Key Aspects in 3D File Format Conversions

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Abstract: We have designed a framework for measuring information loss as one converts g g from one 3D file format to another. Different formats store different pieces of information, thus moving from one format to another sometimes involves dropping information and/or converting the 3D content itself. In addition, software vendors have unique implementations of file importers/exporters which must be considered when converting between formats. In light of this, the information loss obtained from a format conversion becomes a function of both the specification of the file formats involved and the software used to perform the conversion. We introduce a directed graph of conversions called an I/O-graph. This data structure captures the inputs and outputs of various input/output operations (e.g. the import/export operations of 3D software packages). We use the IO-graph to drive an extensible conversion system, NCSA Polyglot, which based on the data stored in the graph calls the relevant third party packages in order to perform a conversion from a source format to a target format. Given a set of 3D files we are then able to assign numerical values to the IO-graphs conversion paths by comparing the original and resulting content.

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Dr. Kenton McHenry is with the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign, working as a research programmer on problems related to 3D content creation, conversion and preservation. Dr. McHenry's research interests include computer vision, pattern recognition and automation.

Peter Bajcsy's research focuses (a) on building bridges from raw data to information and to knowledge where the raw data come from ubiquitous multi-instrument measurement systems, and (b) on understanding computational and algorithmic challenges for automated data-centric operations. Peter Bajcsy has authored more than 16 papers in peer reviewed journals that have been cited more than 200 times on scholar.google.com, and co-authored six books and more than 75 conference papers. His research could also be described as X-informatics, where the X stands for document, hydro, geo, bio, medical image, or sensor.