

Using Dynamic Data-Driven Cyberinfrastructure for Next Generation Disaster Intelligence

Wildland fires and related hazards are increasing globally. A common observation across these large events is that fire behavior is changing to be more destructive, making applied fire research more important and time-critical. Significant improvements towards modeling the extent and dynamics of the evolving plethora of fire-related environmental hazards and their socio-economic and human impacts can be made through intelligent integration of modern data and computing technologies with techniques for data management, machine learning, and fire modeling. However, there are still challenges and opportunities in integration of the scientific discoveries and data-driven methods for hazards with the advances in technology and computing in a way that provides and enables different modalities of sensing and computing. The WIFIRE cyberinfrastructure took the first steps to tackle this problem with a goal to create an integrated system, data and visualization services, and workflows for wildfire monitoring, simulation, and response. Today, WIFIRE provides an end-to-end management infrastructure from data sensing and collection to artificial intelligence and modeling efforts using a continuum of computing methods that integrate edge, cloud, and high-performance computing. Through this cyberinfrastructure, the WIFIRE project provides data-driven knowledge for a wide range of public and private sector users enabling scientific, municipal, and educational use. This talk will review some of our recent work on building this dynamic data-driven cyberinfrastructure and impactful application solution architectures that showcase the integration of a variety of existing technologies and collaborative expertise.

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