develop proactive strategies, and effectively engage with policymakers.

8. **AI-Assisted Interview Analysis:** As a TxDOT HR recruiter, I want an AI tool that listens to candidate interviews, analyzes responses, and provides ratings or recommendations based on predefined criteria, so that TxDOT can streamline the interview process, reduce bias, and identify the best-fit candidates for each position.
9. **Intelligent Email and Chat Summarization:** As a TxDOT employee, I want an AI system that can summarize lengthy email threads or Teams chat conversations, highlighting key points, decisions, and action items, so that I can quickly grasp the essential information, save time, and stay on top of important communications.
10. **AI-Powered Design Standards Research:** As a TxDOT design engineer, I want an AI tool that can quickly search through TxDOT's inventory of completed research, standards, and best practices, providing relevant information and answers to specific design questions, so that I can access the knowledge I need to make informed design decisions and ensure compliance with established standards.
11. **Automated Regulation Comparison:** As a TxDOT compliance officer, I want an AI system that can easily compare and summarize state, federal, and local regulations, programs, and services relevant to TxDOT's operations, highlighting key differences, similarities, and potential conflicts, so that TxDOT can ensure compliance, identify opportunities for alignment, and make informed decisions.
12. **AI-Assisted Industry Monitoring and HR Recommendations:** As a TxDOT HR strategist, I want an AI tool that continuously monitors the transportation industry, identifying emerging trends, best practices, and potential skill gaps, and provides recommendations for talent acquisition, development, and retention strategies, so that TxDOT can proactively adapt its workforce to meet evolving needs and maintain a competitive edge.

T. TxDOT's AI-Powered Virtual Assistant

Challenge: TxDOT faces the challenge of efficiently and effectively communicating with stakeholders, both internal and external, to provide accurate, timely, and relevant information. The current processes for addressing inquiries, complaints, and information requests often rely on manual efforts, leading to potential delays, inconsistencies, and missed opportunities for engagement. The goal is to leverage AI technologies, particularly conversational AI and virtual assistants, to enhance TxDOT's communication capabilities, improve stakeholder experiences, and empower employees with easy access to accurate and up-to-date information, ultimately fostering better collaboration, transparency, and customer satisfaction.



1. **TxDOT Secure AI Assistant:** As a TxDOT employee, I want access to a secure, internal AI assistant that can provide accurate and relevant information from TxDOT manuals, literature, and databases, so that I can quickly find answers to my questions, make informed decisions, and improve my productivity.
2. **AI-Powered Standards Interpretation:** As a TxDOT engineer, I want an AI tool that can interpret and translate complex standards and manuals, such as HCIM, MUTCD, AASHTO, CFR200, CIMAQ, and Design Manual, into plain language, so that I can easily understand and apply the relevant guidelines and requirements to my projects, ensuring compliance and consistency across TxDOT's operations.
3. **Intelligent Project Reporting:** As a TxDOT project manager, I want an AI assistant that can generate project whitepapers and reports, summarizing key information from the Unified Transportation Program (UTP) and other relevant sources, so that I can efficiently communicate project status, highlights, and challenges to commissioners and other stakeholders, ensuring transparency and accountability.
4. **AI-Enhanced Crossroads Platform:** As a TxDOT knowledge manager, I want to transform the Crossroads platform into an intelligent, AI-powered chatbot that can provide personalized guidance, learn from user interactions, and retain information, so that TxDOT employees can easily access the knowledge they need, share insights, and collaborate more effectively across the organization.
5. **Automated Complaint Intake and Triage:** As a TxDOT customer service representative, I want an AI system that can automatically intake, summarize, and categorize public complaints and inquiries, routing them to the appropriate department or individual for resolution, so that TxDOT can respond

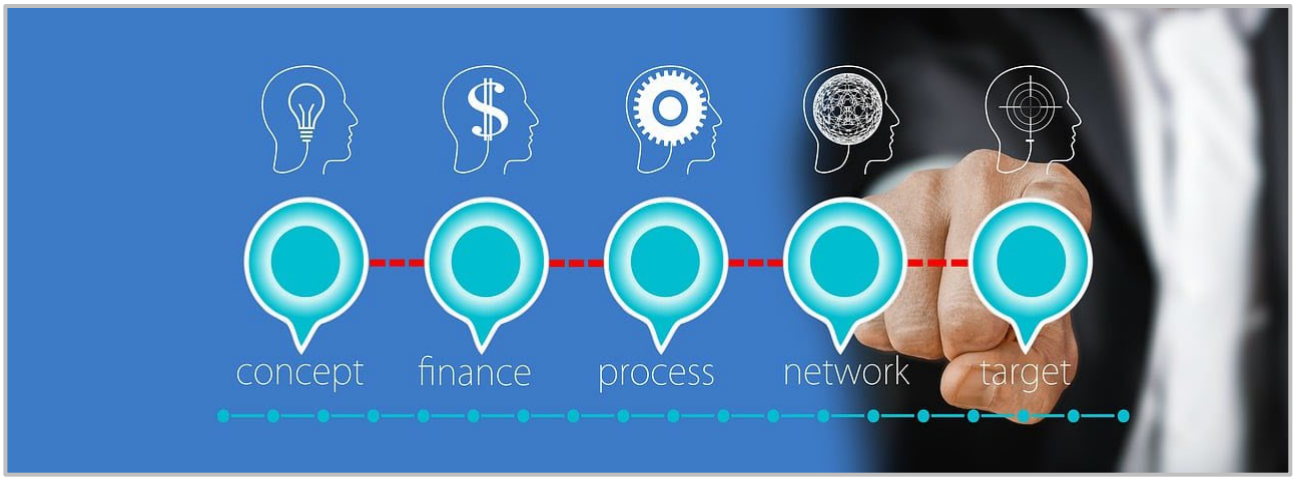
to stakeholder concerns more efficiently, consistently, and effectively, improving overall customer satisfaction.

6. **AI-Powered Website Personalization:** As a TxDOT web developer, I want to leverage AI technologies to provide customized experiences for users of TxDOT's digital properties, such as txdot.gov, based on their preferences, language, and behavior, so that TxDOT can better engage with its diverse stakeholders, improve user satisfaction, and increase the effectiveness of its online communications.
7. **Virtual HR Assistant:** As a TxDOT HR representative, I want an AI-powered virtual assistant that can handle common employee inquiries, provide guidance on policies and procedures, and route complex issues to the appropriate HR specialist, so that TxDOT can provide timely and accurate support to its workforce, improve employee satisfaction, and reduce the workload on HR staff.
8. **AI-Assisted Legal and Policy Guidance:** As a TxDOT employee, I want access to a generative AI tool trained on state transportation and administrative code that can answer questions about legal and policy requirements related to my job, so that I can ensure compliance, make informed decisions, and spend less time navigating complex regulations.

U. Leverage AI for Strategic Talent Management

Challenge: TxDOT faces the challenge of effectively managing its workforce in a rapidly evolving transportation landscape. The current processes for hiring, placement, succession planning, and talent management often rely on manual efforts and lack the ability to fully leverage employee skills and predict future needs. This leads to suboptimal workforce allocation, knowledge loss due to turnover, and missed opportunities for employee development. The goal is to harness AI technologies to streamline talent management processes, optimize workforce planning, and ensure that TxDOT has the right skills in the right places to meet current and future organizational needs.

1. **AI-Assisted Hiring and Candidate Screening:** As a TxDOT hiring manager, I want an AI-powered tool that streamlines the candidate screening process by analyzing resumes, predicting job fit, and providing recommendations, so that TxDOT can efficiently identify top talent, reduce time-to-hire, and improve the overall quality of new hires.
2. **Intelligent EIT Placement and Career Development:** As a TxDOT HR specialist, I want an AI system that optimizes the placement of Engineers-in-Training (EITs) based on their skills, preferences, and organizational needs, and provides personalized career development recommendations, so that TxDOT can retain talented employees, foster job satisfaction, and build a strong pipeline of future leaders.



3. **AI-Driven Workforce Planning and Succession Management:** As a TxDOT HR director, I want an AI tool that analyzes workforce data, predicts staffing needs, and identifies potential skill gaps and succession risks, enabling proactive workforce planning and knowledge retention strategies, so that TxDOT can maintain a robust and resilient workforce in the face of retirements, turnover, and changing skill requirements.
4. **Automated Onboarding and Offboarding Processes:** As a TxDOT HR coordinator, I want an AI-powered system that automates and streamlines onboarding and offboarding processes, ensuring

that all necessary steps are completed, access is properly provisioned or revoked, and risk analysis is conducted, so that TxDOT can provide a smooth employee experience and maintain security and compliance.

5. **AI-Enhanced Talent Allocation and Project Staffing:** As a TxDOT project manager, I want an AI tool that recommends the optimal allocation of employees to projects and tasks based on their skills, experience, and availability, so that TxDOT can maximize workforce utilization, improve project outcomes, and ensure that the right talent is assigned to the right work.
6. **Predictive Talent Retention and Turnover Analysis:** As a TxDOT HR analyst, I want an AI system that analyzes employee data, identifies factors contributing to turnover, and predicts potential retention risks, enabling targeted interventions and proactive retention strategies, so that TxDOT can reduce unwanted attrition, retain top talent, and maintain a stable and engaged workforce.
7. **AI-Powered Employee Development and Career Pathing:** As a TxDOT employee, I want access to an AI-powered career development platform that provides personalized learning recommendations, career path guidance, and virtual coaching based on my skills, interests, and organizational needs, so that I can continuously grow my capabilities, pursue meaningful career opportunities, and contribute to TxDOT's success.

V. Leverage AI for Personal Productivity

Challenge: TxDOT employees often find themselves burdened with repetitive and time-consuming administrative tasks, such as filling out timesheets, scheduling meetings, and managing project deadlines. These mundane tasks can lead to reduced productivity, increased stress, and less time spent on high-value activities that directly contribute to TxDOT's mission. The goal is to leverage AI technologies to automate and streamline these administrative tasks, enabling employees to focus on more strategic and impactful work, ultimately improving overall organizational efficiency and employee satisfaction.

1. **AI-Powered Personal Task Management:** As a TxDOT employee, I want an AI-powered tool that tracks my deadlines, prioritizes my objectives, and proactively proposes projects based on various funding category requirements, so that I can stay organized, meet my commitments, and make informed decisions about my work priorities.
2. **Intelligent Timesheet Automation:** As a TxDOT field worker, I want an AI system that automatically captures my daily activities, such as the intersections I visit for signal work, and populates my timesheet accordingly, so that I can reduce the time and effort spent on manual timesheet entry and focus more on my core job responsibilities.
3. **AI-Assisted Email and Deadline Management:** As a TxDOT employee, I want an AI tool that scans my emails, identifies important deadlines, meetings, and action items, and automatically sets reminders and notifications, so that I can stay on top of my commitments, avoid last-minute scrambles, and improve my overall responsiveness and reliability.

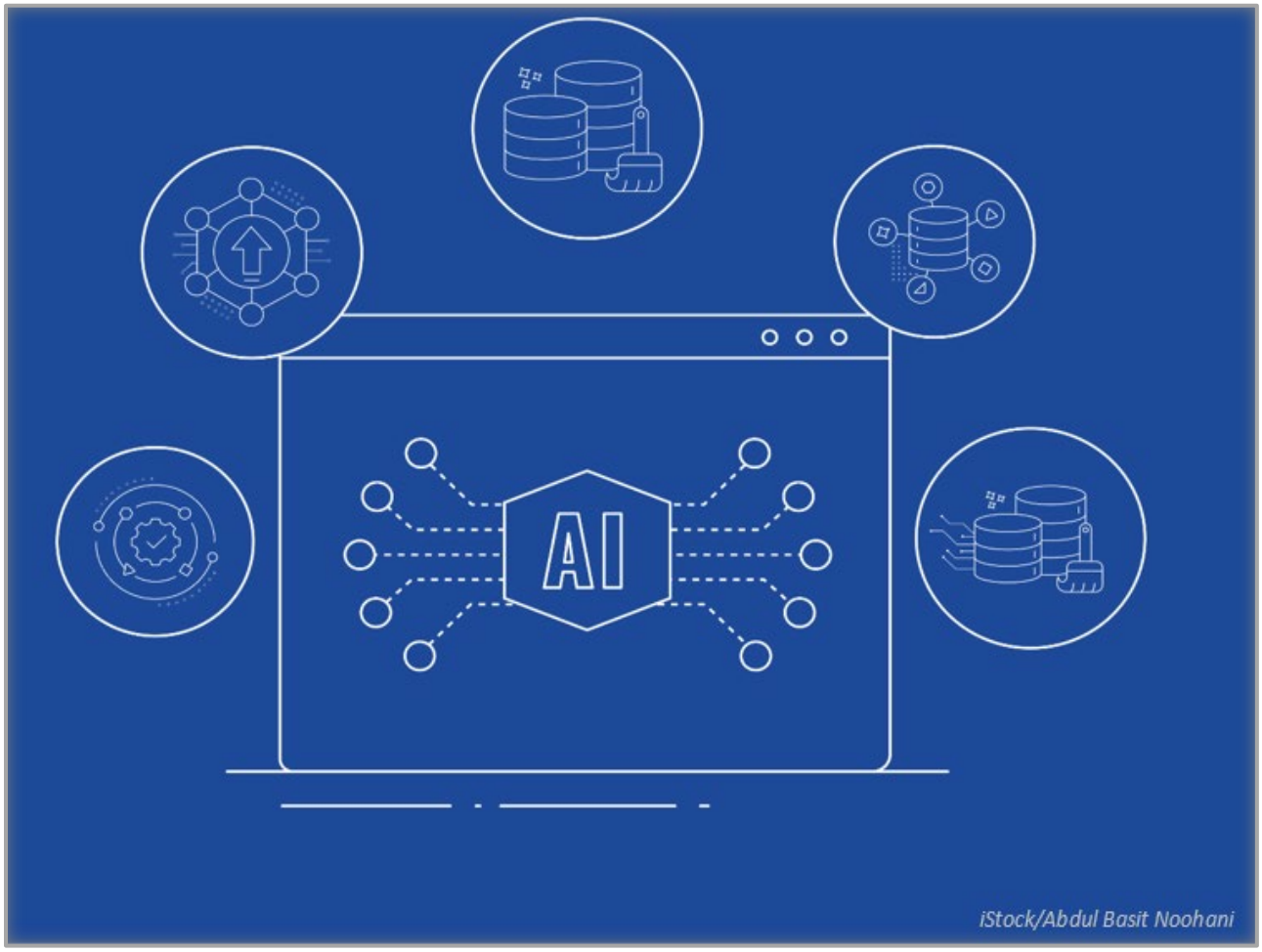
4. **Smart Meeting Scheduling and Optimization:** As a TxDOT project manager, I want an AI-powered meeting scheduler that identifies the necessary attendees, proposes optimal meeting times based on participant availability, and recommends the most appropriate meeting format (virtual, in-person, or cancellation), so that I can streamline the scheduling process, ensure the right people are involved, and maximize the productivity of my meetings.
5. **AI-Driven Task Prioritization and Workflow Optimization:** As a TxDOT employee, I want an AI system that organizes and prioritizes my tasks and requests based on urgency, importance, and dependencies, and provides recommendations for optimizing my workflow, so that I can manage my workload more effectively, reduce overwhelm, and focus on the most critical and impactful activities.
6. **Automated Administrative Task Assistance:** As a TxDOT administrator, I want an AI tool that automates repetitive tasks, such as generating and processing PDFs, handling accounting tasks, and managing grant applications, so that I can reduce the time spent on manual, low-value activities and dedicate more energy to strategic initiatives and process improvements.

W. Optimizing Resource Allocation for Equipment and People

Challenge: TxDOT faces the challenge of optimizing the allocation and utilization of its resources, including equipment, personnel, and funding, across various projects and operations. The current processes for resource allocation often rely on historical data and manual decision-making, which can lead to suboptimal distribution, underutilization of assets, and missed opportunities for cost savings. The goal is to leverage AI technologies to enable data-driven insights and recommendations for resource allocation, ensuring that TxDOT can efficiently and effectively deploy its resources to maximize project outcomes, minimize waste, and meet the evolving needs of the transportation network.

1. **Intelligent Asset and Resource Allocation:** As a TxDOT resource manager, I want an AI tool that monitors the utilization of assets and resources and provides recommendations for optimizing their allocation and reallocation based on demand, efficiency, and cost-effectiveness, so that TxDOT can maximize the value of its resources and minimize underutilization.
2. **Predictive Maintenance Work Scheduling:** As a TxDOT maintenance supervisor, I want an AI system that analyzes historical maintenance data, asset condition, and resource availability to optimize the scheduling of maintenance work, including equipment rental and personnel assignments, so that TxDOT can proactively address maintenance needs, extend asset life, and ensure the efficient use of maintenance resources.
3. **Intelligent Funding Source Identification:** As a TxDOT project planner, I want an AI system that identifies potential funding sources for projects, such as grants, MPO funds, and FHWA programs, and assists in the preparation of necessary paperwork and applications, so that TxDOT can maximize its funding opportunities and secure the resources needed to deliver critical projects.
4. **AI-Assisted PEPS Contract Assignment:** As a TxDOT contract manager, I want an AI tool that evaluates PEPS (Professional Engineering Procurement Services) contracts and consultant profiles, matching project requirements with the most suitable consultants based on their expertise, past performance, and availability, so that TxDOT can streamline the contract assignment process and ensure the best fit between projects and consultants.
5. **AI-Powered Consultant Needs Forecasting:** As a TxDOT project manager, I want an AI system that analyzes historical project data, current workload, and future project pipeline to predict the anticipated consultant needs for design and construction activities, so that TxDOT can proactively plan its resource requirements, optimize consultant utilization, and ensure the timely delivery of projects.
6. **Predictive Dredge Material Placement Area Analysis:** As a TxDOT coastal operations manager, I want an AI tool that analyzes historical shoaling data, predicts future shoaling hotspots, and recommends optimal locations for acquiring land for dredge material placement areas (DMPAs), so that TxDOT can proactively plan for the disposal of dredge material and ensure the efficient maintenance of the Gulf Intracoastal Waterway (GIWW).

7. **AI-Optimized Ferry Operations:** As a TxDOT ferry operations supervisor, I want an AI system that analyzes historical ferry usage data, maintenance records, and staffing levels to optimize vessel scheduling, maintenance planning, and fuel usage, so that TxDOT can provide reliable and efficient ferry services while minimizing costs and resource waste.
8. **Predictive Quantity Estimation for Planning:** As a TxDOT transportation planner, I want an AI tool that predicts the quantities of materials, such as hot mix asphalt, needed for future projects based on historical data, project scopes, and regional trends, so that TxDOT can accurately forecast its resource needs, inform its 4-year plan and Unified Transportation Program (UTP), and ensure the efficient allocation of resources over the planning horizon.
9. **Litter Management Prediction**: As a TxDOT environmental specialist, I need AI to predict litter accumulation areas, enabling proactive cleanup efforts and improving roadway and facility cleanliness.



X. Streamlining TxDOT's Tool Selection Process with AI

Challenge: TxDOT faces the challenge of efficiently evaluating, selecting, and deploying AI tools and technologies that align with its specific needs and requirements, particularly when new categories of AI tools emerge in the market. While TxDOT has established standardized processes for tool selection, these processes may require adaptation to effectively assess factors such as cost-benefit analysis, vendor comparisons, data source reliability, and user interface usability for novel AI solutions. The goal is to leverage AI to enhance the existing tool selection framework, enable data-driven decision-making, and facilitate the timely adoption of user-friendly and cost-effective AI solutions across TxDOT, ensuring that the organization can keep pace with the rapidly evolving AI landscape.

1. **AI-Assisted Tool Evaluation and Auditing:** As a TxDOT IT manager, I want an AI-powered tool evaluator that assesses the effectiveness, security, and reliability of AI tools, providing insights and recommendations to support the tool selection process, so that TxDOT can make informed decisions when adopting new AI technologies and ensure that the chosen tools meet the organization's standards and requirements.
2. **Intelligent Cost-Benefit Analysis for Emerging Tech:** As a TxDOT technology strategist, I want an AI system that conducts comprehensive cost-benefit analyses for emerging AI technologies, considering factors such as potential impact on traffic reduction, implementation costs, and long-term benefits, so that TxDOT can prioritize investments in AI solutions that offer the greatest value and align with the organization's strategic goals.
3. **AI-Driven Vendor Comparison and Selection:** As a TxDOT procurement officer, I want an AI tool that streamlines the vendor comparison process for similar AI products, evaluating key aspects such as data source quality, output accuracy, user interface usability, and overall reliability, so that TxDOT can make data-driven decisions when selecting AI vendors and ensure that the chosen solutions meet the organization's requirements.
4. **Intelligent System Redundancy and Consolidation Analysis:** As a TxDOT IT architect, I want an AI-powered system that reviews the various AI tools and technologies used across TxDOT's divisions and districts, identifying potential redundancies and opportunities for consolidation, so that TxDOT can optimize its AI tool portfolio, reduce costs, and enhance overall efficiency.

5. **Performance Optimization for Large Data Volumes:** As a TxDOT data scientist, I want an AI-assisted performance optimization solution that ensures acceptable speeds and processing times when working with large data volumes, enabling the efficient conduct of machine learning and AI tasks, so that TxDOT can fully leverage its data assets and deliver timely insights to support decision-making.
6. **Low-Code/No-Code AI Development Platform:** As a TxDOT AI developer, I want access to a user-friendly, low-code/no-code AI development platform, such as AWS SageMaker, that simplifies the process of building, testing, and deploying AI models, so that TxDOT can accelerate the development and implementation of AI solutions across the organization.
7. **AI-Powered Design Suggestions for Engineers:** As a TxDOT engineer, I want an AI-powered design assistant that provides proactive suggestions and recommendations based on best practices, standards, and historical data, so that I can streamline my design process, improve the quality of my work, and ensure compliance with TxDOT's requirements.
8. **User-Friendly AI Interface and Navigation:** As a TxDOT end-user, I want AI tools and platforms that feature intuitive, user-friendly interfaces and easy-to-navigate designs, ensuring that I can quickly access the information and insights I need without requiring extensive training or technical expertise, so that I can effectively leverage AI to support my day-to-day tasks and decision-making.

Y. AI-Driven Fraud and Threat Detection

Challenge: TxDOT faces the ongoing challenge of protecting its assets, resources, and sensitive information from potential fraud, misuse, and security threats. The current processes for fraud detection and security audits often rely on manual reviews and reactive measures, which can be time-consuming, resource-intensive, and may fail to identify sophisticated or emerging threats. The goal is to leverage AI technologies to enhance TxDOT's fraud detection capabilities, strengthen its security posture, and enable proactive identification and mitigation of potential risks across various areas, including financial transactions, asset management, and data security.

1. **AI-Powered Fraud Detection for Financial Transactions:** As a TxDOT financial auditor, I want an AI system that continuously monitors financial transactions, such as P-card purchases, vehicle usage, and inventory management, identifying unusual patterns, anomalies, or potential instances of fraud, so that TxDOT can proactively detect and investigate suspicious activities, minimize financial losses, and ensure the proper use of public funds.
2. **Intelligent Collusion and Anti-Trust Detection:** As a TxDOT legal compliance officer, I want an AI tool that analyzes bidding patterns, vendor relationships, and market trends to detect and predict potential collusion or anti-trust activities among contractors or suppliers, so that TxDOT can maintain fair competition, prevent price fixing, and ensure the integrity of its procurement processes.
3. **Automated P-Card Audit and Compliance Monitoring:** As a TxDOT procurement manager, I want an AI-powered P-card audit system that automatically reviews purchase transactions, flagging prohibited items, verifying approvals, and checking compliance with established policies, so that TxDOT can streamline the audit process, ensure adherence to guidelines, and quickly identify and address any non-compliant activities.
4. **AI-Enhanced Infrastructure and Software Security Analysis:** As a TxDOT cybersecurity analyst, I want an AI system that continuously assesses the security posture of TxDOT's infrastructure and software, identifying vulnerabilities, predicting potential threats, and recommending proactive countermeasures, so that TxDOT can strengthen its defenses against cyber-attacks, protect sensitive data, and maintain the integrity of its systems.

5. **Intelligent ROI Auditing for Financial Efficiency:** As a TxDOT financial manager, I want an AI tool that audits the return on investment (ROI) for various financial expenditures, including internal projects, logistics, contracts, and resource allocations, identifying areas of potential waste or inefficiency, so that TxDOT can optimize its financial performance, ensure the most effective use of funds, and redirect resources to high-value initiatives.
6. **Predictive Behavioral Analysis for Risk Detection:** As a TxDOT security officer, I want an AI system that analyzes employee and contractor behavior patterns, access logs, and system usage data to predict and flag potentially suspicious activities or insider risks, enabling proactive investigations and interventions, so that TxDOT can mitigate potential threats, prevent data breaches, and maintain a secure working environment.

Z. AI-Enabled Project Risk Identification

Challenge: TxDOT faces the challenge of effectively identifying and mitigating risks across its diverse portfolio of projects, assets, and operations. The current risk assessment processes often rely on manual reviews and subjective judgments, which can lead to inconsistencies, overlooked threats, and reactive risk management. The goal is to leverage AI technologies to enable proactive, data-driven risk identification and prioritization, focusing on the most critical issues that could negatively impact project success, employee safety, regulatory compliance, and overall organizational resilience.

1. **AI-Powered Risk Prioritization for Project Reviews:** As a TxDOT project manager, I want an AI system that conducts a robust review of Project plans, Specifications, and Estimates (PS&E), automatically identifying and prioritizing the highest-risk items with the most potential negative impact on project success, so that TxDOT can proactively address critical issues, allocate resources effectively, and ensure the smooth execution of projects.
2. **Intelligent Safety Risk Assessment for Employees and Equipment:** As a TxDOT safety officer, I want an AI tool that analyzes the safety risk profile for employees, equipment, and job functions, considering factors such as historical incident data, environmental conditions, and operational practices, so that TxDOT can identify potential hazards, implement targeted safety measures, and create a safer working environment for all employees.
3. **AI-Enabled Continuous Risk Monitoring and Key Risk Indicators:** As a TxDOT risk manager, I want an AI system that automatically monitors and assesses risks across various domains, including safety, cybersecurity, market conditions, economic factors, and operational efficiency, providing real-time insights and tracking key risk indicators (KRIs) to enable proactive risk management and informed decision-making.
4. **Adaptive Risk Frameworks and Gap Analysis:** As a TxDOT compliance officer, I want an AI tool that leverages adaptive risk frameworks, such as COSO and other relevant industry standards, to identify gaps and opportunities in TxDOT's risk management, control, finance, operations, and compliance processes, so that TxDOT can continuously improve its risk management practices and ensure alignment with best practices and regulatory requirements.
5. **AI-Assisted Project Portfolio Risk Management:** As a TxDOT portfolio manager, I want an AI system that analyzes the risks associated with delivering projects, such as utility conflicts, rail interfaces, and environmental concerns, providing a holistic view of the project portfolio and enabling data-driven prioritization and resource allocation to mitigate risks and ensure successful project delivery.

6. **Automated ADA Compliance Assessment:** As a TxDOT accessibility coordinator, I want an AI tool that automatically assesses the ADA compliance of TxDOT facilities, identifying areas of non-compliance and providing recommendations for remediation, so that TxDOT can ensure equal access for individuals with disabilities, maintain regulatory compliance, and avoid potential legal risks.

AA. AI-Powered Optimization for Stockpiles, Fleet, and Asset Management

Challenge: TxDOT faces the challenge of efficiently managing its material stockpiles and inventory across various locations to ensure the right materials are available when and where they are needed for construction and maintenance projects. The current processes for tracking material inventory, predicting usage, and ordering equipment often rely on manual methods and historical data, leading to potential stockpile inefficiencies, excess inventory, or material shortages. The goal is to leverage AI technologies to optimize stockpile management, predict material usage, and automate equipment ordering, ultimately improving operational efficiency, reducing costs, and ensuring the timely availability of materials for TxDOT projects.

1. **AI-Powered Stockpile Location and Material Inventory Management:** As a TxDOT material manager, I want an AI system that continuously tracks and optimizes the location and inventory of materials across various stockpiles, considering factors such as project demand, geographical distribution, and material shelf life, so that TxDOT can efficiently manage its material resources, minimize waste, and ensure the availability of materials when and where they are needed.
2. **Intelligent Material Allocation and Sharing:** As a TxDOT district supervisor, I want an AI tool that optimizes the allocation and sharing of materials among districts and partner entities based on their respective needs and inventory levels, so that TxDOT can foster collaboration, reduce stockpile redundancies, and maximize the utilization of materials across its jurisdiction.
3. **Comprehensive Asset Management for Roadways, Facilities, and Fleet:** As a TxDOT asset manager, I want an AI system that provides a holistic view of TxDOT's assets, including roadways, facilities, yards, and servers, enabling data-driven decision-making for asset maintenance, upgrades, and investments, so that TxDOT can optimize its asset lifecycle management and ensure the reliability and performance of its infrastructure.
4. **AI-Enabled eTicketing for Material Management:** As a TxDOT construction manager, I want an AI-powered eTicketing system that digitizes material tickets, automatically captures material information, and integrates with TxDOT's inventory management systems, so that TxDOT can streamline material tracking, reduce manual data entry, and improve the accuracy and efficiency of its material management processes.

5. **Predictive Material Usage Analysis and Forecasting:** As a TxDOT procurement officer, I want an AI tool that predicts material usage by volume and location based on historical data, project schedules, and external factors such as weather and market conditions, so that TxDOT can optimize its material procurement, avoid stockpile shortages or excesses, and ensure the timely availability of materials for its projects.
6. **Automated Equipment Ordering and Lifecycle Management:** As a TxDOT fleet manager, I want an AI system that automates the equipment ordering process based on predefined criteria, such as equipment lifecycle, utilization rates, and maintenance schedules, so that TxDOT can proactively manage its fleet, reduce downtime, and ensure the availability of reliable equipment for its operations.

BB. Streamline IT Infrastructure with AI-Powered Optimization

Challenge: TxDOT faces the challenge of optimizing its IT infrastructure to ensure maximum uptime, minimize costs, and streamline asset management processes. The current methods for tracking equipment usage, managing inventory, and identifying infrastructure gaps often involve manual efforts and reactive approaches, leading to potential inefficiencies, security vulnerabilities, and increased downtime. The goal is to leverage AI technologies to monitor and optimize IT assets, predict maintenance needs, automate inventory management, and proactively address infrastructure gaps, ultimately improving the reliability, security, and cost-effectiveness of TxDOT's IT operations.

1. **AI-Driven Equipment Usage Monitoring and Optimization:** As a TxDOT IT manager, I want an AI system that continuously monitors the usage patterns of office equipment, such as laptops and phones, providing insights into utilization rates, idle time, and potential optimization opportunities, so that TxDOT can make data-driven decisions about equipment allocation, procurement, and retirement, ultimately reducing costs and maximizing the value of its IT assets.
2. **Intelligent Inventory Management for IT Assets:** As a TxDOT inventory manager, I want an AI tool that streamlines the management of IT assets by automatically tracking inventory levels, predicting supply needs, and optimizing stockpile quantities based on historical data and usage trends, so that TxDOT can ensure the availability of necessary equipment, minimize excess inventory, and improve overall inventory efficiency.
3. **AI-Powered IT Infrastructure Gap Analysis:** As a TxDOT IT security officer, I want an AI system that continuously analyzes TxDOT's IT infrastructure, identifying gaps in patch management, security controls, and operational processes, and providing prioritized recommendations for remediation, so that TxDOT can proactively address vulnerabilities, strengthen its security posture, and ensure the reliability and integrity of its IT systems.
4. **Automated Software Renewal and Purchase Optimization:** As a TxDOT IT procurement specialist, I want an AI tool that streamlines the software renewal and purchase process by automating paperwork review, recommending optimal renewal schedules based on usage data, and identifying cost-saving opportunities through license consolidation or alternative solutions, so that TxDOT can efficiently manage its software assets, reduce manual effort, and optimize its IT budget.
5. **Comprehensive IT Asset Inventory Management:** As a TxDOT asset manager, I want an AI system that maintains a complete and accurate inventory of IT assets, including phones, computers, and other devices, automatically discovering new assets, tracking their lifecycle, and providing real-time visibility into asset status and location, so that TxDOT can effectively manage its IT asset portfolio, ensure compliance with policies, and make informed decisions about asset allocation and refresh cycles.
6. **Proactive IT System Monitoring and Downtime Prevention:** As a TxDOT IT operations manager, I want an AI tool that continuously monitors the health and performance of critical IT systems, such as

TBIRD, predicting potential issues or failures before they occur, and providing proactive alerts and recommendations for preventive maintenance or corrective actions, so that TxDOT can minimize system downtime, improve service availability, and ensure the smooth operation of its IT infrastructure.

CC. AI Predictive Project Planning

Challenge: TxDOT faces the challenge of effectively planning, scheduling, and managing projects to ensure on-time delivery and optimize resource allocation. The current processes for project scheduling and monitoring often rely on manual data collection, making it difficult to identify potential conflicts, track progress, and quickly respond to delays. Additionally, comparing proposed plans against various project documents and evaluating project management efficiency can be time-consuming and prone to errors. The goal is to leverage AI technologies to automate project scheduling, identify resource overlaps, compare project documents, and evaluate project management efficiency, ultimately streamlining project delivery and ensuring on-time completion.

1. **AI-Powered Project Scheduling Automation:** As a TxDOT project manager, I want an AI system that automates project scheduling by collecting and analyzing data on project status, resource availability, and dependencies, and generating optimized schedules that minimize conflicts and ensure efficient resource allocation, so that TxDOT can streamline its project planning process, reduce manual effort, and improve overall project management efficiency.
2. **Intelligent Resource and Roadway Overlap Optimization:** As a TxDOT program manager, I want an AI tool that identifies potential resource and roadway overlaps across different projects and recommends schedule optimizations to minimize conflicts and ensure smooth project execution, so that TxDOT can effectively coordinate its projects, maximize resource utilization, and avoid delays due to competing priorities or logistical challenges.
3. **AI-Assisted Project Progress Monitoring and Delay Analysis:** As a TxDOT project controls engineer, I want an AI system that compares baseline CPM (Critical Path Method) schedules with actual progress, correlating work completed, payments made, and deliverables achieved, and identifies reasons for delays, so that TxDOT can proactively monitor project health, take corrective actions to mitigate delays, and ensure projects stay on track for on-time delivery.
4. **Automated Plan Comparison and Discrepancy Detection:** As a TxDOT design engineer, I want an AI tool that automatically compares proposed plans against various project documents, such as plan sheets, and other relevant materials, identifying any discrepancies or inconsistencies in quantities or specifications, so that TxDOT can quickly catch and resolve errors, ensure consistency across project documents, and streamline the design review process.
5. **AI-Driven Project Management Efficiency Evaluation:** As a TxDOT project director, I want an AI system that evaluates project management efficiency by analyzing factors such as meeting deadlines, work paper quality, and team productivity, providing insights and recommendations for improvement, so that TxDOT can continuously optimize its project management practices, identify areas for training or process enhancements, and ensure the effective utilization of project resources.

DD. AI-Powered Vehicle Management

Challenge: TxDOT faces the challenge of efficiently managing and maintaining its vehicle fleet to ensure optimal performance, minimize downtime, and reduce operational costs. The current processes for monitoring vehicle health, predicting equipment failure, and identifying maintenance needs often rely on manual inspections and reactive maintenance, leading to potential inefficiencies and increased vehicle downtime. The goal is to leverage AI technologies to analyze vehicle data, predict equipment failures, optimize maintenance schedules, and improve overall fleet management, ultimately enhancing vehicle reliability, reducing costs, and improving operational efficiency.

1. **AI-Powered Vehicle Performance Analysis:** As a TxDOT fleet manager, I want an AI system that continuously analyzes vehicle data, including speed, stall events, and utilization rates, to identify performance issues, driver behavior patterns, and underutilized vehicles, so that TxDOT can optimize its fleet operations, improve vehicle efficiency, and make data-driven decisions about fleet allocation and maintenance priorities.
2. **Predictive Equipment Failure Detection:** As a TxDOT maintenance supervisor, I want an AI tool that predicts potential equipment failures by analyzing vehicle data, maintenance records, and sensor information, providing early warnings and recommendations for preventive maintenance, so that TxDOT can proactively address issues, minimize unplanned downtime, and extend the lifespan of its vehicles.
3. **Integrated Fleet Telematics Data Analysis:** As a TxDOT data analyst, I want access to comprehensive fleet telematics data, including OEM data, to build accurate and reliable AI models for vehicle performance analysis, failure prediction, and maintenance optimization, so that TxDOT can leverage the full potential of its data assets to improve fleet management decisions and outcomes.
4. **Single Point of Failure Prediction:** As a TxDOT reliability engineer, I want an AI system that identifies all critical aspects and components that contribute to single points of failure in vehicles, considering factors such as age, usage patterns, and environmental conditions, so that TxDOT can prioritize maintenance efforts, enhance vehicle reliability, and minimize the risk of unexpected breakdowns.
5. **AI-Assisted Vehicle Maintenance Imaging:** As a TxDOT mechanic, I want access to an AI-powered image database that provides visual examples of vehicle components, such as brakes, at different stages of wear and tear, using classification and labeling techniques to help identify when replacements are needed, so that TxDOT can standardize its maintenance practices, reduce reliance on subjective assessments, and ensure timely and consistent vehicle repairs.