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A GRAMMAR DRIVEN DATA TRANSLATION SYSTEM FOR COMPUTER INTEGRATED MANUFACTURING

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Introduction. Integration of engineering software continues to be an important topic in mechanical design and manufacturing. One integration technique which has been proposed is to store a complete product representation in a single database using a database management system. In order to integrate existing CAE applications which are not designed for use with a DBMS, a method for importing and exporting data to the database is needed. A system for recognizing and translating a large class of engineering data, those data formats which can be described by regular grammars, is proposed.

Translator Architecture. A translation program has been developed to transfer data between application data files and an extended relational or object oriented database manager. The translator can be configured to recognize different application data formats by creating a *data description file*.

The data description file contains a context free grammar which defines the syntax of the data. A context free grammar is a set of rules or productions which define the allowable sequences of data items. Each production would typically define a single data entity, such as a point, line or curve. Context free grammars are used to describe the data, because well known techniques are available to automatically generate a translator for the data format based on the grammar.

Each production of the grammar in the data description file can be augmented with a command or action. These commands are used to execute database or application commands. Data is stored or retrieved by specifying the appropriate commands for each data construct.

The translator is intended to be used with an object oriented or extended relational database manager. This simplifies the translator, because geometric or mathematical transformations of the data can be implemented as functions or methods in the database manager. These transformation methods can be used by multiple applications which support the same data types.

Example Implementation. A prototype system for data sharing has been developed based on the AutoCAD drafting program and the ANSYS finite element analysis system. Context free grammars describing the DXF data format and the ANSYS CDWRITE data format have been created. The Postgres extended relational database management system was used as the central data storage system.

Conclusion. A simple yet robust method for transferring data between application data files and a central database is described. This translation technique has been employed to recognize and store two dimensional drafting data and two dimensional finite element data. This system could be used to define translations based on the EXPRESS data description language in order to provide an interface to STEP databases.