

CHEN XIANSHUN

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HP: (private)
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EXPERIENCES

Amazon

2018

Role: Applied Scientist with NSI-Science team at Amazon Selection and Catalog System

Whiz Home Pte Ltd

2017-2018

Role: Software architect of Whiz Home Pte Ltd, specializing in data analytics, web and mobile application for AR-based web and mobile solution.

Meme Analytics Pte Ltd

2014-2017

Role: Managing Director Chief technology architect of Meme Analytics Pte Ltd, specializing in data analytics, machine learning, simulation and optimization, web and mobile application and works on intelligent decision support, analytics and optimization system for supporting large scale real world engineering problems in dealing with complex problem dynamics through modeling and simulation, offer consultancy or direct customized system implementation and integration of turnkey solutions to clients.

CLEF Pte Ltd

2016-2017

Role: System architect responsible for the design and implementation of CLEF web applications and its distributed computing platform built using Spring Cloud, Spring Boot, Apache Spark + GraphX, Hadoop, Apache Mesos, Mariadb Cluster.

Neuro10 Pte Ltd

2015-2017

Role: Data scientist of neuro10, specializing in big-data machine learning for log and timeseries analytics, responsible for designing and implementing big-data machine learning infrastructure as well as algorithms related to anomaly detection, text mining, natural language processing, time series predictive modeling. Actively involved in the development of Java-based software solution using Apache Spark, Mesos, Akka, Cassandra, Kafka, as well as HDFS (Hadoop Distributed File System).

Research fellow, NTU

2013-2014

Role: Researcher working on machine learning and agent-based simulations, actively involved in various industrial projects related to Machine Learning, Data Mining, Supply Chain Optimization, Agent-Based Modeling, etc.

Project Officer, NTU

2012-2013

Role: Research working with NTU, main area of research includes meta-heuristics, continuous and combinatorial optimization, memetic computation, vehicle routing, supply chain risk management. Research work involves genetic programming, multi-objective optimization, robust search, time series forecasting, agent-based modeling, neural networks, gaussian process, PID and MPC controller

Technical Consultant, CodeZone Pte Ltd

2009-2017

Role: Software developer and technical consultant at CodeZone, specializing in delivering custom solutions for scheduling and optimization as well as simulation applications.

Software Developer, Autodesk Singapore Pte Ltd

2007-2007

Role: Software Developer for Office Tool Automation using VBA. The office tool automation includes code generator that dynamically generate and inject VBA codes into excel based on instructions retrieve from database.

Software Developer, Agilent Technologies Singapore Pte Ltd

2006-2006

Role: Software Developer for Office Tool Automation using VBA as well as developing Web 2.0 application using ASP.NET. The office tool automation includes automatic processing data from various data sources such as Excel, Access and process results into auto-generated Powerpoint presentation and auto send via Outlook automation. The Customer Satisfaction Dashboard is a Web App I designed and implemented to automatically retrieves and process data on customer satisfaction and send individually customized report to various level of management, based on their roles and tasks involved

INVENTION

- "Large Engineering Supply Chain Adaptive System (LesCaS)" Technical Disclosure & commercialization through NTU NIEO, TD/193/12. **1st Inventor**
- AIRDesigner Technical Disclosure & commercialization through NTU NIEO, TD/185/14, **3rd Inventor**
- "Crowd Simulation Plugin (FAME)", Research Commercialization Via Deployable APIs, TD/03713, **3rd Inventor**

PROJECT DEMO

Video Demo: <https://www.youtube.com/channel/UCQAmaunPDGQwQ2e2dnaLo9Q>

LinkedIn Profile: <https://www.linkedin.com/in/xschen/>

OPEN SOURCE CONTRIBUTION

github: <https://github.com/chen0040>

Java: <https://mvnrepository.com/search?q=chen0040>

Python: <https://pypi.python.org/pypi?%3Aaction=search&term=chen0040&submit=search>

Javascript: <https://www.npmjs.com/~chen0040>

C#: <https://www.nuget.org/profiles/chen0040>

lua: <https://luarocks.org/modules/chen0040>

RESEARCH AND PUBLICATION**Journal**

- L. Feng, Y. S. Ong, **X. Chen** and C. Chen, "Conceptual Modeling of Evolvable Local Searches in Memetic Algorithms using Linear Genetic Programming: A Case Study on Capacitated Vehicle Routing Problem", *Soft Computing Journal*, No. 9, 2016.
- **X. S. Chen**, "An algorithm development environment for problem-solving: software review", *Memetic Computing Journal*, Vol. 4, No. 2, pp. 149-161, 2012.
- **X. S. Chen**, L. Feng and Y. S. Ong, "Self-Adaptive Memeplexes Robust Search Scheme for solving Stochastic Demands Vehicle Routing Problem", *International Journal of Systems Science*, Vol. 43, No. 7, pp. 1347-1366, 2012.

- **X. S. Chen** and Y. S. Ong, "A Conceptual Modeling of Meme Complexes in Stochastic Search", *IEEE Transactions on Systems, Man and Cybernetics, Part C*, Vol. 42, No. 3, 2012.
- **X. S. Chen**, Y. S. Ong, M. H. Lim and K. C. Tan, "A Multi-Facet Survey on Memetic Computation", *IEEE Transactions on Evolutionary Computation*, Vol. 15, No. 5, pp. 591-607, 2011.
- **X. S. Chen**, Y. S. Ong, and M. H. Lim. "Cooperating Memes for Robust Vehicle Routing", *International Journal of Innovative Computing, Information and Control*, Vol. 7, No. 11, pp. 6483-6506, 2011.
- Y. S. Ong, M. H. Lim and **X. S. Chen**, "Research Frontier: Memetic Computation - Past, Present & Future", *IEEE Computational Intelligence Magazine*, Vol. 5, No. 2, pp. 24-36, 2010
- K. K. Lim, Y. S. Ong, M. H. Lim, **X. S. Chen**, and A. Agarwal. "Hybrid ant colony algorithms for path planning in sparse graphs", *Soft Computing*, 12(10):981-994, 2008.

Conference

- **X. S. Chen**, Liang Feng, Meng Hiot Lim, Caishun Chen, Choon Sing Ho. "Towards Believable Resource Gathering Behaviors in Real-time Strategy Games with a Memetic Ant Colony System", In *The Asia Pacific Symposium of Intelligent and Evolutionary Systems*, 2013.
- **X. S. Chen**, Yew Soon Ong, Puay Siew Tan, NengSheng Zhang, Zhengping Li. "Agent-Based Modeling and Simulation for Supply Chain Risk Management C A Survey of the State-of-the-Art", In *IEEE Systems, Man & Cybernetics Conference*, 2013.
- H.E. Huang, Y. S. Ong, C. S. Ho, **X. S. Chen**, "IGA Flock Brush for Non-Photorealistic Rendering", In *Proceeding SEAL'12 Proceedings of the 9th international conference on Simulated Evolution and Learning*, Vol. 7673, pp. 480-490, 2012.
- L. Feng, Y. S. Ong, A. H. Tan and **X. S. Chen**, "Towards Human-like Social Multi-agents with Memetic Automaton", In *IEEE Congress on Evolutionary Computation*, pp. 1092-1099, 2011
- C. S. Ho, Q. H. Nguyen, Y. S. Ong, **X. S. Chen**: "Autonomous Multi-agents in Flexible Flock Formation", In *Proceedings of the Third international conference on Motion in games*, pp. 375-385, 2012
- **X. S. Chen**, M. H. Lim, and Y. S. Ong. "An Ant colony system algorithm for path planning in sparse graphs", In *ICIAS2007 (International Conference on Intelligent & Advanced Systems 2007)*, pp. 31-36, 2007.
- **X. S. Chen**, M. H. Lim, and D. C. Wunsch II. "A memetic algorithm configured via a problem solving environment for the hamiltonian cycle problems", In *IEEE Congress on Evolutionary Computation*, pp. 2766 - 2773, 2007.

PAST PROJECTS

Develop Real-Time Big-Data Data Analytics System

2016-2017

Role: Designed and implemented big-data infrastructure for a rule-based data analytics platform with real-time association rule mining for job matching and company ranking

AI implemented: big data expert system shell based on spark, real-time distributed association rule miner

Programming Languages: Java, Scala, Javascript

Technologies used: Azure, Spark, Redis, Hadoop, MariaDB cluster, Nginx, snort, Spring framework, Spring Cloud, Angular, gulp, Mesos, Ansible, Linux shell scripts and Powershell automation scripts.

Real User Monitoring System

2016-2017

Role: Designed and implemented real user monitoring system that keeps tracks of user's real-time interaction with the web application and behavior analytics

Programming Languages: Java, Javascript

Technologies used: Graphite, nodejs, Spring Boot, Angular, WebSocket.

Intrusion Detection System 2016-2017
Role: Designed and implemented intrusion detection and prevent system which provides webview, as well as email and chat notification, for both network-based and host-based intrusion detection
Programming Languages: Java, Javascript
Technologies used: snort, iptables, nodejs, Ansible.

Order Preserved Encryption System for MariaDB 2016-2017
Role: Implement order preserved encryption system for mariadb to provide both encryption in motion and at rest as well as support for crypto versioning
Programming Languages: Java
Technologies used: Spring Data JPA, MariaDB.

Desktop Data Analytics and Visualization Tool 2016-2016
Role: Develop a desktop tool that allows user to analyse data from Excel, CSV, or Database using various machine learning algorithms.
AI implemented: Decision Tree, Genetic Programming, Clustering, SVM, ANN, GLM, MA
Programming Languages: C#
Technologies used: Telerik, Winforms, D3

Large-scale Distributed ABMS Platform for Labour Market 2016-2016
Role: Design and develop large-scale distributed agent-based modelling and simulation platfor for labour market using Akka.NET, provides visualization via 3D simulation and modelling using Unity3d, and desktop + web visualization
AI implemented: distributed agent-based modelling and simulation based on distributed computational framework
Programming Languages: C#
Technologies used: Akka.NET, Consul, MS SQL Compact, Telerik, Winforms, Nancy, ASP.NET, Unity3d

Develop Real-Time Big-Data Machine Learning and AI System 2015-2017
Role: Designed and implemented big-data machine learning solution in the areas of log analytics and time series prediction, the work involves designing and implementing anomaly detection, text mining, natural language processing, time series predictive modeling, graph ming
AI implemented: topic modelling (online LDA implementation on both Spark and Akka), Word Colocation, NER, Document Categorizer, Word2Vec, Time Series Forecasting, Non-parametric Regression Analysis, Document Clustering, Isolation Forest Anomaly Detection, LOF Anomaly Detection, Deep FeedForward NeuralNet
Programming Languages: Java, Scala, Javascript
Technologies used: Spark, GraphX, Redis, Zookeeper, Hadoop, Kafka, Cassandra, ElasticSearch, Akka, Spring framework, Angular, nodejs, DeepLearning4j, Mesos, Ansible, Shell scripts,

Develop Mobile OCR Application 2013-2014
Role: Designed and implemented iOS and Android mobile application using OCR (Optical Character Recognition) and Edge Detection Canny Algorithm for detecting objects in video as well as texts in the video, implemented fuzzy text matching for corrupted context obtained from OCR
AI implemented: association rule mining, FPGrowth, sequential association pattern mining
Programming Languages: Objective-C, Java, PHP, Javascript
Technologies used: iOS, Android, AngularJS, JQuery, XCode, JavaFX, Spring framework (Spring MVC, Spring Data JPA, Spring Security, Jersey), Bootstrap, Jasper Reporting and Dynamic Report, tesseract, OpenCV

House Property Lease Search and Recommendation System 2013-2014

Role: Develop house property lease search and recommendation system using machine learning and geo spatial mining techniques.

Algorithms implemented: Clustering algorithm and Collaborative filtering based recommendation system, custom designed crawler, b-tree

Programming Languages: C#

Technologies used: HTMLAgilityPack, SQLite, MySQL, GMap.NET

Network Analytics and Anomaly Detection

2013-2014

Role: Develop the intelligent network management application for network analysis and anomaly detection. Current supported features

Algorithms implemented: 1. Centrality Measurement, including Eigen Vector Centrality, Closeness, Betweenness, Degree 2. Community Finding: Walktrap algorithm 3. Link Anomaly Detection algorithm 4. Community-based Graph Differential Anomaly Visualization 5. Data Capture and Monitor via Fluke's Network Time Machine. 6. Graph Models 7. Simulation and Monitoring

Programming Languages: C#

Technologies used: Fluke's Network Time Machine, PostgreSQL, Windows Presentation Framework (WPF), Telerik, MySQL, Windows Communication Framework (WCF)

Energy Management Simulator and Home Automation Kit

2013-2014

Role: Develop intelligent discrete event multi-agent simulator for an intelligent multi-agent control for simulating power consumption and occupant comfort in smart building engineering. The system includes space location modelling using surface extraction from planar graph algorithm; discrete event simulation for emulating the IO devices and power units in the building; simulation model for energy consumption modelling; model and measurement for occupant comfort; parameter sweeping features for allow users to simulate various scenarios in multi-dimension feature spaces; GUI user interaction including settings for power utilization and occupant comfort, floor plan design; library/script interface for user interaction and external modules to be built on top of the simulator; graph-based visualization for the state transition in Markov Chain Monte Carlo simulation; unit testing and logging module. The system is also a home automation kit which is interfaced with electrical and other home appliances as well as sensor units for real-time monitoring and control in home automation.

Algorithm implemented: ARMA, NSGA II, surface extraction from planar graph

Programming Languages: C#

Technologies used: Windows Presentation Framework (WPF), Telerik, Windows Communication Framework (WCF), Raspberry PI, emonCMS, X10

Develop Vehicle Scheduler Library

2013-2014

Role: Designed and implement a framework and platform to solve various vehicle routing problem (VRP) variants, with 16 solvers including memetic algorithm, genetic algorithm, hyper heuristic, simulated annealing, constructive heuristics, etc, each of which capable of solving one or more (combined hybrid) of the vehicle routing problems such as capacitated VRP, VRP with time windows, VRP with backhaul, VRP with pickup and delivery, multiple depot VRP, VRP with stochastic demands, heterogeneous VRP, as well as dynamic VRP with time windows, with support for routing on map based viewer, parallel processing, simulation, and algorithm performance analytic. The system is designed to be both standalone desktop and enterprise web service, with client in various programming languages (Web Browser, Excel, Java, C#, etc) as the online Vehicle Routing Scheduler Library solvers.

Algorithms implemented: memplex-based memetic computing, hyper-heuristics, constructive heuristics, trajectory-based optimization (tabu search and simulated annealing)

Programming Languages: C#

Technologies used: Winforms, GMap.NET

Develop Distributed Race Solution for IPICO Readers

2013-2014

Role: Design and develop race tracking and reporting solution from scratch. The software solution allows recording participant race results in real time via connection to IPICO lite and elite readers which forms a WAN with a command center via master-slave network structure. The timing data is processed and streamed to web site in real-time for participants of the race to view.

Algorithms implemented: Huffman compression, priority queue based on binary heap, left leaning red black binary search tree

Programming Languages: C#, PHP

Technologies used: Winforms, GMap.NET

National Strategy Analysis and Proposition System using GP and EA 2013-2014

Role: Developed a national strategy analysis and proposition using machine learning approach via Genetic Programming and Evolutionary Algorithms as well as data analytics and prediction such as time series prediction algorithms such as ANN, RBF and ARMA.

Algorithms implemented: Kmeans clustering, genetic programming, genetic algorithm, ann predictive, ARMA, RBF

Programming Languages: C#, Javascript

Technologies used: Winforms, WebKit

3D CAD Tool for sculpting meshes using self-adaptive topology 2013-2014

Role: Design and implements a polygon mesh processing system that allows users to sculpt polygon mesh in real-time, the system successfully implements the self-adaptive topology for freely sculpting 3D meshes, with several additional improvements, which includes integration with other remeshing and model repairing algorithms, managing the multiple unorganized cross-sections as well as developing offline filter version of the system for its integration with other polygon mesh processing tool.

Algorithms implemented: Self-adaptive topology algorithm, remeshing algorithm, mesh processing techniques

Programming Languages: C++

Technologies used: GLUT, GLEE, OpenGL

Association Rule Learning: Job Posting 2013-2014

Role: Developed an association rule learning application using job posted on websites as the data source, the current application can do tasks such as helping answer that if you want a particular career, what skill sets you should learn or know to make you successful in employment in a particular region or country (e.g. Singapore) and help answer that if you wish to join a particular company in a particular region or country (Singapore in the demo), what skill sets will increase your chance of being hired by that company. **Algorithms implemented:** Apriori, DB partitioning-based association rule mining

Programming Languages: C#

Technologies used: Winforms, WebKit, HTMLAgilityPack

OCR Document Scanner for Business Applications 2013-2014

Role: Develop an application which automatically extract content from scanned documents and inserted into database. Within the application, sale order, quote, invoices, and purchase order, etc, in various format can be extracted automatically and populated into database. The software also capable of retrieving barcode, namecards, business letter, etc.from scanned document in various formats.

Sentiment Analysis: Restaurant Review Site Comments 2013-2014

Role: Sentiment analysis on comments posted on restaurant review site, the comments are in Chinese, the sentiment analysis is done to be able to output for multiple criteria.

Algorithms implemented: log-linear model based entropy maximization algorithm for classification, decision tree, naive bayese classifier

Programming Languages: C#, Javascript

Technologies used: Winforms, WebKit, GMap.NET, agilehtmlpack

LesCaS Decision Support System

2011-2012

Role: Designed and implemented the logistics-based agent system for both desktop and mobile device, an intelligent decision-support system that allows user for effective simulation and management of large-scale transportation and supply chain system which involves both land vehicle, fleets, and airasset transportation

AI implemented: goal-based agent framework, discrete-event simulation system, finite state automaton, multi-path A* pathfinding algorithm, bin-packing heuristics, evolutionary computation, ant colony optimization

Programming Languages: C++, C Sharp, Java, PHP

Technologies used: Android, Bing Map, Open Street Map, Google Map, Parallel Task Library, Design Patterns, SilverLight

Multi-criteria Optimization

2011-2012

Role: Designed and implemented evolutionary computation algorithms for solving real-world multiple-objective optimization problems involved in computational fluid dynamics

AI implemented: NSGA, CMAES, Hybrid Game, HAPMOEA

Programming Languages: C++, Linux Bash script

Technologies used: Qt, OpenMP, Shark Lib, OpenFOAM, QtPlot

Accounting System

2011-2012

Role: Designed and implemented accounting system that interfaces with commercial accounting packages

AI implemented: Self-designed domain driven entity framework that layered support to Oracle DB, DB2, MySQL, MSAccess, MSSQL, sqlite, etc.

Programming Languages: C Sharp

Technologies used: crystal report, RDLC reporting engine, WinForm, Silverlight

Evacuation Planning System

2010-2011

Role: Designed and implemented the agent-based evacuation system (console and GUI), an intelligent decision-support system that allows user for effective simulation and management of large-scale evacuation which involves both land and sea-based transportation

AI implemented: multi-path A* pathfinding algorithm, bin-packing heuristics, evolutionary computation

Programming Languages: C++, Python (for system testing and analysis)

Technologies used: Qt, Open Street Map, Google Map, Design Patterns

Memetic Computing Web

2010-2011

Role: Designed and implemented the *Memetic Computing Web*, a tag-based Content Management System developed from scratch using PHP and jQuery that organize data on memetic computing publications using ontology classification tagging

Algorithms implemented: ontology tree generation from relational database.

Programming Languages: PHP, Javascript

Technologies used: cURL, SQLite, MySQL, Ajax (jQuery), JSON web service

Machine Learning Laboratory

2009-2010

Role: Designed and implemented the *Machine Learning Laboratory* (MLLab). MLLab is a 3D agent simulation environment written in C++ that allows user to simulate and test various machine learning and computational intelligence algorithms in a 3D environment

AI implemented: MLP Artificial Neural Network, Hopfield, Fuzzy Logic, K-means, SOM, SOFM, ART1, FALCON, Rule-based Expert System, C45 decision tree, Naive Bayes Classifier, Bees algorithm etc.

Programming Languages: C++, Java, Lua

Technologies used: ORGE (Object-Oriented Graphics Engine), OpenAL, Boost Library, CEGUI

Interactive Evolutionary Web

2008-2009

Role: Designed and implemented the *Interactive Evolutionary Computation* web, that provides web services as well as web-based gui for computer-based art creation in the form of painting, sketch, music, signature writing, based on the principle of interactive evolutionary computation

Algorithms implemented: Genetic Programming, Genetic Algorithm, Image processing algorithms such as sobel filter, NURB, B-Spline, etc.

Programming Languages: C#, Javascript

Technologies used: ASP.NET 2.0, ajax, Webservice, SQL Server, MySQL

Simulator for Flocking Intelligence

2008-2009

Role: Designed and implemented the *Simulator for Flocking Intelligence* (SimFI), an OpenGL-based agent behavior agent that incorporate principles derived from the steering behaviors of autonomous agents, constrained animation and particle swarm optimization. In SimFI, autonomous agents have the ability to navigate around their world in a life-like and improvisational manner with configurable locomotion and action selection.

Algorithms implemented: flocking algorithms (based on principles of alignment, separation, and cohesion), autonomous agent behaviors (e.g. obstacle avoidance, wander, evade, pursuit, interpose, path following...), Particle Swarm Optimization, constrained animation, as well as various spline algorithms such as B-Spline, Bezier, Catmull-Rom,

Programming Languages: C++, Lua

Technologies used: Simple Directmedia Layer (SDL), OpenGL, SDL_Net, FMOD, Audiere

Algorithm Development Environment for Problem-solving

2007-2008

Role: Designed and implemented the *Algorithm Development Environment for Problem-solving* (ADEP), a problem solving environment and code generator for configuring meta-heuristics for solving real-life combinatorial and continuous optimization problems. It was developed to address the need for rapid generation of efficient algorithms that target the real-life problems such vehicle routing, factory layout, portfolio optimization, etc.

Algorithms implemented: Evolutionary Algorithms, Memetic Algorithms, Tabu Search, Simulated Annealing, Particle Swarm Optimization, Ant Colony Optimization, Genetic Programming, Multi-start hill climbing, etc.

Programming Languages: C++, Java

Technologies used: MFC, GDI, Allegro, OpenGL

EDUCATION

Ph.D. School of Computer Engineering, NTU Jul 2007-Dec 2013

Research on competent Memetic Algorithms under the guidance of Assoc Prof. Ong Yew Soon
G.P.A 4.84/5.0

B.Sc. School of Electric and Electronic Engineering, NTU Jun 2003-Jun 2007

Study under scholarship, graduated with majors in Microelectronic [2nd CLASS(UPPER)]

J.C. Temasek Junior College Oct 2000-Mar 2003

Study under scholarship, graduated with ranking Top No. 7 in TJC during A-Level

Score Top No. 1 in Further Math during Preliminary Exam

S.A.T. scores 1490/1600 (First Attempt)