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)

Certificate in Quantitative Fundamentals of Computational Finance — **Aug '16**
University of Washington — Seattle, WA
College of Arts and Sciences (Department of Applied Mathematics)

Work Experience

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

- 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**
Hanlon Financial Systems Laboratory — Sep '17 - Dec '18
School of Business; Stevens Institute of Technology
Stevens Institute for Artificial Intelligence; Stevens Institute of Technology

- Spearheaded an effort to discover and implement new technology solutions to help realize the teaching and research goals of the lab.
- Assisted in the daily operations of the lab, including assisting instructors and students (Graduate and Undergraduate), and maintaining hardware and software resources.

Business Management Team Lead — **Seattle, WA**
UW Hyperloop — May '16 - Aug '17
College of Engineering; University of Washington
Other Titles: Impact Development Team Lead, Control Systems Team Member

- Represented the University of Washington at the inaugural SpaceX Hyperloop Pod Competition in Hawthorne, CA. We placed 4th in the United States, and 6th globally; the competition initially received 1,700 team proposals, which were narrowed down to 30 finalists.
- Led the Business Management Team to launch a highly successful crowdfunding campaign, raising over $20,000 in cash (with an initial goal of $10,000), and over $80,000 of source materials used in the construction of the Pod. The collective effort of the team led us to have the lowest-cost Pod among the 30 final teams.
- Spearheaded the sourcing and delivery of over $50,000 of raw material, including high-density Carbon Fiber, release agents, and powerful Neodymium magnets for the final Pod assembly.

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**
James P. 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, James P. 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.

(Draft) **What is a Knowledge Graph?** **2018**
James P. 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 (Jinja, LaTeX, Python, SPARQL) | `https://precis.rukmal.me` **2019**
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 (LaTeX, Python, scikit-learn) | `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 (Docker, Python, SciPy) | `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.

PaperRank Framework (Kubernetes, Python, Redis, SciPy, scikit-learn) | `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.

Skills and Technologies

Application Software
Adobe Creative Cloud, Autodesk AutoCAD, Blender, Bloomberg Terminal, Microsoft Office, Protege, SolidWorks

Databases
Apache Jena, Blazegraph, MongoDB, MySQL, Neo4j, Redis

Deployment, Orchestration, and Continuous Integration Tools
Amazon Web Services, Docker, GNU Make, Google Cloud Platform, Heroku, Kubernetes, Microsoft Azure, Travis CI

Frameworks and Libraries
Electron, Flask, Go Revel, NLTK, Node.js, R Shiny, RDFLib, SciPy, Socket.IO, Spring, TensorFlow, scikit-learn

Operating Systems
Linux (Ubuntu, Fedora, etc.), Windows, macOS

Programming and Scripting Languages
Bash, CSS, Go, HTML, Java, JavaScript, Jinja, LaTeX, MATLAB, Perl, Python, R, SPARQL, SQL

Reproducible Research Tools
GitHub, Google Colaboratory, Knitr, Microsoft Azure Notebooks, Overleaf, Project Jupyter, Read the Docs

Soft Skills
Conflict Resolution, Excellent Communication Skills, Excellent Writing Skills, Extensive Leadership Experience, Project Management, Public Speaking