Microsoft

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Microsoft response to BEREC's public consultation on the draft report on challenges and benefits of impact of Artificial Intelligence (AI) solutions in the telecommunications sector (including use cases)

Introduction

Microsoft thanks BEREC for organizing a consultation on the *draft BEREC report on challenges and benefits of impact of Artificial Intelligence (AI) solutions in the telecommunications sector (including use cases)*, underscoring the key role of AI will play in the telecommunications sector in the mid-term, identifying recent developments in selected use cases, including their impact on regulation as well as the benefits, risks and opportunities of AI applications in this sector. Microsoft welcomes BEREC's approach in developing a report that builds on the EU's Artificial Intelligence Act (AIA), ensuring that AI systems are in line with EU law and provide legal certainty to facilitate investment and innovation in AI.

At Microsoft, we welcome Europe's proposed AI Act and share BEREC's goal to ensure that the vast potential of AI in the telco sector can be realized by all in ways that are safe, respectful of fundamental rights, and aligned with European values.

Microsoft wishes however to raise caution about the proposed addition of "digital infrastructure" to Annex III of the AI Act which could overlap with existing resilience obligations in the digital and telecommunications area and thereby create legal confusion potentially discouraging digital infrastructure providers from using AI systems that may in fact make their infrastructure more, rather than less, resilient.

AI is among the most powerful technologies of our time and will have nothing less than a transformational impact across industry, not least in the telecommunications sector. In this context, we believe it is critical that the right guardrails accompany the development and deployment of AI, and that Europe continues to foster AI driven innovation. In that sense, we believe BEREC can play a critical role in encouraging a greater uptake of AI-applications across the telecommunications sector, in a way that addresses the challenges and multiplies the benefits that AI systems can offer.

Selected Artificial Intelligence use cases areas

With this report BEREC underlines the potential of AI in the telecommunications sector and has developed six AI use case areas in telecommunications, including Network and Capacity Planning and Upgrades; Channel Modelling, Prediction and Propagation; Dynamic Spectrum Sharing; Quality of Service Optimization and Traffic Classification; Security Optimization and Threat Detection and 6. Fraud Detection and Prevention, use cases in which we foresee a number of benefits of AI/Machine Learning (ML) to be signification to this sector from several perspectives.

In addition to the above uses cases, we believe that AI/ML will play an important role in improving reliability. AI can dramatically speed up and increase the efficiency of returning lost coverage to subscribers by drawing from surrounding cells, proven to be useful on a daily basis and in response to unexpected situations such as natural disasters. Similar benefits can be obtained through AI-enabled dynamic spectrum sharing; channel modelling, prediction and propagation; and reducing service failures. We agree with BEREC that AI techniques are a

well-suited technology to foster a more dynamic approach to spectrum management that will be necessary to meet future demand in shared bands.

AI can be used to improve the **performance, and efficiency of networks** by performing various functions such as network optimization, predictive maintenance, traffic management, self-healing networks, and resource allocation. Network optimization uses AI to analyse network data and make real-time adjustments to parameters, resulting in better performance. Predictive maintenance utilizes AI to predict equipment failures, allowing for proactive maintenance and reducing downtime. Traffic management with AI dynamically manages network traffic, giving priority to critical services. AI enables self-healing networks by detecting and correcting problems before they cause interruptions. Lastly, resource allocation is optimized with AI, leading to improved network capacity and lower cost of upgrades.

The draft BEREC reports list a number of challenges in the development of AI systems for 5G network planning and upgrade purposes, including with regards to data availability, computational capacity, data privacy and security, and integration with existing systems. To address these challenges, we proposed a number of potential solutions for BEREC's consideration:

- As with regards to data- availability, we would recommend the use of data collection and management systems that enable the effective gathering, processing, and analysis of network data. In the United States, we are currently discussing this issue within our FCC work with CSRIC, to see if the service providers could share the information in such a way that no privacy or competitive issues are raised.
- To address challenges related to computational capacity, we believe cloud-based AI-solutions be reduce intensity and the number of computational capabilities.
- In addressing data privacy and security concerns, we believe that the implementation of privacy-enhancing technologies and data protection policies, as well as the use of secure, encrypted data storage and transmission systems, will be critical in addressing these concerns.

We also predict that AI solutions for security optimization, **threat detection, and fraud detection and prevention will bring great value to the consumer.**

The telecommunication sector is undergoing rapid digital transformation. More than ever, operators are seeking to deploy high-quality, cost-minded networks without sacrificing security and resilience to protect critical infrastructure. Today's communication networks need to adapt to architectures based on new security principles and capabilities, involving a model of shared responsibility. This is a consequence of increasing network complexity (e.g. 5G Edge sites) leading to a broader attack surface and undermining traditional "Hard Shell" principles in favor of a modern Zero Trust security strategy. As network complexity grows, this will require more AI security capabilities to defend critical components of telecommunications.

The AI capabilities built into Microsoft Security solutions are trained on 8 trillion daily threat signals and the insights of 3,500 security experts. Custom algorithms and machine learning models make, and learn from, billions of queries every day. As a result, Microsoft Security solutions help identify and respond to threats 50% faster than just two years ago. Azure Sentinel, the first cloud-native SIEM with fusion AI technology turns huge volumes of low fidelity signals into a few important incidents for security professionals to focus on, including how to reduce malware and significant threats to telecommunication networks. We believe

AI-powered security capabilities should be deployed across telecommunication networks. Eventually we will see the use of ML algorithms to detect if a part of the RAN has been compromised and to inspect the interconnect traffic between carriers, to detect if a carrier has been compromised or is a bad actor.

Similarly, AI-enabled resource allocation holds the potential to improve the **sustainability of 5G** and BeyondG services, which will be increasingly important as users and IoT devices increase.

Given their nature, AI solutions can be best delivered through the cloud to enable CSPs to **automate network operations and service assurance, cutting costs, increasing agility and boosting subscriber experience.** For instance, integration of AI/ML into **ORAN** deployments should be strongly encouraged for large scale networks. For smaller providers, AI as a service will be a viable option that should be considered. In this context, we would recommend NTIA to consider funding pilots showcasing how AI can be used for both large and small networks.

In wireless networks, AI is also being worked on in the standards for 6G, with some work being done in 5G as well, specifically to enhance the existing air-interface and network functions. 6G will be AI native, meaning that it will provide the integration of AI from the get to, will be integrated in he design of all network components, including the radio layers, and interfacing with data collection frameworks, enabling all the benefits described above.

Other Service Providers benefits that should be considered, include:

- **Customer Lifetime Value:** applications based on Machine Learning allow operators to predict lifetime value. It's now possible to classify customer segmentation based on Customer's Age Group, VIP Status, Spend Status and Customer Length of Service.
- **Churn Prevention**: churn models aim to identify early churn signals and recognize customers with an increased likelihood of leaving voluntarily. Many machine learning algorithms are used to tackle the churning prediction problem. These methods include Artificial Neural Networks, Decision Trees learning, Regression Analysis, Logistic Regression, Support Vector Machines, Naive Bayes, Sequential Pattern Mining and Market Basket Analysis, Linear Discriminant Analysis, and Rough Set Approach.
- **Predicting Customer Experience:** telcos deal with large amounts of information, which makes it harder to extract customer insights to react to potential causes of poor customer experience. It's now possible to classify customer experiences based on data feeds, customer care calls, spatial distribution, and temporal distribution using a supervised learning approach of Restricted Random Forest.

- **Detecting Fraud:** mobile communication fraud is common since it is easy to get a subscription using fake ID and mobile terminals are not bound to physical locations. Now it is possible to detect fraudulent calls in mobile phones by analyzing the user's calling behavior using machine learning.
- **Service Fulfillment:** AI allows to predict network resources usage and allocate resources accordingly. External data such as traffic, weather, or special events can be taken into consideration. Machine Learning can be used to reconfigure networks either fully- or semi-automatically thus enabling Self-Organizing Networks (SON) and allowing for closed-loop automation.
- **Revenue Management:** operators can optimize and adjust marketing campaigns, promotions and offers based on analytics thus enabling dynamic pricing possibilities. They can discover and anticipate new trends in consumer behavior and act accordingly to launch ad-hoc offers to target specific segments. Advanced data analysis allows operators to offer enhanced personalization and tailor their services to the various needs of their customer.

Due to the above benefits, it is our view that service providers should consider further uptake and adoption of AI as a tool for building better networks, increasing efficiency and the quality of service. In addition, the recent pledge between the European Union and the United States to collaborate on research towards developing further use of AI to address major global challenges, calls for a new cause for momentum around transatlantic cooperation. A transatlantic cooperation based on common values and interests, that will allow researchers across the Atlantic to join forces and develop further societal application of AI, via working with international partners and with the aim of creating a truly global impact. [1]

[1] US, EU pledge joint pursuit of positive impact AI - Mobile World Live