MAEviz 1.0

Introduction

MAEviz 1.0 is the precursor to the current version of MAEviz before an architecture redesign was undertaken. It was initially developed by Christopher Navarro, a member of the Automated Learning Group for the Mid America Earthquake (MAE) Center. The MAE Center develops research methods and tools to support Consequence Based Risk Management (CRM). At the time of its development, Consequence-based Risk Management was a new paradigm for seismic risk reduction across regions or systems that incorporated identification of uncertainty in all components of seismic risk modeling and quantifies the risk to societal systems and subsystems. MAEviz 1.0 was designed to enable policy-makers and decision-makers to ultimately develop risk reduction strategies and implement mitigation actions.

Located on the University of Illinois, Urbana-Champaign campus in the Department of Civil Engineering, the MAE Center collaborated with the Automated Learning Group at the National Center for Supercomputing Applications (NCSA), a leader in software infrastructure supporting scientific and engineering research, for the first iteration of MAEviz. The evolution of MAEviz into version 2.0 and beyond was done by the Cyberenvironments and Technology (CET) division of NCSA.

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Overview of Past Work

The result of this collaboration is MAEViz v1.0, a tool that integrates spatial information, data, and visual information into an environment for performing seismic loss assessment and analysis. Because MAEViz is one interface that integrates a variety of data sources and types of data, it will prove useful to a variety of users, including: working engineers, state departments of transportation, insurance companies and other stakeholders. MAEViz follows the CRM methodology using a visually based, menu driven system to generate damage estimates from scientific and engineering principles, test multiple mitigation strategies, and support modeling efforts to estimate higher level impacts of earthquake hazards, such as impacts on transportation networks, social, or economic systems.

MAEViz v1.0 was built upon the Automated Learning Group's Data to Knowledge (D2K) software framework. D2K is a visual programming environment that allows users to connect programming modules together to build applications. It supplies a core set of modules, application templates, and a standard API for software component development. The D2K framework integrates distributed computational and data management resources to support collaboration and larger-scale analyses. MAEViz v1.0 supports a variety of interactive display environments, from single user displays to large format, multi-projector displays to 3D virtual reality displays. The 3D virtual reality environment utilizes the "CUBE," an immersive stereo display environment developed at the Beckman Institute at the University of Illinois, Urbana-Champaign. The CUBE will immerse the stakeholder in the data and in the modeling results to assist in the decision making process. The CUBE uses 6-sided stereo projection to immerse the user in a 3 dimensional world for viewing the data.

Initially, MAEviz was to be a visualization tool that provided users with a tool for visual exploration of the results of the MAE Research; however, after the initial prototype was developed, it was clear that the tool would require much of the engineering engines to be within the MAEviz framework. Some of this work was prototyped with D2K as the backing engine. After this initial prototyping, the development team was expanded from 1 FTE to 3 FTE's and MAEviz was refactored using Eclipse RCP as the backing framework. More information about the current architecture of MAEviz can be found here.