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Career Overview

Projects: <https://github.com/snatch59>

March 2018 – present: **Powervault Ltd.**

Senior Embedded Software Developer responsible for Inverter control, and ARM A7 software architecture utilising MQTT, AWS Kinesis interface, InfluxDB time series database, Grafana, Mender OTA updating, Docker containerization, and embedded microservices.

Python 3.5 onwards; C++; IoT; MQTT; Dweet.io; Freeboard; Time Series Database InfluxDB/Chronograf/Telegraf with Grafana; Docker; AWS Kinesis; Mender; RS-232, USB, RS-485/Modbus; ARM Cortex-A7 + M4; Yocto Linux; Git. Voltronic InfiSolar inverters.

May 2016 - March 2018:

- Consultancy for Duvas Technologies (6 months).
- Consultancy in the areas of Deep Learning and Remote Sensing for Imperial College start-ups QA-UK, Itadori, and PolyMer Oceans. Business case for Cavity Enhanced DOAS with LED source.
- Developing code in Python to data mine Organisation for Economic Co-operation and Development (OECD) data for a Deep Learning project at Imperial College using Pandas and SDMX.
- Mentoring MSci Physics students project at Imperial College regarding image recognition using Deep Learning. Project went on to win the Imperial College Tessella Prize for Software in Physics.
- Deep Learning with TensorFlow, TensorFlow for Android, Keras, TF-Slim, Python. Some Caffe, Theano, PyTorch, and Movidius Neural Network Compute Stick.
- Machine Learning and feature extraction using PCA/PCR, GLCM, Regression, t-distributed stochastic neighbour embedding (t-SNE), and classification with Support Vector Machines, Random Forest/Extra Trees, K-Nearest Neighbour, and Multi-Layer Perceptron.
- Remote Sensing from Multispectral and Hyperspectral data using NDVI/CCCI/EVI/SAVI/NDWI
- Responsive web design using HTML5, CSS3, Bootstrap, Handlebars, Gulp, LESS/SASS. One site listed in Bootstrapbay Top 20 Bootstrap Example Sites.

2010 – Apr 2016: **Duvas Technologies Ltd.** Joined during the company's start-up at Imperial College. Lead software and electronics engineer with expertise in Full Lifecycle Development, Chemometric algorithms, spectroscopy, MATLAB simulations, coding, embedded systems design, electronics, serial and Ethernet comms, Bluetooth, GPS, GPRS/3G, cross platform development (Linux/Windows/Android), Internet of Things, cloud services and web development.

Achievements: Design of a CE/UL approved custom Linux processor board, electronics and comms, including GPS, GPRS, and Bluetooth boards; suite of MATLAB models for filtering and key algorithms; key improvements to core software algorithms; calibration and data viewer software (with built in network scanning) in C++/MFC, and C#/WPF; Android tablet viewer and control application using Bluetooth; IoT web backend and user dashboard.

2002 - 2009: **Psion** (Psion Software division, then as Visto/Good Technology). Senior software engineer for their smartphone e-mail and social networking products, with experience both on the server side and database development, and on the client smartphone side encompassing Symbian, Windows CE, and Java. Acted as project co-ordinator across technology teams based in America, China and Europe.

1994 - 1999: **British Telecom**. Lead software designer for their Directory Assistance and International Directory Assistance systems, participating in the overall telecoms network systems design and vendor assessment.

1990 - 1993: **International General Electric Medical Systems** as a senior software designer for their cardiac nuclear medicine scanner. Responsible for introducing analysis and design methodologies, Fagin inspection, as well creating the standards leading to ISO 9001 certification for the UK office.

1980 - 1990: **GEC Plessey Telecommunications** under various roles such as satellite communications engineer for the Goonhilly 7 earth station project, and later as lead embedded software designer for their first 'Rabbit' CT2 cordless phone, which included involvement in defining the CT2 standard.

Full Career Chronology:

Mar 2017 – present: Powervault Ltd.

2016 – 2017: Start-up consultancy, concentrating in the area of Deep Learning.

2010 –2016: Duvas Technologies Ltd. Lead Software and Electronics Engineer.

2009 - 2010: Clever Ferret Web Design/Clever Ferret Circuits

2002 - 2009: Psion Software/Visto

2001 - 2002: Intuwave

2001: Psion Digital (contract)

2000 - 2001: British Telecom (contract)

2000: Reuters (contract)

1999 - 2000: Real Time Control

1994 - 1999: British Telecom (contract)

1993 - 1994: Volt Delta Europe

1990 - 1993: International General Electric Medical Systems

1990: Philips Consumer Electronics (Research Division)

1980 - 1990: GEC Plessey Telecommunications

Education:

Nottingham University department of Electrical Engineering: M.Sc. in Modern Electronics.

Leeds University department of Electrical & Electronic Engineering: B.Sc. (Hons) 2ii in Electrical & Electronic Engineering.

Nationality: British

Hobbies: Archery; Treasurer for the Bowmen of Harrow archery club; Writing music. A selection of my recordings are available on Soundcloud <https://soundcloud.com/snatch59> .

Current Skill Set

In the last seven years my roles covered the following areas and skill sets.

General

Able to provide technical drive and direction for all areas of software development and processing electronics. Experience of overseeing, directing and mentoring junior software engineers.

Software

Full life cycle software development covering requirements capture, analysis, design, development, implementation (coding) and test. Able to work with documentation and code under source control, with maintenance driven by a defect tracking system. Able to plan and provide delivery timescales for roll-up into overall project plans.

IoT:

- Time Series Database – InfluxDB/Chronograf/Telegraf and Grafana
- Docker
- AWS Kinesis
- Mender

Deep Learning/Machine Learning:

- Image recognition, CNN retraining
- TensorFlow family (TensorFlow, TensorFlow Mobile, Tensorboard, TF-Slim)
- Keras, Theano, Caffe, PyTorch, Movidius Neural Compute Stick
- Regression, texture analysis using grey-level co-occurrence matrix (GLCM), PCA/PCR, t-distributed stochastic neighbour embedding (t-SNE)

- Classification with Support Vector Machines, Random Forest/Extra Trees, K-Nearest Neighbor, and Multi-Layer Perceptron.
- Latent space visualization with Autoencoders
- Python, matplotlib, numpy, opencv, pandas, scikit-learn, scipy, pyusb, parallel processing
- Build and deployment familiarity: Docker, Bazel, AWS, Ansible

Remote Sensing:

- NDVI, CCCI, EVI, SAVI, NDWI
- Multispectral/Hyperspectral data
- Feature Extraction

MATLAB:

- MATLAB scripting under MATLAB 2012 onwards
- Able to write and build 32/64 bit MATLAB DLLs in 'C' to provide additional functionality
- Familiarity with the Curve Fitting, Optimization, Signal Processing, and Statistics toolboxes

Spectroscopy:

- Knowledge of Differential Ultraviolet Absorption Spectroscopy and the Beer Lambert law
- Knowledge of with how a UV spectrometer works (e.g. diffraction gratings, dark current, photon noise, etc.)
- Knowledge of with how a Deuterium lamp works
- Knowledge of NDIR and Electrochemical sensors.
- Awareness of optical systems

Signal Processing Algorithms:

- Smoothing / Statistical / Time series filtering:
 - Averaging, simple moving average, exponential moving average
 - Butterworth, Chebyshev, Elliptical, Legendre filters
 - Fourier Analysis
 - Derivative spectroscopy
 - Savitzky–Golay filter
 - Curve fitting
 - Classical Least Squares solving
 - Awareness of Inverse Least Squares, Principal Components Regression, and Partial Least Squares solving techniques
 - Awareness of Wiener and Kalman filters
- Regression analysis

Operating Systems:

- Linux Debian 5 onwards, Ubuntu
- Angstrom Linux
- Windows XP, Vista, 7, 8, 10 (32 and 64-bit development)
- Android

- Use of VMware to run virtual machines

Linux specifics:

- Able to build Angstrom Linux under an ARM cross compiler using OpenEmbedded including bootloader, kernel, and root file system
- Build and incorporate Linux device drivers
- Makefiles
- Bash scripting

Development:

- Object Oriented Analysis and Design
- Project planning with Microsoft Project or equivalent
- Agile software development

Coding using:

- Python 3.5+ for data analysis and real-time environments
- C# with WPF 4 and XAML
- C for both Windows and Linux
- C++ for Windows and for Linux /ARM cross compiler; STL; C++11
- Windows MFC
- Java for Android + Android library
- The use of real-time multithreading under both Windows and Linux for all of the above languages.
- XML / JSON

Communication Protocols / Interface Programming / Electronics:

- Serial / RS232 (windows C#/C++ & Linux C++)
- Modbus / RS485 (Linux Python)
- TCP/IP sockets (windows C#/C++ & Linux C++)
- USB (windows C++ & Linux C++)
- Bluetooth (Linux C++): Microchip RN42
- I2C (Linux C++)
- SPI (Linux C++)
- SMBus (Linux C++)
- GPIO under Linux
- GPRS / 3G (Linux): Sierra Wireless SL8090 and Telit GM862
- GPS (windows and Linux C++) and associated NMEA protocols: u-blox NEO-6P/6Q and Telit GM862
- Anemometer and Compass NMEA protocols
- LCD displays
- Temperature, pressure, and humidity sensors

Databases:

- MySQL 5

Development Systems:

- Visual Studio 2008 onwards. Currently using VS2017.
- NetBeans 8.0
- Android studio 2
- Eclipse
- PyCharm
- Atom
- Vi, Vim, Emacs
- MPLAB X IDE

Source Control and Defect Tracking:

- Git
- Subversion (command line and TortoiseSVN)
- Trac or similar

Processors:

- ARM Corext-A7 + M4 (e.g. TechNexion Pico-IMX7)
- ARM Cortex-A9 NVIDIA Tegra 2 (e.g. Toradex Colibri T20)
- ARM Cortex-A8 TI DM3730 (e.g. BeagleBoard-xM)
- Atmega328
- PIC 8/16/32 bit processors (e.g. PIC18F45K20, dsPIC33FJ256GP710A, PIC32MX460F512L)

Web Development

Provision of various web service using the following, including the use of various GIS/map APIs.
Maintenance of the company web site.

- HTML 5
- CSS 3 / Bootstrap / Less / Sass
- JavaScript
- JSON, Ajax
- jQuery, jQuery-ui, jqwidgets
- PHP 5.x
- Apache 2.x
- MySQL 5.x
- phpMyAdmin
- Yii 2
- OpenLayers 3
- Google Maps 3
- JOOMLA 3.x

Electronics

Ability to choose and take reference designs to a marketable product. Knowledge of

- Measurement techniques (multimeter, oscilloscope, logic/bus analyser)
- Processor development kits
- Circuit designs for the following protocols: RS232, I2C, CAN, SMBus, SPI, USB, Ethernet
- Awareness of RF design, and use of antennas for Bluetooth, GPS, GPRS/3G
- Switched Mode power supplies designs
- Interfacing to LCD displays
- Computer On a Module (COM) designs.
- EMC/EMI techniques

Product Certification

- CE and UL certification
- ATEX certification