Luke Boyer

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EDUCATION

Northeastern University, Khoury College of Computer Sciences *Boston, MA*
BS in Computer Science and Mathematics, Minor in Business Administration, *cum laude* September 2017 - August 2021
Course Work: Algorithms (graduate), Advanced Algorithms (graduate), Number Theory (I, II), Artificial Intelligence, Databases, Group Theory, Stochastic Processes, Financial Derivatives
Major GPA: 3.8/4.0 | Overall GPA: 3.57/4.0

COMPUTER KNOWLEDGE

Languages: Java, Python, SQL, Lisp, Mathematica
Software | Platforms | Systems: Solr, Lucene, Git, Postgres, Spring, Vert.x, Maven, scikit learn, Django, AWS
Projects:
Code for Community: One of first members that spearheaded the creation of production websites for two local non profit organizations. Programmed in small team to create in-house backend scaffold in Java with few external lightweight apis which was extended separately by the web app dedicated to each non-profit.
Breaking RSA: The current best algorithm for factorizing integers checks all possible factors (i.e $O(\sqrt{i})$). Is there a place where a factor is more likely to be? Hypothesized that for two factor integers i there exists functions of the form $f : \mathbb{Z} \to \mathbb{Q}^n$ where $f(i)$ would be correlated to i's smaller prime factor's location, proportional to $\sqrt{i}$. Discovered a function that yielded linear and non-parametric regressions able to predict the location of the smaller factor with a backtested distance error normalized to $\sqrt{i}$ of about 25%. This implies that the algorithm that follows from this method has an expected runtime approximately equal to half of the current method's (probabilistically speaking).

EXPERIENCE

Northeastern Math REU *Boston, MA*
Researcher May 2021 - August 2021
- Received a grant to work with another undergraduate and a graduate advisor to research a niche of discrete geometry.
- Generated novel theorems and proofs in classification and analysis in abstract structure of (n_k)-configurations.
- Consolidated discoveries and insights into a formal publication, available at (https://arxiv.org/abs/2108.13565).

Blue Sky Collaborative *Westboro, MA*
Software Engineer May 2020 - December 2020
- Worked as sole developer to bring CEO's vision of fundraising software platform to market for the first time.
- Constructed from scratch an application that allowed fundraisers to collect donations in an electronic form on any platform. Additionally built an elegant data-hub for organizations to better understand their clients donation behaviors.
- Prudently chose frameworks and ops tools that allowed iteration through new features as quickly as possible.

Chewy *Boston, MA*
Software Engineer (Search Team) July 2019 - December 2019
- Tasked with appending features to as well as optimizing the reads from and writes to chewy.com's search-engine.
- Refactored and rearchitected ~50 Python and Java files to increase modularity of aging Autocomplete logic.
- Collaborated in implementing a system to reduce the time to update the search instance with changes in ground-truth product data. By leveraging intermediate (NoSQL) data sources, logical-decoding and Java's concurrency apis, full update time was reduced from ~2hr to ~13min.

Khoury College of Computer Sciences *Boston, MA*
Teaching Assistant January 2019 - June 2020
- Served in a breadth of courses including Fundamentals of Computer Science II and the keystone Algorithms class.
- Analyzed student code and/or mathematical analysis, and provided constructive feedback through the grading process.
- Challenged particularly motivated students with more in depth problems and erudite discussions outside of class.

VOLUNTEER EXPERIENCE

EVKids *Boston, MA*
Volunteer Tutor/Mentor September 2018 - May 2020
- Tutored two local Roxbury resident students in pre-calculus and calculus, creatively covering Newton's proofs.
- Guided senior students in the college application process through essay revisions and program selection.

MY QUINTESSENTIAL READS

Brothers Karamazov | Introduction To Algorithms (clrs) | Tao Te Ching (Stephen Mitchell translation) | The Intelligent Investor
Economics for the Common Good | A Farewell to Arms | A Brief History of Time | The Mythical Man Month | The Iliad