

Graduate Student Research Seminar

Fall 2024

Hypergraphs as Representation Methods of Digital Twin Systems

John Morris (PhD student)

Advisor: Dr. John Wagner

Monday, September 9th

3:00 pm (EST) – 132 Fluor Daniel Building



Abstract

Current methods of representing digital twins have commonly resulted in bespoke, volatile information silos, curtailing efforts to make digital twins widely available. Hypergraphs are an intriguing new solution to this problem, offering benefits of general, flexible relational modeling, accessible decision weighting, and arbitrary simulation sequencing. A valid form for hypergraphs that enables their usage as representational structures is being set forth, as well as methods for traversal and dynamic modification. Validation is established through the application of hypergraphs to several digital twins in manufacturing and building management. Though final conclusions are still forthcoming, current results are encouraging in suggesting a general informational backbone for digital twins that may enable vendor-agnostic distribution and modular interfacing for digital twins, as well as greatly increase their scalability.



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