AN ABSTRACT OF THE DISSERTATION OF

Parisa Ataei for the degree of Doctor of Philosophy in Computer Science presented on June ?, 2021.

Title: Theory and Implementation of a Variational Database Management System

Abstract approved: _____

Eric Walkingshaw

Databases used in the same context that are intended to satisfy the same information need share commonalities while varying in some aspects as well. For example, databases used to store information for a software system are intended to satisfy the client's information need and they share some parts of the schema, however, they still vary in some parts of the schema and most of the content. That is, they are *variants* of a conceptual hypothetical database that captures all the *variation* among them. This pattern appears repeatedly in databases. Instances of variation occurring in databases are: schema evolution, database integration, database versioning, data extraction, and software development either using software product lines approaches or not. While there are specialized approaches to some instances of variation in databases there are no generic solutions to manage variation in databases.

In this thesis, we answer the question: "can we abstract out this repeating pattern of variation appearing in databases and bring the hypothetical database that captures all the variation among a number of databases to life?" To this end, we formalize the database that captures all variation of a number of databases, called a *variational database*, and a query language that allows interaction with the said database, called *variational relational algebra*. [maybe two languages, another: variational SQL, depends on my timing!] We implement these concepts in *Variational Database Management System (VDBMS)*, demonstrate the feasibility of our concepts by developing two real-world use cases, and examine the performance of VDBMS over our two use cases.

Theory and Implementation of a Variational Database Management System

by

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APPROVED:

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Major Professor, representing Computer Science

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Director of the School of Electrical Engineering and Computer Science

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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Parisa Ataei, Author

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[Eric. Committee. partner. abu. parents.]

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