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Research Interests

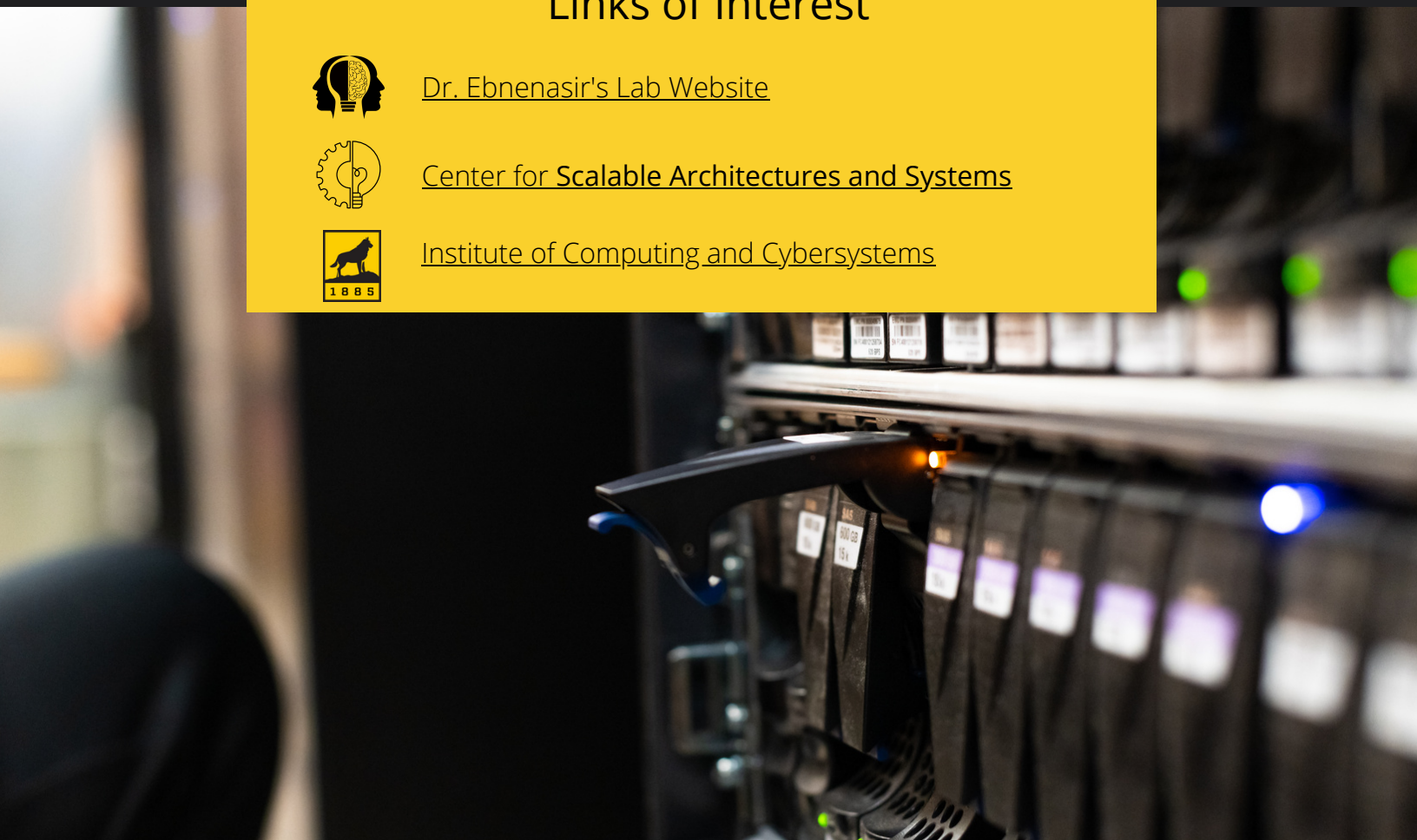
- Software Engineering
- Automated Analysis of Fault-Tolerance
- Formal Methods

Links of Interest

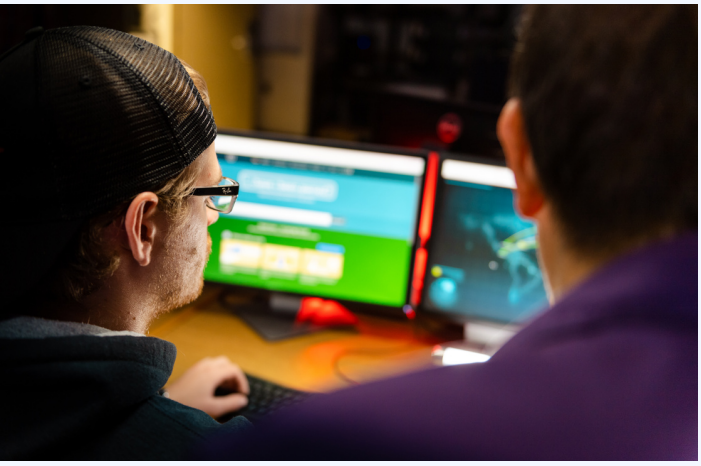
Dr. Ebnenasir's Lab Website

Center for **Scalable Architectures and Systems**

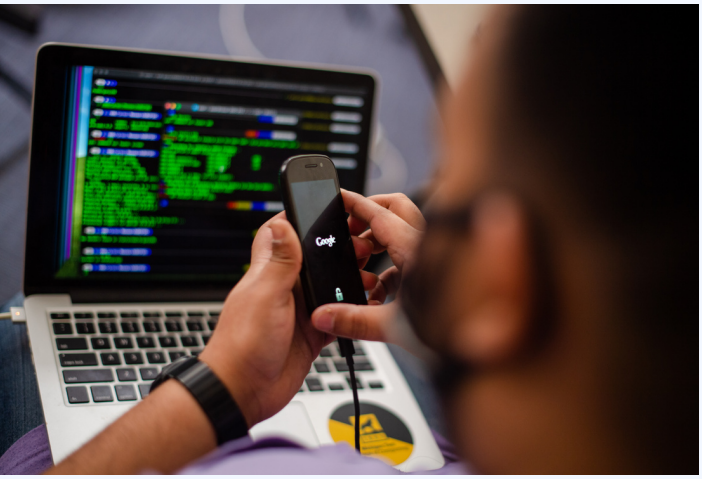
Institute of Computing and Cybersystems



Research Synopsis



Automated design and verification of dependable distributed protocols:
Developing correct distributed systems is a daunting task due to the complexity of detecting and fixing bugs in a collection of non-deterministic communicating processes. Additionally, distributed systems are expected to function correctly when faults and security threats occur. The goal of this project is to provide tools for designers so they can automatically design and debug distributed protocols. Such tools also enable the algorithmic addition of fault tolerance and security concerns to existing distributed protocols.



Automated synthesis of resource-efficient Deep Neural Networks (DNNs):
While DNNs have applications in numerous aspects of our life, their computational cost is a significant impediment before their wider use, especially in resource-constrained devices. Moreover, they partially owe their high accuracy of classification to the manual tweaking of domain experts, which is a hard and tedious task. The objective of this research is to develop methods and tools for automated generation of DNNs that strike a balance between accuracy and computational cost.

Distributed Quantum Computing:
Quantum Computing (QC) has the promise of breaking the boundaries of classic computing by enabling an exponential advantage (i.e., quantum supremacy). No where is this advantage more crucial than realizing a distributed network of quantum computers that can collaboratively solve hard problems. The research objective of this project is to develop the basic primitives of distributed computing (e.g., leader election, consensus) in a quantum setting.

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For more information

Publications