

THAXILA KARUNATILAKE

PROFILE

I am an expert level R&D Director, Data Scientist, and Electronic Engineer

PRIMARY SKILLS

C/C++ programming w/ STL, Boost, multi-threading, real time control systems, kernel & drivers development in i2c, SPI, CAN, USB, Ethernet, GPIO, UART, TCP/IP/UDP, MODBUS, ADC, board bring-up, drivers etc; Microcontrollers - ARM 7/9/11/Coretex Mx, Coretex Ax, Atmel AVR32/16/8, PIC, PPC, Xilinx Microblaze, Zedboard; RTOS – embedded Linux, Xikernel, VxWorks, FreeRTOS, QNX, bare metal; Windows CE Assembler, FPGA Verilog, MATLAB/R; C#/.Net, Java, MS Azure AWS Cloud, Qt, Perl, Linux Shell, VB OOA/OOD, Design Patterns, UML, SDLC/CMM/Agile/MISRA/ISO development & Project Management UNIX(Linux, GNU toolchain, AIX, HP/UX), kernel, Perl, Python, UNIX shell, and Windows 7/NT/XP platforms; Oracle, Sybase, SQL Server PL/SQL database; NVIDIA GPU acceleration, CUDA, OpenGL Algorithms: Machine Vision, Machine Learning, NLP, Statistical Modelling, Neural Networks, Pattern Recognition Sectors: Wireless, Telecom, Audio Broadcast, Video Broadcast, Industrial Automation, Finance, Robotics, R&D

EDUCATION

- 2001 – 2003 **Cambridge University – Speech, Vision & Robotics Labs**
Trumpington Street, Cambridge
Research Associate in Computer Science in Speech Recognition and Machine Vision. Statistical Modeling.
- 1996-1997,1998-2000 **University College London**
Gower Street, London WC1E 6BT, UK
BSc First Class Honours in Computer Science and Electronic Engineering. Project: Effects of Adaptive Boosting on Radial Basis Function Neural Networks. Project developed in C/C++.
- 1989-1992 **Stanford University**
Palo Alto, California, USA
Two years of undergraduate study in Electrical Engineering and Computer Science. Courses on advanced mathematics, electronics, physics & computer science. Transferred to UCL due to immigration.
- 1980-1988 **Visakha College**
Colombo, Sri Lanka
Scholastic Aptitude Test (US): Verbal: Percentile Rank 97, Mathematics: Percentile Rank 99
College Board Achievement Tests (US): Chemistry: P.R. 95, Mathematics: P.R. 99,
Physics: P.R. 98, English Composition: P.R. 96
GCE A/L (1987): Chemistry: Grade A (P.R. 99), Applied Mathematics: Grade A (P.R. 98),
Physics: Grade A (P.R. 99), Pure Mathematics: Grade B (P.R. 99)
GCSE O/L: Distinctions (Grade A) in Science, Mathematics, English, Sinhalese, Buddhism,
Social Science, Health Science, and Commerce & Accounts.

Portfolio, Github: github.com/jtk1919

April 2020 – to date
DeepHeal AI

Lead Data Scientist

3 projects in Machine Learning and embedded development in medical technology (DeepHeal AI), retail ([Glaize.co](https://glaze.co) – consulting), and industrial machinery (noztek.com – consulting) projects. Embedded firmware in C/C++. Machine Vision, Deep Learning, RCNN, statistical modelling, mathematical algorithms, NVIDIA GPU, CUDA, Python, R, C/C++, Qt GUI for retail AI for Glaize. AWS Cloud and AI development for an investor client as the Technical Lead leading a team of software engineers and data scientists in education technology. Amazon AWS based big data solution development. AI NLP analytics, deep learning. Full Stack development. Design. Technologies: AWS Cloud –microservices, C/C++, Aurora DB, Nginx, Django/python, Ubuntu. Leading Javascript/React and Python engineers.

June 2019 – March 2020

Aveva Ltd
High Cross, Madingley Road, Cambridge CB3 0HB

Data Scientist/ Machine Learning Software Engineer (contract)

Machine Learning, NLP, and Machine Vision software for OCR and Engineering Symbol Recognition. Statistical models, Algorithms, Research and development, Deep Convolutional Neural Networks, Long-Term Short-Term Neural Nets, HAAR Cascade, Machine Vision and image processing algorithms. Technologies: Python, C/C++, C#, Linux, GPU acceleration, Microsoft Azure Cloud development. Caffe, Tensorflow, Keras, OpenCV vision libraries.

Feb 2019 – May 2019

Operational Solutions Ltd
Padworth Common, Reading RG7 4QN

Chief Engineer: Machine Vision & Robotics (contract)

Defence contract in Machine Vision and Robotics research and development for drone detection, tracking, alerts and monitoring. Sensor fusion using Hikvision video and thermal cameras, Robin RADAR, and RF Scanners. Camera control for tracking. Filtering for noise handling; Optical Flow, Lukas-Kande, MIL, Boosting for tracking; HAAR Cascade and Deep Convolutional Neural Network for Recognition. Embedded C/C++ development on NVIDIA server for training, on embedded Linux for controls. Python, OpenCV, Caffe, TensorFlow, NVIDIA GPU acceleration with Cuda.

Nov 2018 – Jan 2019

ProcessVision Ltd
Chineham Business Park, Basingstoke, Hampshire RG24 8WA

Lead Machine Vision & Robotics Software Engineer (contract)

Machine Vision Robotics system development for inspection of pollutants in The National Grid natural gas pipelines. ONVIF & RTSP Server development. GStreamer streaming of camera. Machine Vision algorithms. C/C++ development on embedded Linux and Windows. Embedded ARM MCU and Latte Panda SBC. Milestone Machine Vision system. OpenCV. XIMEA Camera. XML SOAP communications. Docker.

Aug – Oct 2018: I had keyhole surgery at Guys & St Thomas' Hospital. Recovery from it.

June 2018 – September 2018

Prudential

3 Sheldon Square, London, W2 6PR

Lead Machine Learning Software Engineer (3-month contract)

Machine Learning research and development on greenfield project building an NLP Speech Recognition, Speaker Recognition and Speaker Tracking system on Prudential's recorded insurance telephone call database. Gaussian Mixture Models, Hidden Markov Models, variational Bayesian inference, EM, model/cluster entropy metrics, model divergence & distance metrics, Support Vector Machines, hierarchical clustering, noise models and filtering, PCA/LDA/ICA, signal processing, blind source separation, feature extraction. Technologies: MATLAB, R, C/C++ implementation, Amazon AWS Linux, Python, Linux shell scripting, Machine Learning libraries: Cambridge's Hidden Markov Model Toolkit (HTK), Cornell & Joachim's SVM Perf. XML Docker. Amazon AWS Cloud implementation.

March 2018 – May 2018

Veed Ltd, King's College Business School

Bush House, King's College, University of London, 30 Aldwych, London WC2B 4BG

Chief Engineer – Machine Learning

Machine Vision R&D for a start-up venture from King's College, University of London, being mentored by King's College Business School and consisting of recent graduates of KCL. Object Recognition and image processing on video streams. Technologies: C/C++, MATLAB, Linux, CUDA GPU acceleration, and Machine Vision libraries – libCVD, Caffe, OpenCV, TensorFlow. Algorithms R&D in Machine Vision, Haar Feature Cascade, Boosting, Linear Discriminant Analysis, Convolutional Networks, Optical Flow, pixel segmentation. Docker, Amazon AWS implementation.

January 2018 – April 2018

Horn Eichenwald Investments Corp

2601 S. Bayshore Dr. Suite 1200, Miami, FL 33133, USA

Chief Machine Learning Software Engineer (Contract based in London)

Algorithmic Research & Development in Machine Learning, NLP for the main company (www.h2e.com) and the new subsidiary spin-off company NVest (nvest.ai - subsidiary for crypto currency analytics) for analytics in financial data. NLP algorithms for quarterly performance transcript analysis, sentiment analysis. Technologies used: MATLAB, R, C/C++, Linux, Amazon AWS Docker, InfluxDB time series database, SQL, Wt/Qt, Python. XML, Cloud, Docker. Amazon AWS implementation.

August 2017 – December 2017

SAIC (MG) Motor Technical Centre Ltd

Lowhill Lane, Longbridge, Birmingham B31 2BQ

Lead Software Engineer – Autonomous Driving Cars (Contract)

Automotive R&D in Autonomous Driving. C/C++, embedded Linux, algorithms. Variable Capacity Oil Pump Controller Engine Control Unit (ECU) interface, MODBUS, CAN bus UDS. Getting the Autonomous Driving & ADAS (Advanced Driver Assisted System) greenfield development off the ground. Development Environment setup with V-Model, ISO26262, MISRA compliance, embedded Linux & QNX, SoC evaluation and selection. NVIDIA & CUDA GPU acceleration, ARM A15. Development infrastructure setup. Autonomous Driving system setup with LIDAR, Video camera, RADAR sensor fusion. Machine Vision and Machine Learning algorithm research and development including AdaBoost, Haar Cascade feature selection, Deep Neural Networks, Gaussian Mixture Models, Machine Learning libraries such as Caffe, libCVD, OpenCV. XML

June 2017 – August 2017

OVO Energy

eSynergy Solutions, 50 Fenchurch Street, London EC3M 3JY

Embedded Software Engineer (Contract)

Embedded design and development of OVO Energy electricity grid control system, storage heater charger, electric car charging station. C/C++, Python, C#, Embedded Linux, UART, MODBUS, CAN, control algorithms, Azure Cloud connection. ARM and AVR MCUs. XML Amazon AWS & Microsoft Azure Cloud implementation.

September 2016 – June 2017

Horn Eichenwald Investments Corp

2601 S. Bayshore Dr. Suite 1200, Miami, FL 33133, USA

(1) Lead R&D Engineer, Contract (up to 25 hours per week in the UK)

Contract in Quantitative R&D of Machine Learning and Natural Language Processing (NLP) algorithms using R and C/C++ for Horn Eichenwald Investments (www.h2e.com). K Nearest Neighbour, clustering, feature selection, PCA/ICA, vector distance metrics, discriminative models, NLP algorithms etc. Modelling in MATLAB and R and development in C/C++/C#. Amazon AWS implementation.

September 2016 – March 2017

EuroSkill Ltd

10 Crescent Parade, RIPON, HG4 2JE

(2) Lead Software Engineer, Contract (up to 30 hours per week)

Software design and development of a network packet sniffing, handling, and profiling and protocol stack development for a networking engineering application. Low level C/C++ development on Linux and Windows including kernel development. XML communications between the Cloud and the clients.

March 2016 – August 2016

X-Markets Securities Ltd/ Pilotware Ltd

11th Floor, 30 Crown Place, London EC2A 4EB

Lead Quantitative Software Engineer

Quantitative and Algorithmic Trading research and development in C/C++ for the hedge fund reporting to the CEO. Research and modelling using MATLAB. Machine Learning algorithm research, design, and development for the Algorithmic trading engine and automated trading strategies. Market Risk, Pricing and Hedging models and strategies. Real time FIX data feed handling. Full system lifecycle design and development in C/C++ on Linux servers across London and New York. Multi-threaded, multi-processing, and real time C/C++. SQL and some NoSQL databases. Qt GUI development; Perl, some Python and shell scripting. Troubleshooting and system architecture. Leading the FX Flow quantitative development and algorithmic trading development. XML configuration & communications.

Unfortunately, the company was pushed into insolvency. The director was unable to pay salaries or office rent due to the insolvency courts freezing company accounts. The company computers were liquidated.

Sept 2012 – January 2016

PPN (MadeSimple) Inc

Jan 2014 – January 2016: PPN Inc (formerly madesmpl Inc), Seattle, WA, USA (head office)

Lead Software Engineer (from the UK offices)

Three contracts (work for US company's UK office of PPN – Perpetual Notion (formerly MadeSimpl Inc. www.madesmplinc.com) in NLP, Algorithms to implement software algorithms in Analytics, Natural Language Processing. Design and development of algorithms such as Wavelet Neural Networks, Clustering, Radial Basis Function Neural networks, NLP Models, and other Machine Learning algorithms in C/C++ and C# on Windows, Linux, and Cloud hosted MS Azure. Modelling in MATLAB and Simulink, LAMP Stack. Low level C development. Embedded programming in Assembler and C on AVR 8/16-bit microcontrollers. Some FPGA Verilog. Some DSP algorithms for IoT sensor data acquisition. Test driven Agile development.

Aug – Sept 2012

Friendly Technologies

33 Linford Forum, Milton Keynes, Buckinghamshire MK14 6LY

Senior Firmware Engineer (voluntary role)

I had to delay my next contract in order to finalise the first two books in my literary suspense fiction series which went into publication with my New York based publisher under my pen name Jenni Wright. I reviewed starting a venture with Friendly Technologies (who were going through their next funding rounds) on their RF ID system that does stock tracking and remote asset monitoring via short range RF, working on the PIC24 microcontroller in C and Assembly prototype. PCI, CAN, MODBUS.

Dec 2011 – March 2012

Neul Limited

Unit 23 Science Park, Milton Road, Cambridge CB4 0EY

Senior Software Engineer (contract)

Design and development of firmware for the Base Station and the CPE on the Company's White Space Wireless network (www.neul.com). Design and development of firmware drivers – the Ethernet driver, the radio driver, the USART driver; DMA controller, reset & clock control, gpio, the watchdog, timers, interrupt controllers, external (FSMC) SRAM etc. configuration and board bring-up etc. - on the new platform on an STM32f2xx SOC with an ARM Cortex M3 core and the company's own board based on it. Configuring FreeRTOS to run on the new board and porting the upper layers into the new board. Java front end. Testing. The development is being done in low level C and Thumb Assembler. Ethernet, CAN, MODBUS. Test driven Agile development. MISRA and ISO standard development. Static and Dynamic analysers.

June 2011 – Sept 2011

InSync Technology Limited

Dragon Street, Petersfield, Hampshire GU31 4JN

Senior Software Engineer (fixed term contract)

Design and development of embedded software on the company's (www.insync.tv) System-on-Chip for broadcast Video CODEC, standards conversion SOC etc. Embedded Linux kernel and low-level system development in C/C++. Design and development of device drivers: an MTD driver for a persistent filesystem on a flash chip, an input driver for an ADC (touch-screen) multiplexer, a serial tty driver with DMA for video data acquisition from multiple FPGA units, input and gpio drivers for communications with the hardware LEDs, and input driver over SSC (Synchronous Serial Controller) for communications between the FrontPanel keys and the Qt GUI. The Associated Controller components and test programs; Qt GUI components. Linux (Angstrom/OpenEmbedded) board bring-up, bootloader, kernel configuration, modprobe handling, udev event handling. Atmel SOC with an ARM9 core. Some FPGA Verilog. Perl, some Python, and shell scripting. XML based configuration files.

January 2011 – April 2011

GlenSound Electronics Limited

1A Brooks Place, Maidstone, Kent ME14 1HE

Senior Embedded Software Engineer (fixed term contract)

Embedded design and development of digital audio broadcast equipment used by the Parliament, the BBC, the Commonwealth Games, radio stations and other broadcast commentary clients. (www.glenSound.co.uk) The systems involved work on developing audio streaming, mixers, commentary controls, faders, audio noise reduction, headphone limiters, call in systems for radio stations etc. Embedded C/C++/FreeRTOS on Atmel AVR chipset. Java front end, Qt, and VB development on PC monitoring and control applications.

July 2010 - Sept 2010

Oak Telecom Ltd

Bath BA4 5QE

Embedded Software Engineer (subcontract)

Development of the 802.16 and 802.11 RF Base station and receiver hubs. Comprehensive MAC Layer and DSP design and development. High performance real-time algorithms for scheduling and bit-rate adaptation.

Technologies: C & VxWorks on dual PowerPC embedded cores. FPGA with a C controller on a Xilinx Microblaze softcore - Xilkernel. C/C++ on Embedded Linux on an embedded Single Board Computer.

March 2010 – June 2010

Raymarine Electronics

Fareham PO15 5RJ

R&D contract (Embedded software engineer)

Research & Development on a Sonar/Radar transceiver-based imaging system. Software-hardware interface; USB to USART/Hardware Communications bridge. USB driver and protocol stack on Linux. C on Atmel – ARM11, ARM Cortex M3, C/C++ on embedded Linux and ARM board support package. UML design. MISRA and ISO standard safety critical design and development. Static and Dynamic analysers.

November 2009 - December 2009

Oak Telecom Ltd

Cabot Lane, Poole, Dorset BH17 7BX

Software Engineer Contract

The C/C++ technical lead in Embedded software development of the Oak Telecommunications Management Suite. Visual Studio C/C++ software design and programming on Windows. Voice over IP, data acquisition, routing, call management functionality, voice recording databases, voice analysis, voice recognition, and related reporting functionality implementation. LAMP Stack.

March 2006 - October 2009

I was doing part time projects from Informatics and other associates, as I was not available for full time work during this time when I was a carer for my mother. Some of the work was on developing components for a trading system for high performance algorithmic Cash Equities trading. C/C++, algorithms.

April 2003 - February 2006

Informatics International

Gloucester Road, West London & Sri Lanka

Software Engineer (permanent)

Software design and development. For both the in-house telecommunication software in Embedded C/C++, and outsource projects in engineering, robotics & industrial Automation. Adapting, developing and supporting AvaBill (www.avabill.com, www.informaticsint.com), the company's telecommunications software suite. Developing new functionality and code modules for the Mobile telecommunications market. Real time C/C++ modules that drove and controlled the transponders and switches. Performance optimization and adding enhancement for Billing and Operations Management: least cost routing, order processing, settlements, mediation, multi-processing TCP/IP, UDP socket communications for remote data gathering and control; providing web access to billing data etc. Technologies: real time C drivers, protocol stacks, and controller, multithreading, Qt GUI, Oracle, Linux. Test driven Agile development. Industry training as Scrum master.

Banking Sector Projects: The Risk Watch Project. Mainly a C# project for an Asset Management fund.

BNP Paribas Market Risk IT Project

Analyst Developer Consultant for BNP Paribas' Market Risk IT project named MRX. The system calculated Value-at-Risk and other Market Risk metrics for the range of BNP's instruments, including Fixed Income instruments. Business requirements analysis, design, development, testing, roll-out and live support of the system. The technologies involved were C++/Sybase on a Windows NT and Windows Server platform.

June 2001 – March 2003

Cambridge University

Trumpington Street, Cambridge CB2 1PZ, UK

PhD Research Associate

Software development of HTK and GMTK large vocabulary continuous speech recognition applications. Languages C/C++, Perl, UNIX (Solaris, Linux, AIX, HPUX), MATLAB, STL and optimised Math libraries, OOD. Development mainly of high performance multi-process Clustering algorithms and Loosely Coupled Hidden Markov Models, running on high parallel processors. Development for improving speech recognition in noisy acoustic conditions. Monte-Carlo Simulations. Digital Signal processing. Completed 4 graduate level classes in Probability, Statistical Models and Machine Learning. The work involved coordinating with the project partners in Europe to conduct research & development in Core Speech Recognition. Publications:

- Thesis (2003): Loosely Coupled Hidden Markov Models for Segmentation and Automatic Large Vocabulary Continuous Speech Recognition in Noisy Acoustic Conditions. *Technical Report TR449*.
- (2002): Acoustic Meta-data Markup. *Coretex Project Report on Improving Core Speech and Recognition Technology*.
- (2002): Cluster Identification for Speaker-Environment Tracking. *Proceedings of the International Conference on Language and Speech Processing 2002*. pp:2001-2004.

May 2000 – May 2001

University College London
Gower Street, London WC1E 6BT, UK

Researcher

Research and Development on Boosting, Kernel Methods and Statistical Data Analysis for modelling AstraZeneca pharmaceutical production processes. Languages: C/VC++ on WinNT, for development of multi-threaded high-performance algorithms on AdaBoost, Neural Networks, Support Vector Machines etc., OOA/OOD, MATLAB, Java. Publications:

- (2001): Performance Degradation in Boosting. *Proceedings of Second International Workshop on Multiple Classifier Systems: Lecture Notes in Computer Science 2096*. pp:11-21.

Sept. 1997 – Oct 1998, May 1999 – Sept. 1999

Reuters Group PLC
85 Fleet Street, London EC4P 4AJ, UK

Senior Programmer (Permanent) – Financial Sector

Complete CMM II design and development for the Reuters Web Infrastructure development team for delivering Reuters News and Financial Information Products. Projects: Design and development for Reuters Web authentication and access control system. OO Design and development of platform control operations tool, Token Agent, etc. Oracle Web server-based design and development of Reuters Web Customer Support Tool. Work with LDAP Directory, Netscape, TCP/IP, SSL communications, TIBCO. Languages: C/VC++/GNU C++, QT, Perl, Windows2000/WindowsNT, UNIX back end servers, Oracle PL/SQL, HTML/XML. Project Management. Training Courses: Effective meetings, Time management, Effective presentations, CMM, Financial Products & Systems on Bonds, Market Risk.

June 1997 – Sept. 1997

Anvil Software Limited
51-53 Rivington Street, London EC2A 3QQ, UK

Programmer (summer contract) – Financial Sector

Analysis, rewriting and testing the Anvil Repo Trading system for year 2000 compliance. The work involved analysing and testing the software system for potential year 2000 bugs, designing software modules for compliance, implementation, testing, integrations with the other systems, and documentation. Work on Market Risk/ Fixed Income systems. Languages: Embedded C/C++, Sybase PL/SQL, UNIX-Solaris, HPUX, Perl.

Jan. 1994 – August 1996

ComputerLand (Pvt) Limited
Colombo, Sri Lanka

Programmer (Permanent) – Financial Sector

ComputerLand is the sole business and service partner of Sun Microsystems Inc. and Oracle Corporation in Sri Lanka. ComputerLand is the systems integrator that took the Colombo Stock Exchange from an open-outcry system to a computerized system, computerizing both Back Office and Front Office functions, and connecting

remote vendor systems. Duties: Development and support for the client installation at the Colombo Stock Exchange trading system. Providing UNIX operating systems training to clients. Managing SunService Training. Software development with C, Oracle development tools & Oracle PL/ SQL, UNIX (Solaris, SCO UNIX) shell, Perl. Helpdesk support for software troubleshooting and bug-fixing. Organizing company exhibitions and sponsorship events. Providing technical support for tenders and marketing demonstrations.

April 1990 - August 1993

Stanford University Aeronautics & Astronautics Dept. & NASA

Palo Alto, California, USA

Research Programmer (Embedded)

Real time embedded C, Unix (ksh, sed, awk), Assembler, PVWave graphical system - programming a force feedback compensation system (a feedback control system) for NASA Project – Gravity Probe B. The project sent a gyroscope on a satellite system, and my work concentrated on the feedback control system that kept the inner part of the gyroscope free of external forces, by estimating and countering forces on the outer shell of the Gyroscope in real time.

INTERESTS AND ACTIVITIES

Creative writing, fiction writing, screen writing, and poetry writing

Fiction writer published in literary magazines and by a New York publisher

English drama, British and American literature, reading, and the cinema. Running a book club.

Running, gym, and swimming