Rukmal Weerawarana

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Education

Master of Science (Financial Engineering) **May '19**
Stevens Institute of Technology Hoboken, NJ
School of Business (Division of Financial Engineering)
GPA (4.0 Scale): 3.8 | *Awards:* Provost's Master's Fellowship

Bachelor of Arts in Business Administration (Finance) **Jun '17**
University of Washington Seattle, WA
Michael G. Foster School of Business (Department of Finance and Business Economics)

Work Experience

Software Engineer (Data Science) **Seattle, WA**
ExtraHop Networks Sep '19 - Present
Unusual Behaviors Group; Data Science R&D

- Designed and developed high throughput data pipelines to transport and load semi structured data across numerous globally distributed data centers. Experienced in creating enriched data sets to deliver insights to internal and external stakeholders.
- Produced numerous Data Science applications for both research and production use, with modern AWS serverless technologies and architectures. Applied modern Data Science algorithms and methodologies to Big Data to deliver insights to our customers.
- Formalized, engineered, and managed the core internal ETL pipeline for over 2 years, delivering value to over 10 internal teams across the business. Scaled the core pipeline to handle an order of magnitude increase in data volume, while increasing functionality, due to increased adoption of ExtraHop's Cybersecurity product, Reveal(X) 360.
- Enhanced ExtraHop's core threat hunting ability as a detector writer, implementing unsupervised heuristics to Big Data scale traffic flows in the cloud. Implemented numerous real-time detectors that act as early warning signals of potential bad actors on corporate networks across our customer base.
- Participated in recruitment efforts, and interviewed teammates before, and during the COVID pandemic. Assisted with mentoring and on-boarding new team members.

Research Assistant **Hoboken, NJ**
Stevens Institute of Technology Aug '18 - May '19
Sensorimotor Control Laboratory; Department of Biomedical Engineering & Stevens Institute for Artificial Intelligence

- Designed and implemented algorithms to assess and classify tremor severity in patients with late-stage Parkinson's Disease.
- Created a highly scalable and extensible web application to be used by the researchers in the lab during this project. This web application incorporated HIPAA-compliant data storage and access, as well as efficient cluster management with Docker and Kubernetes.

Summer Research Fellow **Troy, NY**
RPI-IBM HEALS Research Center May '18 - Aug '18
Tetherless World Constellation; Rensselaer Polytechnic Institute
AI Horizons Network; IBM Research

- Led the design and development of the PaperRank Framework, a methodology for deriving probabilistic community trust in academic publications. PaperRank utilized the PageRank algorithm, coupled with a Gamma Mixture Model applied to citation networks of academic publications. A proof-of-concept was implemented, from extraction to final trust score computation, analyzing over 14 Million articles from the NCBI PubMed Database.
- Formulated and implemented novel strategies for semantically-enhanced automated extraction of medical directives from Clinical Practice Guidelines (CPGs), for eventual inclusion in a knowledge graph of Diabetes diagnosis and treatment directives. Built the 'Guideline Explorer', a tool for efficiently visualizing and examining the American Diabetes Association's 2018 CPGs.
- Explored the field of 'Semantalytics', which lies at the intersection of Semantics and Analytics. Drafted a Vision statement for the future exploration of this novel field of research, through the lens of bioinformatics.

Laboratory Assistant **Hoboken, NJ**
Stevens Institute of Technology Sep '17 - Dec '18
Hanlon Financial Systems Laboratory; School of Business & Stevens Institute for Artificial Intelligence

- Spearheaded an effort to discover and implement new processes, adopt more adaptable technology, and increase functional collaboration, to help realize the teaching and research goals of the lab.
- Assisted in student project guidance, and extra-curricular instruction. Introduced interactive programming technology to aid in the Introduction to C++ course taught to MSFE students.
- Facilitated the daily operations of the lab, including assisting instructors and students (Graduate and Undergraduate), and maintaining hardware and software resources.

Publications

Learned Sectors: A fundamentals-driven sector reclassification project **2019**
Rukmal Weerawarana, Yiyi Zhu, Yuzhen He
arXiv preprint; arXiv:1906.03935
Market sectors play a key role in enabling the efficient flow of capital through the modern Global economy. An analysis of existing sectorization heuristics show that they are not entirely quantitatively driven, but rather are highly subjective and rooted in dogma. To this end, we introduce a new fundamentals-driven Learned Sectors heuristic.

(Draft) **Inferring Community Trust from Citation Graphs** **2019**
Jamie McCusker, Rukmal Weerawarana, Alexander New, Kristin P. Bennett, Deborah L. McGuinness
We introduce the PaperRank scoring algorithm; a proxy of scientific community trust in a given publication. This score is derived from the classic PageRank algorithm (applied to academic citation networks), in conjunction with a one-dimensional Gamma Mixture Model to normalize the PageRank scores on a 3-group publication notoriety heuristic.

Semantic Modeling of Cohort Descriptions in Research Studies **2018**
Shruthi Chari, Rukmal Weerawarana, Oshani Seneviratne, Jamie McCusker, Deborah L. McGuinness, Amar Das
Knowledge Representation and Semantics Workshop; AMIA 2018 Annual Symposium
This research addresses a key challenge faced by physicians using Clinical Practice Guideline recommendations; determining how well idiosyncratic cohort evidence generalizes to the greater clinical population.

What is a Knowledge Graph? **2018**
Jamie McCusker, John S. Erickson, Katherine Chastain, Sabbir Rashid, Rukmal Weerawarana, Marcello Bax, Deborah L. McGuinness
This work attempts to synthesize a clear and unambiguous definition of a 'Knowledge Graph' that conforms to current knowledge graph research, while constraining the research space that may be considered a knowledge graph.

Selected Projects

Precis | https://precis.rukmal.me **2021**
Precis is an Ontology for modeling personal professional metadata. The extended Precis toolkit also includes a Pythonic search API for the Ontology, a JSON data loader, and an extensible templating engine.

fe621 | https://git.rukmal.me/FE-621-Homework **2019**
fe621 is a Python library that provides functionality for lattice based derivative pricing models, exotic option picing, Monte Carlo simulations, numerical differentiation and integration, and optimization.

reIndexer | https://git.rukmal.me/reIndexer **2019**
reIndexer is a research tool for the backtest-driven evaluation of different sectorization heuristics, using a system of synthetic ETFs, and efficient portfolios of those synthetic ETFs.

HTKG and NYPD-Compstat-LD | https://git.rukmal.me/NYPD-Compstat-LD **2019**
Collaborators: Ryan Hartman, Ayush Kalla, Kovid Shukla, Sanket Saharkar
HTKG (Human Trafficking Knolwedge Graph), and NYPD-Compstat-LD (the main data ingestion engine) is a knowledge graph platform for linking suspected human trafficking advertisements with crime data from the NYPD to retroactively assess trends.

PaperRank Framework | https://git.rukmal.me/PaperRank **2018**
The PaperRank framework is designed to enable bibliometrics and citation analysis of academic literature graphs. It is highly extensible, and designed to be corpus-agnostic; currently, it is configured for use with the NCBI PubMed database.

Selected Talks

Neural Ordinary Differential Equations **2020**
https://drive.google.com/file/d/1fqVH6GJe1TcRyD6tL2cDUXkkkhyRq4vY
A literature review of Neural Ordinary Differential Equations by Chen et al., a new family of deep neural network models that parameterizes the hidden state of a neural network.

Knowledge Graph Fundamentals **2018**
https://drive.google.com/file/d/1f21S_QZtm6aYiYLnXPA5opgsoBdIX7zX
An overview of the fundamental technology powering modern knowledge graphs, focusing on the concepts of semantic data, ontologies, and inference.

High Frequency Trading (HFT) - A Deep Dive **2017**
https://drive.google.com/file/d/1I7JuZhVzsAT84xe88lLsbHbSIa-Ev7eF
A deep dive into High Frequency Trading (HFT), covering market microstructure, exchange dynamics, regulatory implications, electronic order execution models, RegNMS, algorithmic trading, and popular HFT-driven strategies for exploiting arbitrage opportunities.