

NEW ENGLAND TRANSPORTATION CONSORTIUM QUARTERLY PROJECT PROGRESS REPORT

A. PROJECT NUMBER AND TITLE:

NETC 20-2 Current Status of Transportation Data Analytics and A Pilot Case Study Using Artificial Intelligence (AI)

B. PRINCIPAL INVESTIGATOR(s) & UNIVERSITY(s):

Yuanchang Xie, PhD, PE, University of Massachusetts Lowell

C. WEB SITE ADDRESS (*If one exists*):

None

D. START DATE (*Per NETC Agreement*):

5/5/2021

E. END DATE (*Per NETC Agreement*):

12/31/2023

F. ANTICIPATED COMPLETION DATE:

12/31/2023

G. PROJECT OBJECTIVES:

- (1) Provide clear and comprehensive picture to the six New England state DOTs regarding their data assets, data needs and emerging data sources, modeling and workforce needs, and data collection, analysis, utilization, storage, and sharing practices related to traffic operations;
- (2) Provide strategic and practical recommendations to prepare New England DOTs for future data-driven transportation system analytics; and
- (3) Conduct a pilot case study of using AI techniques to analyze existing multi-source data for improving traffic operations and safety.

H. REPORT PERIOD:

2nd Quarter, 2023

I. ACCOMPLISHMENTS THIS PERIOD:

- With the kind support of NHDOT, we have finished the data collection at all five sites in New Hampshire. The team has been working on processing the collected radar and thermal video data.
- For the radar data analysis, we have been focusing on (1) data cleaning, (2) detecting risky behavior from vehicle trajectories, and (3) deriving speed profiles along a road segment for different vehicle types, different lanes, and time periods of a day. We also plan to (1) compare the collected radar speed data with the TomTom data at the five sites, and (2) calculate the percentages of speeding vehicles during different periods of a day.
- For the camera data analysis, we have been working on using artificial intelligence (AI) algorithms to (1) derive traffic counts, (2) extract vehicle lane-changing behavior (when

and where do they change lanes), and (3) identify unsafe lane changes (some vehicles cross a raised median to merge early).

- The team has also been working on using StreetLight data to analyze curve speeding activities and linking such activities with curve characteristics (e.g., radius, # of lanes, superelevation, urban vs. rural).
- We continued modifying the reports for Tasks 1 and 2 by adding additional figures for better result presentation. These figures will be included in the final report.
- The team had two meetings with the project panel on May 4 and June 29, respectively. At these meetings, the team presented some preliminary radar and camera data analysis results.

J. PROBLEMS ENCOUNTERED (If any):

None

K. TECHNOLOGY TRANSFER ACTIVITIES:

None

L. STATUS BY TASK:

Task	Description	% Complete
Task 1	Review of Current Data Collection and Utilization Practices	100%
Task 2	Assessment of Data Needs, Emerging Data Sources, and Data Processing and Analytics	100%
Task 3	Recommendations	100%
Task 4	Case Study	70%
Task 5	Draft Final Report	15%
Task 6	Final Report	5%

M. PERCENT COMPLETION OF TOTAL PROJECT:

80%

N. ACTIVITIES PLANNED FOR NEXT QUARTER:

The team will finish the data analysis.

O. FINANCIAL STATUS:

As of: July 08, 2023

Total Project Budget: \$200,000.00

Total Expenditures (including encumbrance): \$ 139,452.12

Note: This report should not require more than 2-3 pages & should be e-mailed to the NETC Coordinator so as to arrive no later than three (3) working days after the end of each calendar quarter.