Juspreet S. Sandhu

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Interests

Search, Distributed Systems, Type Theory, Artificial Intelligence, Programming Language Theory, Interpreters

Education

University of Illinois at Urbana-Champaign — **Urbana-Champaign, IL**
Bachelor of Science : Engineering Physics — **Aug 2011 – May 2015**
Minors : Computer Science, Mathematics
(Dean's List - Spring 2012)

Technical Experience

Software Engineer, Search & Discovery Team, Tumblr Inc. — **December 2015 – Present**

- Using Scalding to write offline jobs for Data Analysis
- Reducing latency via Architectural improvements and increasing relevancy via Algorithmic improvements

Formal Verification of Distributed Systems (Verdi, UWPLSE) — **April 2017 - Present**

- Working with James Wilcox to extend the Verdi framework to provide Formal Verification for more implementations of different Distributed Systems
- Also working to extend the Network Semantics and Handler Monads to be more robust and provable

Interpreter : Untyped-Lambda Calculus (LISP) — **September 2016**

- Wrote an interpreter in Racket (LISP) for a version of the Untyped-Lambda Calculus (called MUPL) as part of the Programming Languages Course on Coursera (UW)
- Wrote functions to generate MUPL for some HOFs such as Map & Filter in Racket

Researcher, Prof. Jasiuk's Group, Composite Materials — **April 2015 – July 2015**

- Used Regression to model Physical Parameters on mixing Polymers with Fillers

Researcher (SPIN), NCSA (Natural Language Processing) — **February 2015 – May 2015**

- Worked as a Research Programmer in GroupScope, under I-CHASS & National Center for Supercomputing Applications to and wrote Python code using the iGraph library

Grader/TA, CS-410 (Text Information Retrieval Systems) — **January 2015 – May 2015**

- Helped Grade Midterm Exam and HW Assignments for 180 students
- Regularly held Office Hours to provide Algorithmic and Coding assistance to students

Binary Classifiers (Group Project : CS-412 - Data Mining) — **November 2014 – December 2014**

- Analyzed a Large Data-Set regarding Car Auctions and purchases to train a Binary Classifier
- Designed one Algorithmic Classifier using Principal Component Analysis applied in parallel to a Naïve Bayes Classifier with Laplacian smoothing and another Classifier as a Perceptron with margin

Independent Study : Computer Science (Natural Language Processing) — **August 2014 – January 2015**

- Analyzed Data Sets with Natural Language Processing toolkits in Python & Java (NLTK and StanfordCoreNLP) to resolve co-reference resolution and create modified Term Frequency distributions
- Conducted Analysis on large datasets to optimize for Search Performance & evaluate MAP on a Query-Set

Custom Search Engine (Group Project : CS-410 - Text Information Retrieval Systems) **June 2014 – July 2014**

- Formulated and coded a Retrieval Function in Python using relevance measures, sentiment analysis, stock prices and aggregated through Alchemy API, Quandl API and Bing Finance Query API
- Created a Custom Search Engine that generates a ranking of publications related to company finance performance as measured by Stock prices

Independent Study : Physics (Data Analysis in Astro-Physics) **February 2014 - May 2014**

- Designed and coded an Algorithm in Python to compute Bayesian Probabilities for Supernovae
- Applied the GALSNID method to create plots of Supernovae and to visualize host-galaxy morphology effects

Leadership Experience

Peer Mentor for Freshman Physics Students **August 2013 – May 2015**

- Guided and assisted freshman in Physics with queries regarding the Physics program at U of I

Awards

National Mathematical Olympiad **August 2008**

- Stood 52nd out of at least 10,000+ in the event, held in New Delhi, India

Classical Guitar, Delhi School of Music **December 2010**

- Performance Recital with Distinction (Grade 5) from Trinity College, London, UK

Relevant Coursework

Data Structures	Text Information Retrieval	Abstract Linear Algebra	Machine Learning
Discrete Math	Quantum Theory	Data Mining	Differential Geometry
Modern Physics Laboratory	Algorithms & Computational Theory	Grad Seminar: Information Retrieval	Applied Complex Analysis
Programming Languages (Coursera)	Cryptography (Coursera)	Quantitative Model Checking (Coursera)	Enumerative Combinatorics (*In Progress)*

Professional Skills

- **Programming Languages :** Python, PHP, SML, Scala, Java, Coq, Ruby, Racket(LISP), C++, LaTeX, HTML
- **Platforms :** Mac OS X, Linux, Windows 8, Origin Pro 9, ROOT
- **Spoken Languages :** English, Hindi, Punjabi, Sanskrit
- **Control Systems/Version :** Git, Subversion
- **Libraries :** orgjson4s, log4j, jsoup, stanford-core-nlp, NLTK, Weka, JSON, CSV, math, TEvA

Personal Website, GitHub

Personal Website: https://jssandh2.github.io/Juspreet-Sandhu/

Github: https://github.com/jssandh2