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Dr Alexander Mikhalev

Personal Details

Summary: An experienced technical leader and innovator with a unique combination of skills in innovation with a focus on data, engineering and machine learning. Capable of taking innovation from idea to production by building a complete platform with a whole lifecycle and corresponding organisation.

Key strengths/Core Attributes:

Management: Created and managed teams in Agile/Waterfall and mixed environments using Ultimate Kanban and Reliable Scrum and transparent performance metrics, for example:

- Shopitize Ltd: The managed team of up to 32 in 4 locations, transition to the team of 6
- Nationwide: Lead teams of Technical architects (2 -12) on large projects like GDPR, Open Banking, CMA, Mobile app

Leadership and Innovation: Leader as a coach, mentoring and inspiring my team members to innovate:

- Nationwide: Created and prototyped a new type of distributed infrastructure to deploy machine learning models on commodity devices
- Sponsored, mentored and lead team members to create the first patent Nationwide using blockchain-inspired design
- Inspired Accenture consultant on DevOps project to come up and prototype Architecture as a Code (DevOps)
- Shopitize Ltd: our search engine for string matching (part of Intellectual Property)
- Mentored and lead teams of data scientists

Data Science and Analytics: Experienced Data Scientist and mentor, leveraging expertise across multiple industries to build novel solutions

- Specific examples: During my tenure at Cranfield University developed a novel data fusion technique based on image processing. This resulted in hundreds of high-performance algorithms for data fusion from multiple sensors also in Cranfield University invented a new type of waveform for communication based on wavelet-packets.
- Deep Learning Neural Network classifier for Therapy Box to detect learning disability in child speech

Systems Engineering/Software Engineering: Systems Engineering thinking is a foundation of my activity; this allows me to navigate complex projects quickly, drive new strategies for business, develop new architectures and take them from conceptual level to production with necessary automation (DevOps/DataOps) and corresponding team.

I also can code my ideas into pipelines or services using Python/Lua/Java/Matlab/Rust/Go:

- Short contracts for startups: Memrise: Java/Spark Machine learning pipeline for communications (2 weeks contract)
- ThirdEye: Kubernetes/Tensorflow based pipeline for video recognition (1-week contract)
- Nationwide: Python/Pytorch Machine learning for data non-compliance monitoring

Innovation & Entrepreneurship: I have a systematic way to innovate by challenging common assumptions using Theory of Creative Problem solving (TRIZ) and Theory of Constraints (TOC), enabling the business to create disruptive strategies:

Shopitize Ltd: Created a distributed cache for mobile API. This cache removed dependency on IT infrastructure for scalability; only business cashflow became a limited factor (constrain)

Nationwide: By observing challenges to deliver data compliance, proposed a Machine Learning technique to monitor data compliance. Potential savings 80 million per year (without taking fines into account)

Nationwide: An invented new type of infrastructure: leveraging members devices to store data, solving challenges of security, compliance, availability and resilience

Experience

Financial Services

AI/ML Architect, Data Architecture team, Nationwide Building Society, Swindon, June 2018 – present

AI/ML architect, working closely with innovation and venturing team and data&analytics community, specifically working on privacy-preserving techniques for machine learning models, synthetic data and digital twins.

Lead Entrepreneur/ Head of Prototyping Engineering/Principle Engineer. Prototyping Engineering team, Nationwide Building Society, Swindon, June 2017 – 2018

I enabled Prototyping Engineering capability inside Nationwide. Led the team to create a prototype of new infrastructure to build a digital distributed organisation - powered by blockchain and Machine Learning algorithms. We have invented and patented a new type of distributed storage complementary to existing cloud/on-prem infrastructure. I also personally contributed to AI and Blockchain strategies.

Lead architect. Accelerate Change Efficiency DevOps, Nationwide Building Society, Swindon June 2016 – June 2017

Performed the role of the lead architect on Accelerate Change Efficiency DevOps programme, where I shaped DevOps Enterprise blueprint, proposed a standard value-based metric for enterprise to track consistently (cashflow per day) and created a proof of concept demo for Architecture as a Code.

Tech Lead/Lead Technical Architect, Nationwide Building Society, Swindon November 2014 – June 2017

Background:

One of the most traditional Building Society, with a strong focus on members and attitude to become a fully digital society.
I lead a team of Technical Architects to produce systems designs for a large number of strategic initiatives: Next Generation Banking App, Strategic Origination, Risk Profiling, CMA 1.1, Open Banking (PSD2), Information Management Strategic Architecture, Treasury Technology and Enhanced Third Party Controls project to name a few. I have provided input into Technology strategy and influenced enterprise architects in corresponding areas. I have won the Raspberry Pi IT Architecture challenge by

presenting a solution to use Machine Learning to monitor data compliance for PCI and GDPR regulatory requirements

Key achievements:

- Drive a Technical Architecture/Design of the change projects in a complex and high-pressure environment
- Lead, coach and supervise a team of Technical Architects/Designers working across multiple projects
- I collaborated with Enterprise Architecture to make sure projects solutions are delivered in line with Enterprise Strategy for Society.
- Lead a process to make sure technical debt delivered by projects is minimised
- Implemented Technical Quality Assurance and Governance of artefacts and built products from outsourced partners (IBM, Accenture and TSC) to ensure deliverables were meeting Nationwide standards
- Enforce regulatory standards: CMA/PSD2/PCI DSS 3.2 to ensure project solutions will maintain compliance.

Startup: Head of Architecture and Development, Shopitize Ltd, London UK November 2011 – November 2014

Responsibilities:

I have been the most senior technology professional in Shopitize my goal was to align business strategy with technology and product development.

Key achievements:

- I actively contributed to increasing Shopitize company valuation by 40 times during my term of employment.
- 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.
- I also 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. 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 build to replace Solr (Lucene-based search engine), which outperform Solr 10 times regarding speed of indexing.
- 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.

The technology stack used: Middleware: Python, Django, Rabbit MQ, Riak, PostgreSQL, Mongo DB, various Machine Learning Libraries. Front-end: Javascript, jQuery, Knockout JS, Ember JS/Angular JS

Researcher: Research Fellow, Wireless Networks and Communication Group, Defence College of Management and Technology, Cranfield University, UK May 2007 – November 2011

The main achievement during 2007-2009 was the 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). Another project was to develop novel methods of communication for in-vehicle sensor networks funded by the IVHM consortium led by Rolls Royce and Boeing, which was also completed, presenting new ways for simulations of in-vehicle communications. In-Vehicle Health monitoring in Aerospace is a Big Data problem. Although not advertised as such presents common Big Data challenges, where communication network is the main bottleneck in the data processing.

IT/IS Executive, Microsharp Corporation Limited (previous name: Durand Technology Limited), UK February 2003 – May 2007

Design, development and testing of IT and phone infrastructure of the company, created fully automated and redundant IT infrastructure.

Entrepreneur: Co-founder and Editor-in-chief, “System Administrator" magazine for system administrators (Russia), September 2002 – February 2003

Responsible for developing and controlling the publishing process for the magazine. Management and development of the offline magazine. The position of the editor-in-chief was not editorial but managerial. I led a small team (5-8 employees) and ensured the magazine would be printed on time.

Engineer - Developer Ross Business Consulting, Russia — 04.2002-09.2002

Responsible for the development of web portals, including portals for the Russian Ministry of Energy and several oil companies.

Web-developer, Publish house "Pushkin Square" (Russia) — 4.06.2000-19.04.2002

Extra Achievements

Two patent applications

Over 20 publications in peer-review journals including Best Student Paper Award“A. Mikhalev and R.F. Ormondroyd, Emitter Geolocation using a fusion of TDOA Data with a Particle Filter, in Student Papers. The International Conference on Information Sciences, Signal Processing and its Applications February 2007, Sharjah, UAE.”

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

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

NoSQL (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: 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

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."