Master of Engineering Multidisciplinary Project Listing

Deadline: Nov. 30, 2020

Industry Advisor: Advanced Research Lab for Multifunctional Lightweight Structures (ARL-MLS)
Project ID: ARL-MLS2
Supervisor: Professor Kamran Behdinan
Disciplines Required: IE (1), ME (1)
Disciplines still needed:
Start Date: Jan. 11, 2021
End Date: Aug. 31, 2021
NDA: no
Project Title: The use of AI in quality assurance using NDT

Project Description:

The use of ultrasonic excitation for flaw detection is an established method for non-destructive testing (NDT) and assessment of part quality. As with many other NDT techniques, ultrasonic testing relies heavily on the expertise and judgement of trained human inspectors. The recent advances in artificial intelligence (AI) and machine learning algorithms have solved many similar difficult problems related to classification and anomaly detection that were previously considered intractable. Within the literature, the use of machine learning in NDT has shown promise, however one challenge hindering its wider use is the limited availability of training data sets especially for non-metallic materials such as polymers. One solution that has been explored in the literature is the use of finite element models to generate the training data. Thus, the objective of this thesis would be to develop a finite element model with built in flaws for structure-borne noise analysis (i.e. ultrasonic NDT) and the subsequent training of an AI algorithm for flaw detection based on the generated data.

Project Deliverables: Literature review on the use of AI in quality assurance through NDT with a focus on 3D printed parts. Detailed plan for integrating AI into NDT and simulation for generating data. Final report and presentation.