Stanley (Guo Liang) Gan

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SKILLS

Technical Skills

- Programming Languages: Python, R, MATLAB, C++, Bash Scripting
- Optimization Tools: IBM CPLEX, MATLAB Linprog
- Deep Learning and Machine Learning Tools: Keras, TensorFlow

Transferable Skills

- Independent and quick learner: Learned CPLEX Python API which has limited online resources, in 1 week
- Team player: Enjoy working and brainstorming mathematical problems with fellow research colleagues
- Time management skills: Managed to juggle teaching duties, research and courses in 1 semester
- Communicate effectively in 4 different languages: English, Mandarin, Cantonese and Malay

WORK EXPERIENCES

Research Experience/Machine Learning Experience

Research Intern in *1QBit, Canada* September 2017 – Present

- Working in the machine learning team, focusing on the aspect of integrating knowledge of advanced quantum computation and machine learning in the area of quantitative finance
- Worked with Accenture Labs and Biogen in developing a first-of-its-kind quantum-enabled molecular comparison application which could vastly enhance advanced molecular design for drug discovery
- Learned about Agile framework when working with researchers and software developers, and the importance of communication in meeting client-oriented project deadlines

Teaching Experience

Teaching Assistant for Discrete Mathematics, Algorithms in *SFU, Canada* Jan 2017 – August 2017

- Conducted tutorials on topics involving logics, set theory, combinatorics, design and analysis of algorithms using resources such as textbook, online problem sets to help students build a solid foundation in mathematics
- Marked assignments, midterm exams within a time frame and provided useful feedbacks to the students by showing common conceptual mistakes during tutorials
- Learned to convey sophisticated concepts in simpler terms, which helps improving communication and presentation skills

Research Experience/Optimization Experience

Research Assistant in Computational Biology in *SFU, Canada* Sept 2016 – Present

- Study the diversity of pathogenic bacteria which causes Lyme disease, *Borrelia Burgdorferi* in tick samples using mathematical and computational approaches under the supervision of Prof. Chindelevitch and Prof. Chauve
- Mapped and aligned ~60GB Illumina short reads data using Bowtie, SRA Toolkit and ClusterW
- Formulated mixed integer linear programs(MILP) to address different biological problems and coded MILPs using CPLEX Python API
- Communicated with biologists about their prior expectations on co-infection pattern and the result of this project will lead to improved ecological prevention and control protocol of Lyme disease

Operational Research / Optimization Experience

Strategic Planning and Advisory Intern in *AECOM Asia Co. Ltd., Hong Kong* June 2015 – Aug 2015

- Participated in constructing a customized transport model for a major bus company in Hong Kong using different software such as EMME, ArcGIS and Excel, where the company attained about 13% increase in bus route efficiency after first trial run of the model
- Analysed traffic, transport and population related data using different aggregate and logical functions in Excel, in which these analysed data were inputs of the transport model
- Experienced cultures and administrations of one of the largest multinational engineering consulting firm

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PUBLICATIONS

Deconvoluting the Diversity of Within-host Pathogen Strains in a Multi-locus Typing Framework

- Accepted for RECOMB-Seq 2018 conference and selected for publication in Bioinformatics journal

PROJECT EXPERIENCES

Statistical Learning (Featured Bioinformatics Topic on Kaggle)

Predicting Diabetes Incidence for the Pima Indian Dataset, *SFU Canada* Sept 2017 – Dec 2017

- Explored different statistical learning methods, including Generalized Additive Model (GAM), Gradient Boosting Machine(GBM), Support Vector Machine(SVM), Random Forest(RF) and Logistic Regression
- Used VIM package in R to visualize missingness pattern and utilized Multivariate Imputation using Chained Equation(MICE) method in imputing missing values
- The best model is an ensemble of GAM, GBM and SVM, achieving 80.6% average test accuracy which is comparable to state-of-the-art models

Deep Learning (Natural Language Processing)

Aspect Based Sentiment Analysis using Deep Neural Networks, *SFU Canada* Jan 2017 – May 2017

- Analyzed the sentiment of a product review given an aspect of the product using Deep Memory Network (DMM)
- Achieved test accuracy higher than state-of-the-art neural network based model in 3 classes sentiment classification (Positive/Negative/Neutral)
- Test accuracy for Restaurant Data (3041 training, 100 test): 84.8% > 77.2% (State-of-the-art)
- Test accuracy for Laptop Data (3045 training, 100 test): 73.44% > 68.9% (State-of-the-ar

Machine Learning (Computer Vision)

Fingerprint Liveness Detection using Neural Networks, *SFU Canada* Sept 2016 – Dec 2016

- Developed neural network models in classifying real and fake fingerprint images (2000 training images: 1000 real and 1000 fake, 2500 test images: 1000 real and 1500 fake)
- Architectures implemented include multi-layer perceptron, CNN and a model based on different input features extracted using local image descriptors such as BSIF and WLD
- Utilized dimensionality reduction technique PCA which improved test accuracy by ~9% for all models
- The best model achieved test accuracy of 99% and ACE score of 1.1(Metric used by LivDet competition)

Theoretical Computer Science (Design and Analysis of Algorithm)

Online Randomized Algorithm, *HKU Hong Kong and SFU Canada* Aug 2015 – Jan 2016, Sept – Dec 2016

- Studied the design of competitive online algorithms using primal dual approach and applied this approach in analysing RANKING algorithm for online bipartite matching problem
- Research idea developed in HKU was further investigated by Dr. Huang's group
- Re-explored this problem as a course project in SFU and obtained 100% for this project

EDUCATION

Simon Fraser University (SFU), Canada Sept 2016 – Present

- Pursuing MSc(Thesis) Computing Science under the NSERC-CREATE funded program, MADD-Gen
- Graduate Fellowship holder and Entrance Scholarship holder

The University of Hong Kong (HKU), Hong Kong Sept 2012 – June 2016

- Graduated with BSc(Hons) Mathematics with minor in Computer Science
- Scholarship holder of HKU Foundation Scholarship and HKSAR Government Scholarship

EXTRA-CURRICULAR AND VOLUNTEERING ACTIVITIES

- **August 2017:** Presented poster topic "Illuminating the Diversity of *Borrelia* in Ticks" at the SFU Symposium on Mathematics and Computation
- **Jan 2013 – Jan 2016:** Performed as a pianist/guitarist/drummer for the HKU Residential College Band in charity events and cultural nights