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Developing a Courseware Database for The AudioGraph

A Thesis presented in partial fulfilment of
the requirements for the degree of

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in
Computer Science

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New Zealand.

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Dedication

To memory of my auntie, Jin Yuan Pan

To my eldest sister, Feng Lan Pan

To my lovely daughter, Shu Ke

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Contents

Abstract

The goal of this project is to investigate and prototype a database driven server for the editing and delivery of multimedia courseware. This project required the analysis, design, and construction of a client/server based, distributed educational system. The components of the project are a relational database server with a particular database schema that can be downloaded or distributed with an existing project and the AudioGraph. The AudioGraph is an application using a multi-media tool to publish university lectures, tutorials or training material on the Web. The front-end interface is a Java application that lets the lecturers or students interact with the database. This system can be used to keep track of various stages of courseware development and web publishing. The overall aim was a flexible and adaptive system with the current lecture development and environment maintained. The system may be distributed on Windows NT, Unix and Macintosh platforms and so is portable and extendible and is platform-independent. The background and technology employed in the project is introduced. Each stage of the project process is explained in terms of the development lifecycle of the system. A limitation imposed by multi-platform compatibility is discussed and the achievement is presented by screenshots. Through the report, the structure of the file, run time environment, inter-process communication, user interface, and server access are explained.

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Definitions

AudioGraph A multimedia authoring tool for Web publishing, designed by researchers at Massey University and distributed by NZEdSoft.

API Application Programming Interface: the group of system tools that allows an application to access the system.

AWT Abstract Window Toolkit: the Java API that enables programmers to develop Java applications with GUI components.

CASE tool Computer Aided Software Engineering tool: this refers to any computer-based tool for software planning, development, and evolution.

CORBA Common Object Request Broker Architecture: the OMG (see OMG definition) platform-independent technique for programs running on different machines to communicate with each other.

COM Component Object Model: Microsoft's interface specification for hooks into Java for inter-program communication.

DBA Database Administrator is responsible for the physical realization of the database system.

DBMS Database Management System: this enables users to create, define and maintain the database and provides access controls to this database.

DCOM Distributed Component Object Model is a set of Microsoft concepts and program interfaces in which a client program object can request services from server program objects on other computers in a network.

DCE Distributed Computing Environment: an industry-standard software technology for setting up and managing computing and data exchange in a system of distributed computers.

DDL Data Definition Language: a language can be used to define the database.

DML Data Manipulation Language: this enables users to insert, update, delete and retrieve data from the database.

ANSI The American National Standards Institute, which is the primary organization for fostering the development of technology standards in the United States.

ER Entity-Relationship is a methodology to model a relational database.

FTP File Transfer Protocol: this is basically a tool used for transferring and handling files across computers anywhere on the Internet.

GUI Graphical User Interface to a computer.

HCI Human-Computer Interaction is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings.

IDE The Integrated Development Environment is a collaborative strategic infrastructure embodying data standards that support business processes across a number of geographically dispersed and heterogeneous organizations.

JDBC Java Database Connectivity is an application program interface specification for connecting programs written in Java to the data in a popular database.

JDK Java Development Kit: a development environment for writing applets and applications that conform to the Java platform.

JFC Java Foundation Classes: this extends the original AWT and is portable and compatible with all AWT-based applications.

JIT Just-in-Time compiler, which improves the performance of Java run time and is used to implement a Java Virtual Machine.

JNMI Java Native Method Interface

JRE Java Runtime Environment.

JVM Java Virtual Machine: this provides an application with a guaranteed run time environment.

MIME Multi-Purpose Internet Mail Extensions are an extension of the original Internet e-mail protocol that let people use the protocol to exchange different kinds of data files on the Internet.

MRJ Macintosh Runtime for Java refers to the Java Virtual Machine and associated class libraries for the Macintosh operating system.

mSQL Mini SQL is a lightweight database engine. It offers a subset of SQL as its query interface.

mSQL-JDBC This is a JDBC driver of the third kind; A pure-Java JDBC driver for mSQL was created and is being maintained by George Reese from The Center for Imaginary Environments.

MySQL This is a true multi-user, multi-threaded SQL database server.

ODBC This stands for Microsoft's Open Database Connectivity; A standard or open application programming interface for accessing a database.

OO Language Object-Oriented Language: this is used to programming.

RDBMS Relational Database Management System.

RFC Request for Comments, in which the FTP commands are described.

RMI Remote Method Invocation: enables the programmer to create distributed Java-to-Java applications, in which the methods of remote Java objects can be invoked from other Java virtual machines, possibly on different hosts.

SDK Software Development Kit: a programming package that enables a programmer to develop applications for a specific platform.

SDLC System Development Life Cycle.

SQL Standard Query Language is a simple, high-level language used for specifying transactions on a database.

UML This is a OO language and stands for Unified Modeling Language, which was designed by Grady Booch, James Rumburgh, and Ivar Jacobson, known as the three amigos.

URL Uniform Resource Locator; URLs are the mysterious text strings.