Agastya Kalra

University of Waterloo Mathematics - Computer Science

Projects

Live Free
Machine Learning Project (Penn Apps XIII Winner) - January 2016

A neural network to predict glucose levels of diabetes patients 20 minutes in the future with 91% accuracy based solely on previous readings.

- Wrote an ANN from scratch and optimized using bias vs variance analysis and cross validation, test, and training data sets.
- Implemented Stochastic, mini-batch, batch, and random-batch gradient descent with map reduction on Linode servers.
- Co-ordinated data transfer between Javascript, Python and Octave.

Toe Tactics
Artificial Intelligence project (Hack Princeton) - November 2015

A powerful AI that can play n-in-a-row games e.g. Gomoku and Tic Tac Toe.

- Wrote the minimax algorithm with alpha beta, forward and heuristic pruning in Java.
- Optimized to play perfect 3, 4 in a row on any size board, and wins against 80% of online Gomoku players and 100% of other online AIs
- Wrote a Threat Search to finds 20 move deep wins in less than 1 second, using bit manipulation hackery, hashes and graphs in Python.

Spam Classifier
Machine Learning Project - January 2016

Supervised Machine Learning used to sort email data into spam/not spam.

- Applied SVMs with linear and gaussian kernels to achieve 99% accuracy
- Modified scripts to parse emails to find and paramatrize specific words.

Handwritten Digit Recognition
Machine Learning Project - January 2016

Supervised Machine Learning used to recognize handwritten digits.

- Implemented a vectorized neural network from scratch with 98% accuracy on testing data.
- Implemented vectorized multi-variate logistical regression with 95% accuracy on testing data.

About

Enthusiastic machine learning and artificial intellegence designer with a passion for algorithms, data science, chess, and learning.

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Skills

- Experience with Python, Ruby, Rails, MATLAB, SQL, Javascript, Java, Racket (Scheme), Haskell, HTML, (S)CSS, GNU Octave, Actionscript, Git, and C/C++.
- Top 50 chess players, Canada 2013.
- Passion for creative approaches to visual/algorithmic design problems
- Proficient with Blender 3D and Adobe CS4+ for design and animation.
- Enthusiastic, self-motivated learner and active team leader and contributor.

Awards

- Best application with a Linode Server - Penn Apps XIII
- Best creative predictive algorithm - Penn Apps XIII
- Technological Innovation Award Winner - Spirit of the Capital 2015
- 1st at Canadian Youth Chess Championships 2013 U16.
- 61st
- Prepared two students who finished top 50

Image Compression
Machine Learning Project - January 2016
Unsupervised Machine Learning used to compress images.

- Implemented K-means from scratch to reduce number of colors in an image to a fixed quantity.
- Implemented principal component analysis to perform dimensionality reduction on RGB images, turning them into BW images.

Server Monitoring
Machine Learning Project - January 2016
Unsupervised Machine Learning used to detect anomalies in server performance.

- Implemented multi-variate gaussian distribution from scratch to detect anomalous data points.
- Optimized using cross validation, test, and training data to detect 99% of anomalies in test data.

Knight's Tour Solver,
Algorithmic Project - October - November 2015
Moving a knight to all 64 squares on a chessboard in 63 moves.

- Combined bit manupulation hackery, balanced binary search trees, and graphs to produce over 100 solutions in 10 seconds by brute force purely functionally in Racket.

Work

Genband
Data Analytics Developer Intern, June-August 2015

- Implemented business intelligence metrics with SQL databases
- Designed creative algorithms to evaluate sales performance that were presented directly to CEO and used by executive team.
- Become first intern
- Created Javascript tutorials for the Kandy RTC API.
- Gained experience with SQL, BlazeDS, Model View Controller Development, Java, Javascript and Actionscript.
- 4th out of 68 in the Genband Internal Kandy Hackathon (won an iPad!).

Galadriel
Software Developer, (Startup), December 2015 - Present

- Improved an NLP Algorithm to remove over 50%
- Played a key role in the development of a dashboard in Ruby on Rails.

Certifications

- Stanford Machine Learning - Coursera
- John Hopkins Machine Learning Specialization - Coursera (in Progress)
- University of Michigan Python Specialization - Coursera (in Progress)

Hackathons

- Penn Apps XIII (Winner)
- Hack Princeton 2015
- TerribleHack II
- Genband Internal Kandy Hackathon (Winner)

Leadership/Teamwork

- Vice President - UWSGI: A club for student happiness and world peace.
- Member - Waterloo Warriors Competitive Dance Team
- Instructor - Bollywood Dance
- Member - Computer Science Club
- Coach - UW Chess Team - placed 2nd overall/1st individual at National Championships

Other Interests

- Competitive Chess
- Competitive Dance
- Peace Activism
- Digital Art
- Animation
- Ping Pong