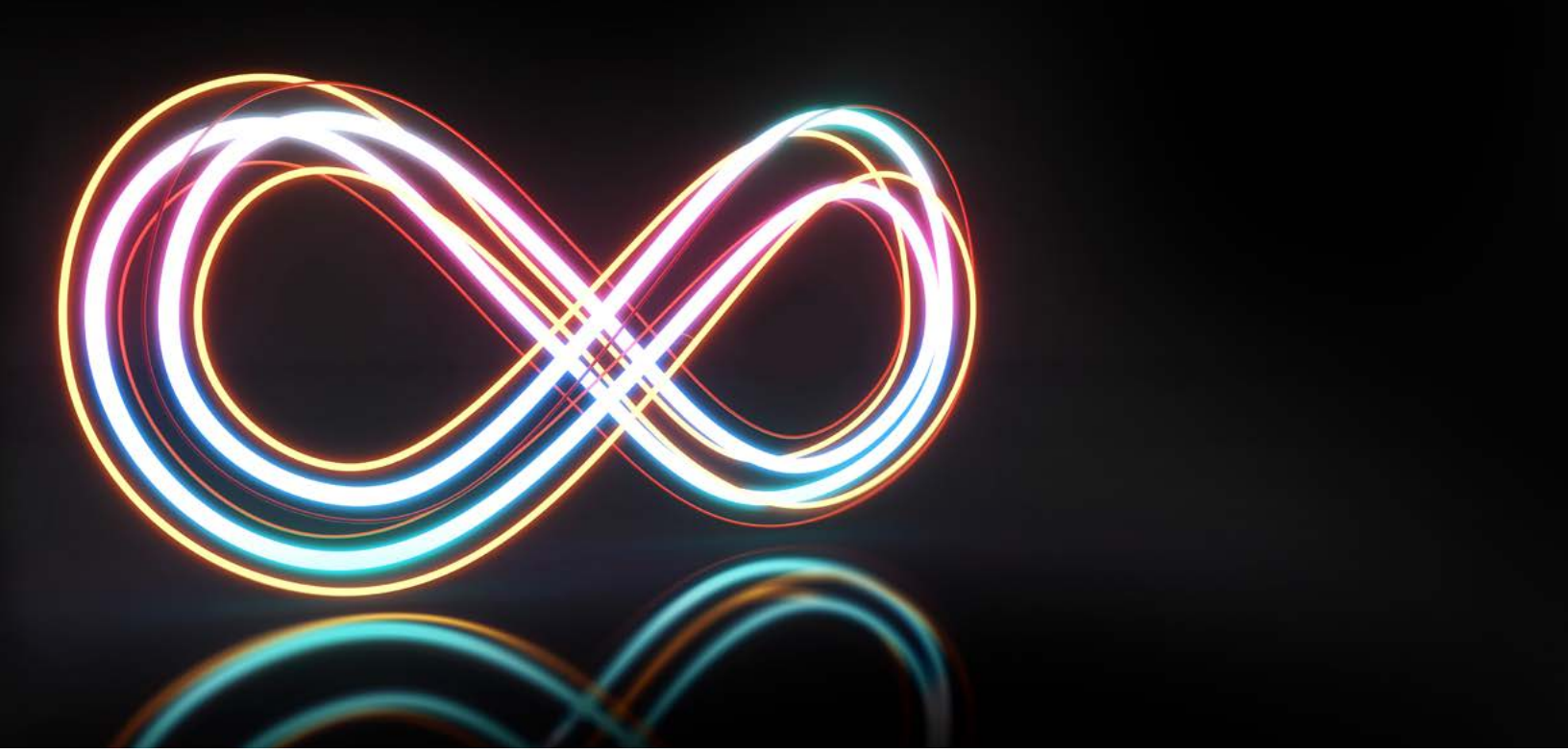

(Image courtesy of 123RF)

VIAVI SOLUTIONS ON USING AI FOR TESTING AI, AND THE ROLE OF NETWORK DIGITAL TWINS

Operators, generally, are currently (and have been for some time) going through a number of significant transformations, chief among them the shift to cloud-native 5G Standalone and the disaggregation of hardware and software in the RAN. The idea is to build out a more efficient, future-ready platform that reduces costs while creating new avenues for service delivery and monetization. Then AI hit the scene.

VIAVI Solutions CTO Sameh Yamany, in a conversation on the heels of Mobile World Congress in February, noted that the complexity of increasingly automated modern networks has already prompted automation of the vital test and measurement processes VIAVI works on with its customers.

Referencing this confluence of complexity, Yamany said, "Adding in AI and integrating AI both on the network side and the services side and the cloud side, as well as the testing side, it introduces for us challenges and opportunities." AI-enabled use cases like network optimization, monitoring and troubleshooting all rely on operators' data, he said; that data "can be fed in real time to AI systems to help improve efficiency and availability." But before that happens, it all has to be tested. In addition to working on standardized AI models and test methodologies, Yamany said VIAVI is tapping AI to test AI.

"We talk about the concept of digital twin where you can actually use AI to build and mimic real world network conditions with all this complexity and facilitate the comprehensive testing across diverse scenarios," he said. Drawing on existing data sets and developing testing frameworks results in a solution that can "find patterns, anomalies, during the testing time and enable more coverage and quickly detect defects…[AI] can immediately generate these kind of 'what if" scenarios that we didn't see…or we never thought of before." In this sense, it's "AI testing AI."

As part of VIAVI's programmatic 6G research program, and in cooperation with Northeasterm University's Institute for Wireless Internet of Things and the Open6G research center, the company recently discussed work on a city-scale digital twin of a 6G network. This would support AI-based radio frequency propagation and channel modeling. One goal is incorporating higher-layer KPIs in the digital twin to accurately simulate how variability in network conditions impacts application performance.

Another aspect is testing neural receivers which VIAVI is doing using a unit developed in-house using open source libraries and proprietary data for the transceiver architecture. The company described it as follows: "The base station employs an AI-aided constellation design, where the modulation block is replaced with a neural network to design a customer constellation for the receiver. The…neural receiver is generalizable over various channel models and modulations, delay and Doppler, signal-to-noise ratio and other conditions, which is vital for deployment in practical systems."

VIAVI's Ian Wong said the work with Northeastern "has led to breakthroughs in the use of AI/ML for radio propagation modeling. We believe this research is critical in enabling large-scale network digital twins, which VIAVI is well-poised to deliver given our leading network emulation solutions in the lab and network monitoring and optimization solutions in the field, gathering data from actual operator networks."

Big picture, Yamany said, "Telcos are trying to explore how AI-driven solutions can optimize these network and edge resources and also offer applications specifically for AI-hungry… services and support innovative use cases. I think the integration of AI technology is enabling today a lot of telecom operators to address complex challenges, improve operational efficiency, and deliver innovative services for their customers. Everyone understands the value of AI right now. It's a buzzword but, at the same time, we're seeing good examples of how AI can help the network in general."

SAMEH YAMANY
Chief Technology Officer
VIAVI Solutions

IAN WONG
Director of RF and Wireless Architecture, CTO Office
VIAVI Solutions