

## PROJECT OVERVIEW REPORT

1. UTC Identifying Number  
69A3551847102
2. Center Identifying Number  
CAIT-UTC-REG74
3. Project Title  
Rapid Damage Assessment in Infrastructure Systems using Vibration  
Measurements within a Machine Learning Framework
4. Principal Investigator & Contact Information  
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Professor  
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Patrick Szary, Ph.D.  
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7. Project Description  
The primary goal of this proposal is to develop different Machine Learning (ML) algorithms for the rapid identification of damage in bridge structures using the bridge's dynamic response during regular service operation. These algorithms are in theory applicable to any dynamical system but will be tailored specifically for bridge structures. This research will provide diagnostic tools that can be directly used in real time by bridge owners for rapid damage assessment. By collecting data and analyzing them in near real time, the algorithms should be able to provide information on the conditions of the structure and this could help in 1) controlling the traffic operation on the bridge as well as 2) in prioritizing resources in terms of rehabilitation/maintenance operations.
8. Implementation of Research Outcomes (or why not implemented)

The intended outcome of the project is the development of Machine Learning based tools for rapid damage assessment in bridges which are expected to have tremendous implications in practice and education of modern civil engineers.

9. Impacts/Benefits of Implementation (actual, not anticipated)  
To Be Determined

10. Dates and Budget

Start date: 9/1/2022

End date: 8/31/2023

UTC (CAIT) Dollars: \$120,000

Cost Sharing: \$120,000

Total Dollars: \$240,000

11. Keywords

Rapid damage assessment in bridges, Machine Learning Algorithms, Structural Health Monitoring

12. Web Links (Reports and Project Website)

<https://cait.rutgers.edu/research/rapid-damage-assessment-in-infrastructure-systems-using-vibration-measurements-within-a-machine-learning-framework/>