

UTC Project Information	
Project Title	MPC-616 – Descriptive and Predictive Deep Learning Analytical Tools for Enhanced Bridge Management: Bridge Subtyping and Bridge Deterioration Forecasting
University	University of Colorado Denver
Principal Investigator	Farnoush Banaei-Kashani, Ph.D. Kevin Rens, Ph.D.
PI Contact Information	<p>Farnoush Banaei-Kashani, Ph.D. Assistant Professor Department of Computer Science and Engineering University of Colorado Denver Phone: (303) 315-0116 Email: farnoush.banaei-kashani@ucdenver.edu ORCID: 0000-0003-4102-9873</p> <p>Kevin Rens, Ph.D. Professor Department of Civil Engineering University of Colorado Denver Phone: (303) 315-7159 Email: kevin.rens@ucdenver.edu ORCID: 0000-0002-8643-3709</p>
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Brief Description of Research Project	<p>Several U.S. Acts mandate the government to perform regular bridge inspections in order to assure health of the national bridge network. These inspections have been conducted since the 1970s and have generated valuable historic databases of bridge data based in local and state governmental agencies across the nation. While these agencies currently use the inspection data to maintain bridges and prevent failure, we believe the inspection databases are heavily underutilized. In particular, with the advent of machine learning and data mining methods, we envision data-driven solutions that can derive much more valued hidden knowledge from these databases that can be utilized to significantly enhance bridge management. While in the past various data-driven deterioration models are proposed in the literature to model bridge deterioration, these models either suffer from low accuracy or are too complex to be applicable. Moreover, they only address the problem of deterioration forecasting. Recently deep learning is shown to</p>

	<p>significantly outperform other analytical modeling methodologies in a variety of application domains. In this study, we propose to develop two analytical tools based on deep learning models for enhanced bridge management. Our proposed tools will address the problems of bridge subtyping (for descriptive analysis of inspection data to effectively categorize bridges to groups based on their performance characteristics and behavioral trends), bridge deterioration forecasting (for predictive analysis of the bridge data to accurately identify quantitative descriptors for the structure deterioration state (e.g., condition ratings) as well as any possible anomalies in the deterioration pattern of the bridge structure), and bridge anomaly detection.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	