

MonB5G

Solution for Sustainable and Robust 6G Networks

Dr. Engin Zeydan Project coordinator of MonB5G

Zero-touch service management and orchestration is an efficient way to automatically manage underlying communication networks without requiring human intervention.

MonB5G (acronym for Distributed management of Network Slices in beyond 5G) project is working on a new way to achieve zero touch service management and orchestration by deploying a data-driven system that relies on artificial intelligence (AI) techniques to distribute management and operational tasks across the network. This approach is designed to support the deployment of a massive number of network slices simultaneously in the network infrastructure. Network slices allow operators to divide the network into multiple virtual networks, each with its own specific requirements for different types of applications such as video streaming, online gaming, or autonomous vehicles. The MonB5G framework helps mobile network operators meet the growing demands of users and ensure that network management systems can keep pace with the increasing number of network slices. We have spoken with Dr. Engin Zeydan to find out more about the project.

Are human errors the main problems in communication networks?

Human error can be a significant problem in communication networks, but it is not necessarily the main problem. Rather, the main problem for service providers today is meeting the complex and diverse requirements of modern mobile services.

As mobile networks evolve and new services are introduced, there is a growing need for a system that can manage and orchestrate massive number of net-

work slices with different requirements and functions. To ensure this, mobile service providers need a secure and reliable automated solution for managing so many network services and reduce the reaction time in case of network faults.

This underscores the need for a new approach to mobile network management that can help significantly simplify network management tasks performed by humans and automate operational and management tasks for network service providers. The traditional centralized design of cloud computing and network functions virtualization is unable to handle this growing demand, leading to a strain on the management and orchestration system.

Is MonB5G and Artificial Intelligence the solution?

Yes, they are part of the solution. Indeed, MonB5G provides distributed AI-empowered autonomic and self-optimized management and orchestration mechanisms to reduce the traditional human-in-the-loop reaction time to sensitive service degradation and avoid human errors. The system leverages several technology enablers, including novel Key Performance Indicators (KPIs) for monitoring the performance of network slices, multi-agent deep reinforcement learning for decision making, graph-based learning for KPI prediction, and federated learning for distributed analytics to achieve low Service Level Agreement violations and identify, detect and mitigate attacks on 6G network components.

What advantages will it bring compared to what is currently available?

The MonB5G system prioritizes security and energy efficiency, ensuring that all network slices are managed in an autonomous manner which is not currently available in network operators' infrastructure. The system uses a decentralized management structure to ensure that all parts of the network are functioning properly. Because of its distributed design and use of AI-based techniques, it can adapt in real time to changing conditions and detect and mitigate against at-



Dr. Engin Zeydan, in the center, together with MonB5G research team of the Centre Tecnològic de Telecomunicacions de Catalunya (CTTC). From left to right: Farhad Rezazadeh, Luis Blanco, Engin Zeydan, Sergio Barrachina, Josep Mangues and Luca Vettori.

Dr. Engin Zeydan, is a senior researcher at Services as NetworkS (SaS) research unit at the Centre Tecnològic de Telecomunicacions de Catalunya (CTTC). He is the project coordinator of H2020 5GPPP MonB5G project funded by the European Commission, gathering efforts of 12 partners from 8 different European countries.

tacks on the network to improve security or minimize energy consumption.

The MonB5G system will enable network operators to offer a wider range of services to their customers, with a focus on adapting to new needs and delivering high-quality experiences.

So, mobile networks can become more sustainable, right?

Yes, MonB5G leverages energy-aware decision engines and techniques for radio access and edge networks to improve network infrastructure sustainability. It provides a distributed and scalable architecture. This design decision helps next-generation networks be managed more efficiently. It saves energy and shortens reaction time because decisions are made locally rather than globally.

What role does the CTTC play in the project?

CTTC is the project coordinator of the MonB5G project and provides a Beyond 5G lab environment to project partners where final proof of concept will be demonstrated. CTTC is developing its own AI-based network management algorithms and works closely with project partners to contribute to standards, generate patents and scientific publications that envision the next generation of mobile networks.

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