**Johnny Kelsey**

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I am currently the Senior Machine Learning Engineer at Biostrata Lab, a startup specialising in machine learning efficiency and optimisation. My role is to optimise systems by applying novel techniques to the machine learning process, including:

* using genetic algorithms (GAs) to tune metaparameters (parameter search)
* applying GAs and related algorithms to weight adjustment
* applying evolutionary techniques to the architecture of the neural network.

among other projects.

**Summary:**

I have been fascinated by machine learning since my 1st computer science masters dissertation. Since it became mainstream, I have 7+ years of professional experience designing and implementing machine learning systems, and more researching and implementing the algorithms while working in infrastructure. This has given me a detailed knowledge of how to take machine learning systems from designing on the whiteboard to prototyping to release into cloud-based clustered environments. I am comfortable in an Agile team environment, but given my research background, I’m also used to being given problems to work on independently.

I’ve worked with both structured and unstructured, heterogeneous data sources, and so have built a familiarity with large-scale, high volume data infrastructures. I develop mainly in Python, since the provision of libraries such as Tensorflow, Keras, Pandas, Scikit-learn speeds the development process, and use container technology such as Jenkins, Kubernetes and Docker to release, usually targeting cloud-based clusters on AWS or Google Cloud. I have also designed and built “real-time” big data applications using Apache Spark, leading to considerable exposure to Scala, Kafka and the Hadoop ecosystem, and the whole ETL, data modelling, data warehousing cycle.

I have 2 masters degrees in computer science, 4 masters degrees in total, and a PhD in Mathematics from University College London; I am a strong believer in keeping up to date with the latest research and technologies.

**Skills:**

* **Machine learning:** RNNs, GANs, tensorflow, keras, clustering algorithms, CNNs, ESNs, evolving neural networks. Have developed a number of innovative algorithms.
* **Python:** extensive experience, including developing models in Tensorflow and Keras, mathematical modelling using e.g. numpy/scipy, and deep learning neural networks such as CNNs.
* **Scala/Spark/Cassandra**: Applications developed include anti-money laundering app, **real-time analytics**, a **machine learning** API, crime model using reaction-diffusion PDEs. Familiar with Hadoop software ecosystem.
* **Hadoop:** considerable familiarity with the Hadoop ecosystem including **Storm/Kafka/Zookeeper/HDFS**.
* **Mathematical skills**: Developed the B-Cell Algorithm (BCA) for **function optimisation**. Employed stochastic techniques such as **Markov chain analysis** to analyse cytokine networks, and examining their dynamics by finding stationary distributions. Member of the London Mathematical Society.
* **Java**: Development includes an economic spatial diffusion **Monte Carlo simulation**, and a **pattern recognition** system based on a type of immune system cells. Java was the primary language used in development of stochastic models of immune system interactions.
* **C++:** Development includes the B-Cell algorithm and the application of genetic algorithms to weights in a neural network using bit-level operations.
* **Communication skills**: I have delivered a short course for programmers teaching C++, taught Java programming and adaptive systems at Kent University, and mathematical biology at UCL. I have also presented my work at various universities and conferences, and at company/client meetings.

**Experience:**

**BioStrata Lab**

**Senior Machine Learning Engineer**

**January 2019 – now**

* Applying GAs and related algorithms to weight adjustment
* Using genetic algorithms (GAs) to tune metaparameters (parameter search)
* Applying evolutionary techniques to the architecture of the neural network.

**NEX**

**Senior Machine Learning Engineer**

**June 2017 – December 2018**

* Developed an unsupervised clustering algorithm for assessing the accuracy of data sources.
* Used recurrent neural networks to forecast a variety of time series.

**Semblent**

**Head of Machine Learning/Chief Data Scientist**

**August 2014 – May 2017**

* Developed an anti-money laundering application for a major bank using Scala, Spark and Cassandra.
* Implemented a crime model for an app using a system of reaction-diffusion PDEs.
* Built a **real-time analytics** (RTA) application which evaluates portfolios of financial instruments based on changes in the underlying price (e.g. stock price). RTA was developed in Scala using the **Akka actor system**; it is distributed, cluster aware, scalable, and highly fault tolerant.

**Verdande Technology(Norway)**

**Machine Learning Engineer**

**May 2012 – July 2014**

* Researched and implemented machine learning techniques applied to multiple time series data for the oil and gas industry.
* Java development of agents and **Echo State Network** neural nets.
* Development methodology: **scrum**, using tools such as **git** and **Jira**.
* Verdande's technology stack: **Hadoop** ecosystem including **Storm/Kafka/Zookeeper/HDFS**.

**University College London**

**Senior Research Fellow**

**March 2009 – April 2012**

* Analysed a model of spatial distribution of market potential.
* Explored spatial economics model by Paul Krugman; modified model simulated using Mathematica/Matlab.

**Ph.D. Mathematics, University College London, 2005-2009.**

**Full time Masters by Research, University College London, 2004-2005.**

**Full time Masters by Research, Kent University, 2003-2004.**

**See Education section below for details**

**JP Morgan**

**Senior Systems/Infrastructure Engineer**

**September 2001 – September 2003**

* Consulted on **Solaris internals** / performance tuning for production support and Sybase DBA teams.
* Role included **kernel crash analysis**. Developed Solaris high availability system with automatic failover with Veritas JFS on EMC storage

**Full-time Masters degree, Sussex University, 2000-2001.**

**Nomura International Limited**

**Senior Systems Engineer**

**September** **1998 – September 1999**

* Responsible for administration and integration of Nomura Bank into the rest of Nomura including setting up of disaster recovery and Y2K testing.
* Replaced Sun Network Manager with my own perl client/server monitoring software.

**European Central Bank**

**Senior Systems Engineer**

**January 1997- January 1998**

**Credit Suisse**

**Senior Systems Administrator, Global Engineering**

**1996-1997**

**Salomon Brothers**

**Senior Systems Administrator, Infrastructure**

**1995-1996**

**Education:**

**Ph.D. Mathematics | 2009 | University College London**

* Modelling the interleukin 1-beta immune system network

**MRes. Modelling biological complexity (dist.) | 2005 | University College London**

* Dissertation: Modelling complexity of immune system networks.

**MRes. Computer science (dist.) | 2004 | Kent University**

* Developed the B-Cell Algorithm, an optimisation algorithm based on somatic hypermutation and cloning, inspired by the immune systems creation of antibodies.
* Two published papers, one of which won the Best Paper Award at GECCO in Chicago, 2004.

**Msc. Evolutionary and adaptive systems (dist.) | 2001 | Sussex University**

* Thesis on evolving hierarchical neural structures applied as a robot control system.

**Msc. Computer science (dist.) | 1991 | Hertfordshire University**

* Thesis on applying genetic algorithms to structures in Kohonen and back-propagation neural networks.

**References:**

Professor Andrew Hone

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Steve Edmans

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