



FY 2025 Annual Program Research Project Statement 25-145

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| Title: | Leverage AI for Asset Inventories & Management |
| The Problem: | <p>TxDOT owns and maintains several safety and traffic-related assets, including signs, delineators, guardrails, roadway lights, and traffic signals. While TxDOT maintains inventories for large infrastructure assets such as bridges, there is a need to develop a more robust, dynamic inventory database and framework that is created passively using remote sensing technology, that can extract meaningful asset information automatically, and can integrate condition assessment information into existing TxDOT processes seamlessly without adding burden to TxDOT teams.</p> <p>An AI enabled tool would enable TxDOT to make strides toward developing a cutting-edge proactive and holistic asset management practice to prioritize assets and corridors for maintenance and maintain an updated understanding of asset location and condition. Key in this project's recommendations will be how to integrate this data into TxDOT maintenance practices in a way that is complimentary to how TXDOT maintenance teams do work today.</p> <p>This project shall assist with expanding TxDOT's Transportation Asset Management Plan (TAMP) which currently only includes pavements and bridges. Other DOTs, such as the Connecticut DOT TAMP, have already included five additional assets: traffic signals, sign supports, pavement markings, and highway buildings, acknowledging their importance to the safety and integrity of the roadway network.</p> <p>The project shall also complement NCTCOG's effort to increase situational awareness using the infrastructure-related dataset from Blynscy.</p> <p>This effort shall increase the value of various data sources to assist in informed procurement decisions.</p> <p>Timeline Expectations: This project is expected to deliver value to TxDOT incrementally throughout the project lifecycle, with initial value via research delivered quickly to TxDOT to build upon learnings throughout the project. Total project lifecycle should be <24months from kickoff with majority of deliverables provided within the first year.</p> |
| Technical Objectives: | <p>The objectives of this project are:</p> <ul style="list-style-type: none"> • Conduct a literature review and summarize state-of-the practice and key findings assessment of existing asset inventory and management practices adopted TxDOT and other DOTs. <ul style="list-style-type: none"> ○ Include minimally asset name, asset condition rating system, asset condition collection method, and data storage and retrieval methodology for use in maintenance activities. • Conduct literature review and company source data assessment available to assist in recommended asset condition assessment data collection, for purpose of recommending requirements in additional TxDOT contracts for third party's specific to targeted assets, i.e. TxDOT Fleet requirements. • Compile TxDOT asset inventory and condition summaries of recommended assets using one or multiple third-party datasets or remote sensing technologies, such as connected vehicles, lidar/GPS, or internal data sources such as nighttime assessments of reflectivity. • Develop a condition rating system for each infrastructure item to understand and monitor the status and recommend data collection methodology using remote/passive technologies • Develop an end-to-end framework able to integrate third-party data into TxDOT's asset inventory toolkit. <ul style="list-style-type: none"> ○ Integrating known traditional remote sensing and mobile mapping applications data used into regular maintenance activities ○ Augmenting with new data sources of asset location and conditions, training AI to: <ul style="list-style-type: none"> ▪ Identify assets, ▪ Detect changes to asset condition. <p>The expected technology readiness level (TRL) for this project is 8.</p> |

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| Anticipated Deliverables: | <ol style="list-style-type: none"> 1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Product 1 - Asset Inventory and Condition prototype integrating current and new data sources. 4. Project Summary Report 5. Research report documenting the findings of this research, including: <ul style="list-style-type: none"> • A framework integrating third-party data services, asset inventory and condition rating. • A list of recommendations for each asset maintenance program. • Process improvements for future implementation. • Value of Research (VoR) that includes both qualitative and economic benefits. |
| Proposal Requirements: | <ol style="list-style-type: none"> 1. RFP#1 Q&A Deadline: 12:00 p.m. Central Time, Tuesday, February 20, 2024. 2. Proposal Deadline: 12:00 p.m. Central Time, Thursday, March 21, 2024. 3. Use the current “ProjAgre” and “PA Forms” templates located at the RTI Forms webpage. 4. Proposals will be considered non-responsive and will not be accepted for technical evaluation if they are not received by the deadline or do not meet the requirements stated in RTI's University Handbook. 5. Proposals should be submitted by the University Liaison in PDF format; (1) PDF file per proposal. File name should include project name and university abbreviation. 6. This project will be tracked during the life of the project using the Technology Readiness Level (TRL) scale. 7. The 2021 Texas Legislative Session requires that universities be in compliance with Senate Bill 475 by submitting a completed and signed TxDOT Security Questionnaire (TSQ) to RTIMAIN@txdot.gov. Universities that have not submitted a completed and signed TSQ one week after award will be considered non-compliant and unable to participate in the Program. |