



A FRAMEWORK TO CONSTRUCT DIGITAL TWINS FOR DYNAMIC RISK ASSESSMENT IN CRITICAL INFRASTRUCTURES

To provide experts with characteristics that would allow them to build or refine digital twins to be a better utility for dynamic risk assessment.

We need to better understand how fidelity, synchronisation, and other features of digital twins are interacting and affecting different dynamic risk models.



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RESEARCH QUESTIONS

WHAT ARE THE CHARACTERISTICS THAT DETERMINE THE VARYING SUCCESS RATES OF DIGITAL TWINS FOR DYNAMIC RISK ASSESSMENT IN CRITICAL INFRASTRUCTURES?

- ? What is the level of fidelity required for a digital twin to help dynamic risk model achieving significant assessment results, and how would combining various levels of fidelity in the digital twin affect these results?
- ? What is the level of synchronization required in digital twins for a significant dynamic risk assessment, and how mixing various levels of synchronization would affect the assessment?
- ? What are the relations between the varied characteristics of a digital twin for dynamic risk assessment?
- ? What are the fundamental steps and factors that needs to be considered when designing a digital twin for dynamic risk assessment?

RESEARCH PLAN

- ✓ A literature review to critically examine the literature on digital twins characteristics, its utility for dynamic risk assessment, and its applications in critical infrastructures.
- ✓ Building a connected, robust, and detailed digital twin of a critical infrastructures testbed at BCSG labs.
- ✓ Interviews with critical infrastructure's risk assessment experts to determine scenarios and risk models to be later applied to the experiment. this will help in assessing the digital twin's behaviours, responses, and characteristics.
- ✓ A focused user study to test the formalized framework, the participants will use the framework in conceptualizing their own digital twins for dynamic risk assessment.

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