

The inevitable automation of Next Generation Networks

27 September 2018

Hosted by The Computer Laboratory, University of Cambridge

Venue: The Computer Labs, Cambridge, William Gates Building, 15 JJ Thomson Ave, Cambridge, CB3 0FD

AGENDA

09:30 Registration and networking with refreshments

10:00 **Welcome from CW (Cambridge Wireless)**

Robert Driver, CEO, CW

Welcome from our host The Computer Labs

Dr Ian Wassell, Senior Lecturer, **University of Cambridge Computer Laboratory**

10:10 **Scene setting / Intro to the day**

Stephen Unger, Independent, Chair of CWTEC Committee

Session chaired by Mary-Ann Claridge, Founder, **Mandrel Systems**

Can networks think?

What practical techniques exist now, or are being developed, for the automation of complex systems? How can we apply these to the specific challenges associated with next generation networks?

10:20 **AI in Telco Networks**

Dr Kim Larsen, SVP, Group Development, **Deutsche Telekom**

Kim will address how might AI (dramatically?) change Telco Networks in short, medium and long term. How to leapfrog operational efficiencies and customer experience with AI. The session will cover some use cases that Kim and his team have worked on in the past. Finally, some thoughts on the hidden luddite in most of us Humans and why this is a threat to fast AI exploitation.

10:35 **AI Ops – getting value from real-time data**

Dave Salam, Director Mobile Core and Data Analytics, **BT**

This session will explore how BT is addressing the increasing need for intelligent real time Insight in the design and operation of its Mobile Network

10:50 **Machine Learning – what’s in it for communication networks**

Tero Rissa, Chief Architect, Machine Learning, ATF, Mobile Networks, **Nokia**

This session will explore how can we classify the different techniques available for machine learning and what are they capable of achieving, now and over the next few years. What might go wrong? Why now?

11:10 **Panel Session with audience Q&A**

11:30 **Refreshments and networking**

Session chaired by Sylvia Lu, Senior Engineer, Cellular Technology, **u-blox UK**

Managing complexity in end-user devices

What types of new devices will be used with next generation networks? As these devices become more complex, what is the potential for simplifying their operation using embedded AI / ML?

12:00 **AI in networks - opportunities and challenges**

Yue Wang, Principal 5G Researcher, **Samsung Electronics R&D Institute, UK**

The presentation will give an overview of the current and future-looking applications of AI in the communication networks, including the current standard activities in network automation and intelligence. Through a few examples it will show how AI can benefit the network for enhanced performance and reduced cost, as well as the challenges the industry is facing when applying AI to the networks.

12:15 **Huawei** (speaker to be confirmed)

12:45 **Panel Session with audience Q&A**

13:05 **A word from our lunch sponsor**

13:10 **Lunch and networking**

Improving end-to-end quality of service

What performance data do next generation networks generate? Can this be used to continuously optimize network performance? What improvement could this deliver over current network management techniques (SON etc)?

14:10 AI with a human-touch - application to Network Performance

Mansoor Hanif, UK5G Advisory Board Member, **UK5G**

Inevitable indeed, but how fast and how deep is Machine Learning and AI being applied to building better, more reliable and more secure networks? What is "AI with a human touch" - how close can we get to Zero touch (full automation) and what is the continuing relevance of humans in network optimization?

14:25 Transformation of mobile network management with machine learning

Dr Chris Murphy, Research Director, **VIAVI Solutions**

To deliver its promise of ubiquitous, highly reliable, low latency communication for a wide range of subscriber and device types requires a radical shift in the way that networks are built and operated. Machine learning is one of the technological pillars that will be needed to realise this transformation and allow us to build what could be amongst the most sophisticated autonomous systems in existence.

14:40 Panel Session with audience Q&A

Security and privacy by design

How effectively can automated tools identify and mitigate cyber-attacks on networks? Can such tools identify vulnerabilities ahead of any attack? Can they provide greater protection of privacy - or do they create new risks for privacy?

15:00 Title to be confirmed

Peter Haigh, National Cyber Security Centre (NCSC)

Narrative to be confirmed

15:15 Future challenges and opportunities in Cyber Defence

Dr Ben Azvine, Global Head of Security Research & Innovation, **BT**

Cyber Security is one of the greatest man-made challenges of our time. In this talk I'll focus on why businesses need to think differently about security to meet the challenges. I'll also cover the positive and negative impact of a number of technologies such as IoT and AI on Cyber Security, and demonstrate our latest tools and technologies being developed at our labs.

15:30 Title to be confirmed

Prof Carsten Maple, Professor of Cyber Systems Engineering & Director of Research in Cyber Security, **University of Warwick**

Narrative to be confirmed

15:45 Panel Session with audience Q&A

16:05 Refreshments and networking

Session chaired by Stephen Unger, Chair of CWTEC Committee

Understanding network availability

What data is generated on network availability, either by the networks themselves, or crowd-sourced applications on devices? Can application of AI / ML to these datasets provide a better understanding of KPIs such as mobile coverage, network outages, broadband speeds?

16:35 Title to be confirmed

Toby Simpson, Chief Technology Officer, **Fetch.ai**

Narrative to be confirmed

16:50 Automated HetNet Design

Iris Barcia, COO, **Keima**

The talk will cover the challenges faced by network planning and strategy teams designing modern wireless networks. Examples will show how automation is already used to overcome them, and how could it be in future.

17:05 Title to be confirmed

Richard Baker, CEO, **Geospock**

Narrative to be confirmed

17:20	Panel Session with audience Q&A
17:40	Closing remarks Stephen Unger, Chair of CWTEC Committee
17:45	Event close

With the permission of the speakers, presentations will be loaded to the CW website within two weeks of the event

Profile of organisers

Cambridge Wireless (CW)

CW is the leading international community for companies involved in the research, development and application of wireless and mobile, internet, semiconductor and software technologies. With over 400 members from major network operators and device manufacturers to innovative start-ups and universities, CW stimulates debate and collaboration, harnesses and shares knowledge, and helps to build connections between academia and industry. CW's 19 Special Interest Groups (SIGs) provide its members with a dynamic forum where they can network with their peers, track the latest technology trends and business developments and position their organisations in key market sectors. CW also organises major conferences and start-up competitions along with other high-quality industry networking events and dinners. With headquarters at the heart of Cambridge, UK, CW partners with other international industry clusters and organisations to extend its reach and remain at the forefront of global developments and business opportunities. www.cambridgewireless.co.uk

UK5G

UK5G is the new national innovation network dedicated to the promotion of research, collaboration and the commercial application of 5G in the UK. UK5G is a 'network of networks' to facilitate and encourage the engagement and coordination of organisations working on 5G activities across the UK. It will enhance links between ongoing research and development and other activities being undertaken by organisations across telecoms and other sectors, as well as the testbeds and trials that will be funded through the UK Government's 5G Testbeds and Trials Programme. It will facilitate the joining up of businesses, large and small, academic institutions and the public sector throughout the UK. UK5G is independent and impartial. A senior national advisory board will advise the Government's 5G Testbeds and Trials Programme, providing expert feedback from industry, identifying their priorities and advising on future areas of focus. UK5G will be a focal point for international engagement into the UK's 5G eco-system - encouraging international participation and investment. www.uk5g.org

Profile of host

The Computer Laboratory, University of Cambridge

The Computer Laboratory is an academic department within the University of Cambridge that encompasses Computer Science, along with many aspects of Engineering, Technology and Mathematics. It consists of 44 academic staff, 30 support staff, 7 research fellows, 102 post-doctoral research workers and 121 PhD students. We have over 300 undergraduates studying for Part I, II and III of the Computer Science Tripos and 36 graduate students studying for the MPhil in Advanced Computer Science. Its current research areas include bioinformatics, computer architecture, computer vision, distributed systems, graphics and human-computer interaction, logic and semantics, machine learning, natural language processing, networking and wireless communication, operating systems and virtualization, programming, security, and sustainable computing. www.cl.cam.ac.uk

Profile of sponsor

Fetch.AI

Fetch.AI is based in Cambridge, UK with development talent across the globe. Fetch breathes life into machines, data, services and infrastructure with digital representatives that can trade autonomously and unsupervised. Fetch delivers a unique, decentralised digital world that adapts in real-time to enable effective, friction-free value exchange. Powered by innovations such as the world's first Smart Ledger, Fetch has digital intelligence at its heart: delivering actionable predictions, instant trust information and enabling the construction of powerful collaborative models. With unrivalled performance and scalability, Fetch is the missing critical infrastructure for tomorrow's digital economy. fetch.ai

Profile of speakers

Dr Ben Azvine, Global Head of Security Research & Innovation, BT

Ben is responsible for setting direction and strategy for Security research, identify innovation opportunities and lead a strong international team of researcher to develop new capabilities in collaboration with industrial and academic partners. Ben has 30 years' experience in both academia and industry. His previous roles included leading the IT research centre and head of business intelligence & customer analytics research at BT Group Chief Technology Office. He holds a BSc in Mechanical Engineering, an MSc in Control Engineering, a PhD in Intelligent Control Systems from Manchester University and an MBA from Imperial College, London. Having held research fellowship and lectureship posts in several universities, he joined BT in 1995 to lead a research programme to develop and exploit novel Artificial Intelligence technology to support next generation IT systems. Since then he has held senior, principal, chief research scientist posts at BT's global R&D headquarters in Adastral Park, Ipswich where he is currently based. He has edited two books and published more than 100 scientific articles on novel application of intelligent systems. He is an inventor of 50 patent applications, has won 4 BCS and an IET gold medals for IT innovation, holds visiting professorship positions at the Universities of Bristol, Cranfield, Suffolk and Bournemouth. Ben is a current fellow of Institute of Telecom Engineers (FIET) and has acted as the chairman of the European network of excellence for Uncertainty management techniques from 1998 to 2001. His current research interests include the application Artificial Intelligence and Machine Learning to Cyber security, protection of critical national infrastructure, data analysis and information & knowledge management. His current projects include Visual Analytics for Cyber defence, cloud & Internet security, machine learning and anomaly detection in network data and future identity and access management.

Richard Baker, CEO, Geospock

Profile to follow.

Iris Barcia, COO, Keima

Iris Barcia is Chief Operating Officer and co-owner of Keima, an innovative software company delivering disruptive wireless design solutions worldwide. Iris is an innovator and forward-looking technologist working with the executive teams and engineers at Tier 1 network operators, network infrastructure vendors, neutral-host vendors, government organizations, and international services companies. She has been involved in the proposal and assessment of novel HetNet strategies for nation-wide 4G, 5G, IoT and public-safety networks, with a focus on future capacity provision and multi-technology evolution. Prior to Keima Iris has worked on RAN design, optimization and deployment projects at Telefonica and European rural broadband wireless initiatives. She has a BSc and MSc in Telecommunication Engineering from the University of Vigo (Spain) and an MBA from Cardiff Metropolitan University (UK).

Peter Haigh, National Cyber Security Centre (NCSC)

Profile to follow.

Mansoor Hanif, UK5G Advisory Board Member, UK5G

Mansoor has 24 years' experience of planning, building, optimising and operating mobile networks around the world. In 2011 Mansoor joined EE as Director of Network Integration and LTE, accountable for the technical launch of 4G as well as the Integration of the 2G/3G Orange and T-Mobile networks. From 2013 he was Director of RAN, with responsibility for all of the EE radio access networks. Mansoor was a board member of MBNL (the joint venture of EE with H3G) until 2016. At BT Mansoor was Director of the Converged Networks Research Lab from 2016 to 2018, and led deep and wide collaboration with UK Universities, innovators, and government bodies. He provided regular inputs to calls for evidence from the UK Government in relation to connectivity: ranging from 5G deployment pilots, rail connectivity and transport strategy to vertical industries. Mansoor was closely involved in the foundation of several cross-industry initiatives to accelerate innovation with disruptive technologies: in the UK, he co-founded the Scottish Innovation Partnership, and also globally with the Telecom Infra Project (TIP), founding the Europe's 1st TIP ecosystem acceleration centre in the UK. Mansoor is currently a member of the Advisory Board of the UK5G Innovation Network and a member of the UCL Electrical and Electronic Engineering Industry Advisory Board.

Dr Kim Larsen, SVP, Group Development, Deutsche Telekom

Dr. Kim Larsen has more than 16 years of experience in the telecommunication industry, with national, as well as international senior management roles. He is currently working for Deutsche Telekom Group Development. Previously he was the CTIO in Magyar Telekom, Hungary's market leading telco operator. Also, previously he worked

for Deutsche Telekom as Senior Vice President of Technology Economics & Transformation reporting directly to the Deutsche Telekom's Group CTO. He holds a Ph.D. degree in Physics and a master's degree in physics & Mathematics. Kim is passionate about value-based technology innovations and in particular the strategic and economic impact of new technologies such as 5G and AI. He publishes and discusses his views as 'Dr. Kim' on his techno-economical strategy blog www.techneconomyblog.com, his AI strategy & policy blog www.aistrategyblog.com and on Twitter @KimKLarsen.

Among many things, Kim has been developing a blue print for Deutsche Telekom's Network-centric big data architecture supporting all network needs including the diverse use cases & requirements in a modern telecommunications network. He is driving various applied machine learning initiatives, aggressive network automation and how to get more data science competences into the telecom industry. Lately, he started a debate on relevance of 5G for the mass market, the rightful expectations to its potential and last but not least the economic impact on the telecom industry.

Prof Carsten Maple, Professor of Cyber Systems Engineering & Director of Research in Cyber Security, University of Warwick

Profile to follow.

Dr Chris Murphy, Research Director, VIAVI Solutions

Chris has nearly 20 years of commercial experience in telecommunications covering network performance measurement, optimization and SON, particularly in cellular RAN including LTE, UMTS, CDMA and 5G. His focus has been on the modelling, simulation and optimization of next generation technologies to build a revenue stream early in the life cycle of each new generation of telecommunication systems. He has contributed to various industry and standardisation bodies including 3GPP, NGMN, ATIS and the WiMAX Forum. Chris holds a degree in Mathematics and Computing and a Ph.D. in the calibration of oceanic remote sensing satellites for improved models of climate change. He has authored numerous journal and conference papers and has filed 16 patent applications.

Tero Rissa, Chief Architect, Machine Learning, ATF, Mobile Networks, Nokia

Tero has over 20 years of industrial experience of scaling new technologies from research and concept engineering into commercial products. He started working with artificial neural networks in 2009, and has since held senior positions in both engineering and management. Most recently before joining Nokia Networks, he was a director of R&D at Microsoft and the lead architect of OZO in Nokia Technologies. Tero holds MSc in CS/EE, Digital and Computer Systems from TUT Finland, and PhD in Computing from Imperial College London UK. He is also an emeritus member of the Nokia CEO Technology Council and Bell Labs Distinguished Member of Technical Staff.

Dave Salam, Director of Mobile Networks, BT

Dave Salam is Director of Mobile Networks at BT, with overall responsibility to Design and Build the leading Mobile Network in the UK. Dave has a 25-year history in Mobile Technologies working across Network Strategy, Architecture, Design and Operations both in UK and Internationally. Recently, Dave has also led teams in Big Data technologies with a specific focus on developing real-time Customer Experience Insight and Operational simplicity.

Toby Simpson, Chief Technology Officer, Fetch.ai

Toby is a pioneer in AI, autonomous agents and shared virtual world technology. He produced the cult hit Creatures series and was one of the initial team at DeepMind looking at nature's contribution to Artificial General Intelligence. It was the investigation into P2P distributed ledger technology and blockchain which led to the realisation that the Fetch's vision is within reach.

Yue Wang, Principal 5G Researcher, Samsung Electronics R&D Institute, UK

Yue Wang is a Principal 5G Researcher at Samsung Electronics R&D Institute UK. Over the past 10 years in her career, she has held various roles in the US and the UK, and has worked on a number of technical subjects in wireless communications research and standards. Her current interest is on the strategy and innovation of applying AI in communication networks. She leads the research activities of AI within the 5G team, is the Samsung delegate of ETSI ISG ENI (Experiential Networked Intelligence), and the Secretary and Rapporteur of ENI. She also sits in the Industry Advisory Board of two Universities, and is the industry supervisor of a 5-year research program, all on the area of AI in 5G and beyond.