

# 7a.032.UVA - Development of Human and Machine Predictive Maintenance and Care Service Based on Industrial Internet of Things (IIoT)

## Project - Team

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## Project - Summary

The project is a continuation of the project from year 6 with the identical title. In year 6, through the project, a modeling and solution framework based on hierarchical decomposition and reinforcement learning (RL) Adaptive Multi-scale Prognostics and Health Management (AM-PHM) was developed. The framework was able to provide a decision making policy for the maintenance and operation of an Industry 4.0 Industrial Internet of Things (IIoT) capable smart manufacturing facility.

In year 7, the project is extended to focus on the scalability and implementability of the developed framework. The research activities will be centered around a) development of scalable smart manufacturing simulation with IIoT capability, b) comparison study on the scalability of AM-PHM against deep RL methods such as Asynchronous Advantage Actor-Critic (A3C) methods, and c) apply and improve RL methods (based upon Wolpertinger etc.) on manufacturing settings, and see how the concept of resource allocation is realized via Deep RL, specifically under the settings with large-scale discrete action space.

## Project - Novelty of Approach

This project focuses on addressing issues related to the implementation of a framework for utilizing IIoT data for system performance improvement through optimized decision making. Topics related to scalability, agility, and implementation cost are critical topics in IIoT system implementation in industrial systems that are often overlooked.

## Project - Deliverables

	Deliverable
1	Scalable Industry 4.0 Manufacturing Simulation with IIoT Capability
2	A3C based deep RL algorithm code on large scale manufacturing simulation
3	AM-PHM scalability report
4	Resource allocation via deep RL, specifically with large-scale discrete action space

## Project - Benefits to IAB

Member companies with an interest in utilizing IIoT-based, or other sensor-based data from an industrial system such as a smart manufacturing system will benefit from having a structured implementation methodology.

## Attention Project PIs

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- To **PUBLISH** your changes, click the blue "Publish" button in the lower right-hand corner of this page
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## Spaces

- All Spaces

	CVDI 2017 IAB Fall Meeting				
	CVDI 2018 IAB Fall Meeting				
	CVDI 2018 IAB Spring Meeting				
	CVDI 2019 IAB Fall Meeting				
	CVDI 2019 IAB Spring Meeting				
	CVDI Calendar				

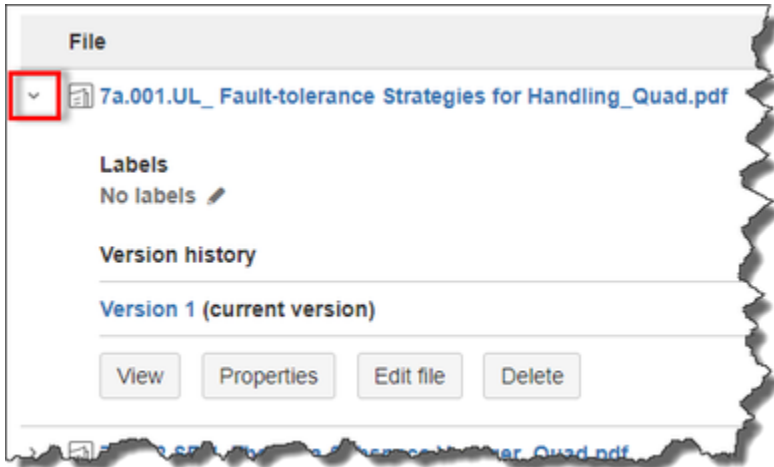
## Project - Presentation Video (Spring 2018)

[Video Link \(8:53 minutes\)](#)

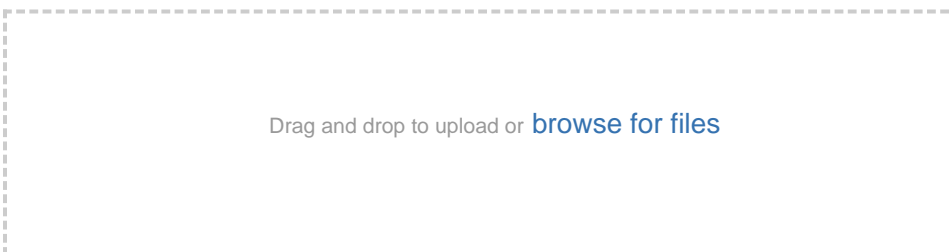
## Project - Documents

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File	Modified
>  7a.032.UVA_Executive Summary.docx	Feb 25, 2018 by Sally Johnson
>  7a.032.UVA-Poster.pptx	Mar 15, 2018 by stephen adams
>  7a.032.UVA_Quad Chart_2018 Spring Meeting.pptx	Mar 19, 2018 by Sally Johnson
>  7a.032.UVA_Year 7_CVDI Mid-Year Report.docx	Dec 13, 2018 by stephen adams



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## Project - Comments

	CVDI Leadership (All Sites)	+ ★ ☆
	CVDI Marketing Materials	+ ★ ☆
	CVDI Reports & Document Library	+ ★ ☆
	CVDI SITE (Drexel University)	+ ★ ☆
	CVDI SITE (Stony Brook University)	+ ★ ☆
	CVDI SITE (Tampere University)	+ ★ ☆
	CVDI SITE (University of Louisiana at Lafayette)	+ ★ ☆
	CVDI SITE (University of North Carolina at Charlotte)	+ ★ ☆
	CVDI SITE (University of Virginia)	+ ★ ☆
	IAB - Industry Advisory Board	+ ★ ☆
	Year 6 - Funded Projects (7/1/17 - 6/30/18)	+ ★ ☆
	Year 7 - Funded Projects (7/1/18 - 6/30/19)	+ ★ ☆
	Year 8 - Proposed Projects	+ ★ ☆

