**Dr Alexander Mikhalev**

**Director of AI**

🕿: +44 7842912714 | **🖂:** alex@metacortex.engineer| **🖃:** Swindon, Oxfordshire

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| A senior technical team leader with a proven track record of delivering innovative data driven solutions as well as excelling in the fields of engineering and machine learning (ML). Constantly strives to stay at the forefront of new technologies, bleeding-edge thinking and project management methodologies with deep experience in collaborating with top institutions. From ideation to full-blown production, creatively builds complete platforms and oversees the successful delivery of technical projects. Capable of interfacing at all levels of stakeholder, from executive to team. Considered a go-to expert in respective professional areas of interest and a public speaker at international conferences. |

Areas of Expertise

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| * Leadership | * Systems Engineering and Architecture | * Innovation and R&D |
| * Data Science/Data Fusion | * Natural Language Processing (NLP) | * Management |
| * Distributed Systems (inc Blockchain) * Data Privacy and Synthetic Data | * ML and Intelligent Pipelines * Knowledge Graphs | * Entrepreneurship * Mentoring and Coaching |

**Professional Experience**

**Current Employers**

**Director of AI (Founder) Mar 2007 – Present**

**Applied Knowledge Systems Ltd**

Applied Knowledge Systems Ltd (AKS) is a UK based consultancy firm that specialises in helping clients to create intelligent systems using AI/ML: image recognition, natural language processing and knowledge graphs.

* Works closely with the innovation and venturing team, specifically on privacy-preserving techniques for machine learning models, synthetic data, and digital twins.
* Oversees development of many intelligent platforms: LIDAR data fusion platform for meteorologists in France, the mobile-first platform to help detect speech disorder in children in UK, a platform involving the analysis and matching of receipts to purchased products, a project involved with scaling cancer detections as well as a platform focussed on digital imaging.
* Acts as primary contributor in machine learning algorithms or sophisticated data pipelines.
* Creator behind Redis award winning open source NLP project targeting medical researchers through spacial visualation and innovative AI/ML techniques.
* Involved in running an AI workshop for Oxford University (Green Templeton College) both for internal academics at the forefront of their respective fields (medical, IT etc) as well as for top visiting multinational CEOs attending.

**Past Employers**

**AI/ML architect December 2011 – December 2022**

**Nationwide Building Society**

One of the largest Building Societies in the world, based in the UK, with a strong focus on members.

* Works closely with the innovation and venturing team, specifically on privacy-preserving techniques for machine learning models, synthetic data, and digital twins.
* Shaped and delivered a Synthetic Data Platform from inception into full-enterprise capability.
* In 2018 enabled Prototyping Engineering capability inside Nationwide and led the team to create a prototype of new infrastructure powered by blockchain and Machine Learning algorithms.
* Invented and patented a new type of distributed storage complementary to existing cloud/on-prem infrastructure, which could be saving hundreds of millions in infrastructure costs for financial service applications.
* Personally contributed to AI and Blockchain strategies.
* Team leader of Technical Architects/system designers working on many strategic initiatives: digital, integration, risk, Fraud, AML and information management.
* Provides input into Technology strategy and influences enterprise architects in corresponding areas.

Key Accomplishments

* Shaped, influenced and led the delivery of Synthetic Data Platform which mitigates the risks of using live data and enables data-driven innovation.
* Enabled, assembled and led secret lab to create distributed data platform for blockchain and machine learning.
* Created Architecture as Code DevOps concept.

**GROUP OLVIA & ASSOCIATED COMPANIES**

A global company with divisions focussed on sustainable mining, supply chains for mineral ores & alloys, smart energy & infrastructure, commodity trading, exploration as well as financial services. The Group has executive offices in London, UK and Athens, Greece but with it’s ops spread throughout subsidiary/sister companies in Africa, Canada, USA, South America, EU and CIS.

**Director of R&D Jan 2019 – Jan 2021**

**M2M Ecosphere Ltd**

Headquartered in the UK, M2M Ecosphere (part of Group Olvia’s portfolio of companies) is primarily involved in the development of multi-objective real-time AI-powered traceability solutions for its metals refining and supply chain digital platform.

* Responsible for establishing the innovation process, R&D ecosystem, knowledge management and organisation design to support innovation activity throughout Group Olvia.

Key Accomplishments

* Deployed AI prototype solutions for the Group’s copper cathode supply chain from DRC to China, from mine to port, proving we can intelligently optimise supply chain routes and react to unforeseen events in a timely manner, saving time and money whilst mitigating multiple risks.

**Head of Architecture and Development November 2011 - November 2014**

**Shopitize Ltd**

Based in the UK, Shopitize Ltd is a data driven, shoppertech company, which partners with brands and retailers to build intuitive mobile marketing platforms, designed to create loyalty through value and turn shoppers into buyers.

* Acted as the most senior technology professional (CTO) in Shopitize where my goal was to align business strategy with technology and product development.

Key Accomplishments

* Actively contributed to increasing Shopitize company valuation by 40 times during my term of employment.
* Created a patent application for Shopitize technology and process.
* **Advanced distributed system architecture design and implementation**: I have designed and overseen the implementation of a fully automated receipts processing system based on advanced image processing and OCR technologies. The innovative architecture, technical and business processes resulted in the patent application "A method and a system for providing loyalty program" of which I am one of the primary inventors.
* Designed scalable, secure and high-performance architectures for advanced data processing, middleware layer and cost-effective hardware infrastructure capable of serving millions of customers per day using a mix of public and private cloud with dedicated hardware. Created REST API for mobile and web clients, Publish/Subscribe architecture for back-end processing, SOAP/XML based services for integration with BACS and Paypal processing.
* Product search engine specifically built to replace Solr (Lucene-based search engine), which outperformed Solr 10 times regarding indexing speed.
* **Mentoring and managing Data Scientists:** our technology solution has been evaluated. Even our competitors conclude that we are one of the most robust and scalable platforms in our industry, generating a unique dataset and leveraging Big Data Technology using COTS components. I have also mentored my team members as well as Science to Data Science school participants to achieve distinguished results and be able to present results to stakeholders.
* **Team management and innovation**: I managed a team of up to 32 engineers and designers, including three architects - UX, mobile and middleware located offshore, then hired and built a robust and high performance and innovative in-house team limited to 5 engineers.

**Research Fellow, Wireless Networks and Communication Group**

**Defence College of Management and Technology May 2007 - November 2011**

**Cranfield University, UK**

* Cranfield Defence and Security (CDS) is based at the Ministry of Defence establishment on the Oxfordshire/Wiltshire borders. It is a specialist postgraduate university with a strong research community. During my tenure at Cranfield University I successfully delivered innovation projects sponsored by General Dynamics UK, Boeing and Rolls Royce UK.

Key Accomplishments

* Development of the new water-filling waveform for mobile communication band-sharing on a physical layer using wavelet packets and implementing it in hardware (Anritsu Vector Generator and Analyser).
* Novel methods of communication for in-vehicle sensor networks funded by the IVHM consortium led by Rolls Royce and Boeing, currently this project is cited as an exemplar of "digital twin."

Awards and Professional Certifications

* **Platinum Winner** for “Build on Redis” international Hackathon 2021 with “The Pattern: Machine Learning Natural Language Processing meets VR/AR: avoid bias and find relevant knowledge using Artificial Intelligence and novel UX elements”.
* **Winner** of 2017 internal Nationwide competition by presenting a solution to use Machine Learning to detect data non-compliance for PCI and GDPR regulatory requirements using Raspberry Pi.
* **Patent** GB 1815423.7: Secure Distributed Data Storage UK Intellectual Property Office Sep 2018. Led a team of engineers to successfully prototype and patent novel technology. The patent inventor is my team member Dr Matin Mavaddat.
* **Best Student Paper Award**. A. Mikhalev and R.F. Ormondroyd. Emitter Geolocation using fusion of TDOA Data with a Particle Filter. The International Conference on Information Sciences, Signal Processing and its Applications Feb 2007 TOGAF® 9.
* Certified member of Enterprise Architecture community.
* Member of International Council on Systems Engineering (INCOSE), The Institute of Electrical and Electronics Engineers (IEEE) and The Institution of Engineering and Technology (IET).
* Certified courses "Practitioner" on Engineering Leadership, Strategy and Systems Engineering management.

**Earlier Career Summary**

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| **IT Executive** | Microsharp Technology Ltd (UK) | **2003-2007** |
| **Co-Founder and Editor-in-Chief** | Systems Administrator Magazine (Russia) | **2002-2003** |
| **Engineer/Web-developer** | Ross Business Consulting (Russia) | **2000-2002** |

**Technical Skills**

* **Knowledge of Standards**: TOGAF 9.1, Zachman, ISO 42010, ISO 15288, ISO 15926, ISO 29148, Open Group Essence/SEMAT.
* Expert developer in Python, Matlab/Octave, Julia. Intermediate level in Java/Scala/Ocaml/Go/Rust.
* **Machine Learning Frameworks**: PyTorch and chainer.
* Virtualisation experience using RHEL, Debian, Ubuntu, LXC/Docker, Virtual Box, Vagrant, Chef, Ansible.
* Development process engineering and management using Lean, PRINCE 2, Agile/ Scrum/Kanban, Critical Chain Project Management, P2M.
* **NoSQL Databases**: Blockchain/Solidity, Blockchain/Dapp, Basho Riak, CouchDB/Couchbase, MongoDB, Redis, Cassandra.
* **Non-structured text processing**: Lucene/Solr, ElasticSearch/Kibana, Hadoop/Spark, Berkeley DB/Perl based search engines before 2004.
* **Search Engines and Intelligent systems**: Natural Language Processing, Advanced Image processing and Recognition.
* **Advanced SQL skills**: Postgres SQL, MySQL, MS SQL.
* **Wireless and Wired Infrastructure**: I have advanced knowledge of Network Ethernet 10/100/1000, TCP/IP, Token Ring, ARINC 429/629, MIL-STD-1553. Routing protocols OSPF/BGP. Wireless networks: IEEE 802.11\*, IEEE 802.15.4, Mobile: 3G, CDMA, HDSPA, 3GPP - aware location services, WiMAX, Mobile bandwidth and spectrum management.
* **Scientific interests**: Knowledge Graphs, Data Fusion, Multip-Objective Optimisation, Natural Language Processing, Higher-Order Statistics, Image Processing, Statistical Analysis, Sensor Fusion, Geolocation, Cognitive Systems, Distributed Computing, Large Scale Text Processing, Evolutionary Computations, Large Scale Data Processing, High-Performance computing, Internet of Things

**Education and Qualifications**

* **PhD in Wireless Networks**, Defence College of Management and Technology, Cranfield University, UK — 2004–2010
* The thesis title "Image Processing and Agent-Based framework for the Geolocation of Emitters" PhD thesis was concerned the novel use of the image processing technique (Hough Transform) for geolocation non-line-of-site emitters for military and emergency applications and comparison with Particle filter algorithm, which leads to a more generalised estimator. This work resulted in multiple publications in peer-reviewed journals and conferences.
* **MSc (Engineer)** in Information Systems and Computer Science, Moscow State Technical University n/a Bauman (MSTU), Russia — 1996–2002
* Master's thesis: "Semantic Search System for Large-Scale Hypertext Libraries on Compact Discs.