Civil and Environmental Engineering

Present

DATA DRIVEN ANALYTICS ON AADT ESTIMATION FOR CT TOWN MAINTAINED HIGHWAYS

Speaker:

Kai Wang, PhD
Assistant Research Professor
Connecticut Transportation Institute

Annual Average Daily Traffic (AADT) is one of the most inevitable elements for both transportation planning and traffic safety analysis, and therefore collecting AADT data is a critical task for state Departments of Transportations (DOTs). AADT values are usually collected and calculated using a combination of permanent and temporary traffic count stations. However, collecting AADT using the traffic count stations is extremely labor intensive and time-consuming, and it is usually performed for the state-maintained highways instead of the low-volume roadways maintained by town jurisdictions due to limited resources. Therefore, it is necessary to propose less expensive approaches to estimate AADT for low-volume roadways while still maintaining prediction accuracy. To this end, this study conducted a comprehensive literature review on methodologies and relevant data that have been used for AADT estimation. Based on the data availability, data elements used for modelling AADT in CT were exploared and collected. Specifically, AADT for town-maintained highways from 2016 to 2020 were collected from the StreetLight platform and were calibrated to fit the CT condition. Furthermore, multiple machine learning and deep learning algorithms were developed to predict future AADT beyond 2020. The model validation results indicate that the AADT estimated by this project is robust and reliable in terms of prediction accuracy. Specifically, the Pearson correlation coefficient between the observed and predicted AADT is up to 0.964, the Mean Absolute Error (MAE) is as low as 150, and the Average Absolute Percentage Error (AAPE) is as low as 1%. Furthermore, to help users better visualize and query the AADT both collected from the CTDOT and predicted from this study, a web-based application tool was developed using the Esri WebApp Builder. As a conclusion, the predicted AADT from this study can serve as a valid asset in transportation planning and traffic safety analysis to practitioners and transportation agencies.

Friday, November 11, 2022

12:20 – 1:10 PM

McHugh Hall (MCHU) - Room 106

Bio:

Dr. Kai Wang earned his B.S. in Civil & Construction Engineering from the Xiamen University of Technology in China in 2011, with a major in construction project management. He earned his first M.S. in Civil & Environmental Engineering from the South Dakota State University in 2013, with a major in Transportation Engineering, and a minor in both Economics and Statistics. He then went to earn his Ph.D. from the University of Connecticut in 2016, with a major in Civil Engineering (concentration in Transportation & Urban Engineering), and a minor in Statistics. Dr. Wang is currently pursuing his second M.S. in Computational Data Analytics from the Georgia Institute of Technology with a concentration on machine learning and big data technologies.

Dr. Wang has extended knowledge on State-of-the-art statistical and econometrics methodologies, investigation and implementation of machine learning/deep learning approaches, big data technologies and cloud computing on transportation data analysis and decision making. Dr. Wang has been publishing more than thirty journal papers/technical reports. He is the recipient of the Dwayne & Helen Rollag Scholarship from the South Dakota State University, and he received the Best Practices Award in Annual Traffic Records Forum from the Association of Transportation Safety Information Professionals (ATSIP) in 2019 and the young researcher best paper award from TRB committee ANB20 as a lead author in 2015. He has been serving as a PI/Co-PI to multiple national and in-state projects sponsored by USDOT, FHWA, NCHRP and CTDOT.