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RESEARCH INTERESTS

I am broadly interested in systems that extend data analysis capabilities to non-expert users. Relevant fields include data mangament and optimization, data provenance, and interface design.

EDUCATION

Expected 2014   **Massachusetts Institute of Technology**, Cambridge, MA
Ph.D., Electrical Engineering and Computer Science
Advisor: Samuel Madden
Dissertation: Implementation and Applications of High Performance Provenance Systems for Data Analysis

May 2012   **Massachusetts Institute of Technology**, Cambridge, MA
M.S., Electrical Engineering and Computer Science
Advisor: Samuel Madden
Dissertation: Shinobi: Insert-aware Partitioning and Indexing Techniques For Skewed Database Workloads

Spring 2007   **UC Berkeley**, Berkeley, CA
B.S., Electrical Engineering and Computer Science

PROFESSIONAL EXPERIENCE

2007–2012   **Massachusetts Institute of Technology, Cambridge, MA**
Ph.D. Student – CSAIL

MIT Big Data Challenge
Designed and ran MIT's largest Big Data prediction and visualization challenge.

"Why" Queries on Aggregate Queries
Designed and implemented an analysis framework to explain outliers in the results aggregation queries by constructing predicates on the input data. I formalized the concept of predicate influence and identified several operator properties to enable higher performance on common statistical aggregates.

Efficient, Low Overhead Provenance
Designed, prototyped, and evaluated a low overhead provenance system for large-scale scientific workflow applications that process gigabytes of data per second.

Query Processing with Humans
This project pioneered the use of human computation platforms such as Mechanical Turk within a database query execution engine.

Index and Partitioning Techniques
I investigated the application of indexing and partitioning techniques for time-varying and skewed query workloads. Shinobi incrementally re-partitions and indexes database tables based on recent query access patterns. Our no-bits paper proposed the use of unused space in B-tree index pages as a cache for heavily accessed tuples. This could improve the performance skewed query workloads by up to three orders of magnitude.

Trajectory Optimized Storage
Implemented core storage system for TrajStore, a high performance data management system for storing and querying vehicle trajectory data by location and time. The system incrementally optimizes the storage layout as the query workload changes over time.

2007-2008 Google Inc., Mountain View, CA
Intern – Data Management Research

Webtables Project
I worked in Alon Halevy's data management group on the WebTables project to mine the Google web corpus for tabular data. I developed the table extraction pipeline and extracted more than 125 million tables. In addition, I built a table search engine that allows users to query over the structured data and automatically visualizes attributes in graphs or maps.

Summer 2005 Microsoft., Redmond, WA
Engineering Intern
Worked on internals of Exchange Server

Spring 2005 IBM Extreme Blue., Almaden, CA
Engineering Intern
Developed a new software patch service for DB2 for z/OS team that reduced patch application times from the order of months to a few minutes.

2004–2006 UC Berkeley, Berkeley, CA
Undergraduate Researcher – Computer Science Department

High Performance Stream Processing
Designed and implemented one of the first high performance complex event processing systems for detecting high level events (e.g., shoplifting occured) from streams of raw sensor events (e.g., RFID tag XXX detected). Results were published at SIGMOD, the premier database conference.

The HiFi Project
Implemented the RFID reader interface for extracting raw events from early RFID readers and the interactive dashboard for the VLDB demonstration. HiFi is a research project around cascading stream architectures for large-scale receptor-based networks.

TEACHING EXPERIENCE

Fall 2013 *Instructor, Big Data Systems (MIT 6.885)*

Co-developed and instructed MIT's first course focused on large scale data analysis tools and techniques. Topics ranged from data cleaning and integration, large-scale systems like Hadoop, to scalable visualization techniques. The course featured 8 new labs to give students hands-on experience with the systems covered in class.

Spring 2012   *Instructor, Data Analysis IAP Course*
Co-developed and taught an Introduction to Data Analysis course to approximately 20 students during MIT's Independent Activities Period in January. The course is online at dataiap.github.io

2011 – 2012   *Head of Curriculum, MEET*
MEET is a 3-year technology program and peace initiative that teaches Israeli and Palestinian high school students. I organized curriculum preparation for each year's incoming instructors. I also successfully migrated the organization from a Java-based curriculum to a Python-oriented one and developed the lesson plans for the transition.

Fall 2010   *TA, Database Systems (MIT 6.830)*
Assisted in writing and grading the assignments and projects.

Summer 2010   *Instructor, MEET*
Mentored a group of 30 Israeli and Palestinian high school students as part of the MIT MEET program, a peace initiative in the Middle East centered around teaching computer science.

Spring 2010, 2011   *Instructor, Introduction to Java Course (MIT 6.S092)*
Instructed a class of 50 students in an introduction to the Java programming language.

Fall 2006   *TA, Database Systems (UCB CS186)*
Taught approximately 30 students in weekly discussion sections. Assisted in writing and grading the assignments and projects.

LEADERSHIP EXPERIENCE

2010   Head of the CSAIL Student Committee
2013   Organizer for the Pre and Post-doctorate Tea

PERSONAL

I love drawing and designing T-shirts and posters. I have created over 20 designs that have been printed and my shirts have been worn by thousands of people. The following link lists some of my designs. www.mit.edu/ eugenewu/gallery.html

Publications

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References

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[15] E. Wu. *Shinobi: Insert-aware partitioning and indexing techniques for skewed database workloads*. PhD thesis, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, 2010.

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