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Zayd Hammoudeh

Education

2017 – Present **Doctor of Philosophy**, *University of California, Santa Cruz*, Santa Cruz, CA, Computer Science.
Advisor: Dimitris Achlioptas

2014 – 2016 **Master of Science**, *San José State University*, San Jose, CA, Computer Science.
Advisor: Chris Pollett

2002 – 2006 **Bachelor & Master of Science (Dual Degree)**, *Drexel University*, Philadelphia, PA, Computer Engineering.
Advisors: Moshe Kam & Nagarajan Kandasamy

Experience

09/17 – Present **Research Assistant**, *University of California, Santa Cruz*, Santa Cruz, CA.

- Developing an algorithm to sample a CNF solution set of unknown size uniformly at random.

11/11 – 09/17 **Wireless Power Engineer**, *Integrated Device Technology Inc.*, San Jose, CA.

- Lead semiconductor validation engineer for the wireless power integrated circuits in the Apple Watch as well as Samsung's Note 5, Note 7, Note 8, S7, and S8 smartphones.
- Designed and implemented a framework for semiconductor test programs using object inheritance and reflection. This framework standardized the program architecture, reduced development time, and eliminated code duplication.
- Developed a centralized, REST-based architecture running Sinatra to deliver unique keys to remote systems. All inter-machine communication used JSON and HTTP GET requests.

07/06 – 11/11 **Applications Development Engineer**, *Teradyne Inc.*, San Jose, CA.

- Authored internal and user group conference papers. The primary focus was enabling hardware focused engineers to use techniques more typically used by software engineers.
- Designed and implemented automated hardware calibration systems for the testing of precision analog-to-digital converters (ADC) with accuracy requirements of $<1\,\mu V$.

06/03 – 07/06 **Research Assistant**, *Drexel University – Data Fusion Laboratory*, Philadelphia, PA.

- Developed a parallel, system on chip (SoC) architecture that significantly reduced the power consumption of fork-join programs that have high levels of data-sharing between processes.
- Used digital-signal processing techniques to predict gravitational-force induced loss of conscious (G-LOC) in fighter pilots for the United States' Office of Naval Research (ONR).
- Collaborated with DuPont scientists to identify relationships between maize genes based on their expression profiles post-fertilization via unsupervised learning techniques.

Teaching

09/03 – 07/06 **Fundamentals of Systems and Differential Equations I & II**, *Teaching Assistant*, Drexel University, Philadelphia, PA.

- Taught weekly recitation sections as well as occasional lectures and exam review sessions.
- Created and graded course quizzes and exams for class sizes of approximately 250 students.
- Held regular, weekly office hours and dealt with course administrative issues including incidents of cheating, grade disputes, etc.

04/04 – 07/06 **Evaluation of Experimental Data and Engineering Ethics I & II**, *Teaching Assistant*, Drexel University, Philadelphia, PA.

- Moderated and graded student end-of-semester, ethics debate presentations.
- Generated multiple choice quizzes on assigned weekly readings.

Notable Projects

Master's Thesis
Dec. 2016

Title: '*An Improved Solver for Square Piece, Mixed-Bag Jigsaw Puzzles*'
Project Website: www.cs.sjsu.edu/faculty/pollett/masters/Semesters/Spring16/zayd/

Designed a solver that reassembles multiple jigsaw puzzles simultaneously. The solver receives no information regarding the number of input puzzles, their size, or the original image contents. Puzzle pieces are equal-size squares, eliminating the use of shape when determining inter-piece pairwise affinity. This solver significantly outperforms the current state of the art.

Semester Projects

Title: '*A Recipe Cuisine Type Classifier*'
Project Website: github.com/ZaydH/recipe_cuisine_type_classifier

Developed a stacked generalization classifier that determines a recipe's cuisine type (e.g., Italian, French, British, etc.) using only the recipe's list of ingredients. Component algorithms and techniques used include: cross-validation, bagging, boosting, K-Nearest Neighbors, Random Forests, Naïve Bayes, Term Frequency-Inverse Document Frequency (TF-IDF), and lemmatization. Top 5% ranking in the Kaggle competition.

Title: '*Implementation of a Dialect of Haskell in the JVM*'
Project Website: github.com/ZaydH/haskell_in_the_jvm

Created an architecture that uses a custom ANTLR grammar to parse a dialect of Haskell. The resulting abstract syntax tree is then transpiled to Scala, which runs in the JVM. An accompanying system-level test bench was created using `bash` scripting.

Title: '*A Parallel Implementation of Minimax with Alpha-Beta Pruning*'
Project Website: github.com/ZaydH/parallel_minimax_with_alpha_beta_pruning

Parallelized the Minimax algorithm by converting the Minimax tree to a Directed Acyclic Graph (DAG) using the Pipeline API on Google App Engine (GAE). Streamlined the intra-process communication necessary for Alpha-Beta pruning by using GAE's Memcache.

Title: '*Genetic-Algorithm Based Classification of Malignancy in Breast Tumors*'
Project Website: github.com/ZaydH/breast_cancer_genetic_algorithm_classifier

Implemented a genetic algorithm from scratch in Java that had >90% accuracy detecting malignancy in breast tumors.

Technical Skills and Expertise

Programming Languages
- *Expert Experience*: Python, Java, Visual Basic 6.0 & VBA, Ruby, ANTLR, LaTeX
- *Proficient Experience*: C/C++, C#, Haskell, JavaScript

Software Environments NumPy, Apache Hadoop, Google App Engine, Amazon AWS, OpenCV2, PyTest, Pickle, Vim, Pycharm, Oozie, Subversion, Git

Operating Sytems macOS, Windows, Unix, Linux

Awards

2017 – 2018 University of California, Santa Cruz Chancellor's Fellowship

2005 Arnold H. Kaplan Scholastic Achievement and Academic Excellence Scholarship

2005 Drexel University Undergraduate Student Research Award

2004 Drexel University Teaching Assistant Excellence Award

Publications

Conference Proceedings

Z. Hammoudeh and C. Pollett. Clustering-based, fully automated mixed-bag jigsaw puzzle solving. In *17th International Conference on Computer Analysis of Images and Patterns*, volume 2, pages 205–217, 2017.

Master's Theses

Z. Hammoudeh. A fully-automated solver for multiple square jigsaw puzzles using hierarchical clustering. Master's thesis, San José State University, San Jose, CA, 2016.

Z. Hammoudeh. ForPowER: A novel architecture for energy efficient implementation of fork-join parallelism using system on a chip. Master's thesis, Drexel University, Philadelphia, PA, 2006.