AI can accelerate the development of the 5G network

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Developers of the 5G mobile network can now get help from artificial

intelligence (AI). A thesis from Umeå University shows new machine learning methods that provide faster troubleshooting and better understanding of the mobile network.

Tobias Sundqvist, industrial doctoral student at the Department of Computing Science, has developed new machine learning methods that learn how the mobile network behaves based on troubleshooting information that software developers analyze daily. The new methods can quickly find errors and help understand what goes on in large distributed systems.

Having worked as a developer in telecom for over 20 years, Tobias Sundqvist felt that developers were not getting the support they needed to troubleshoot the huge amounts of data produced by the Radio Access Network (RAN). He then decided to take matters into his own hands, and together with Umeå University and the company Tietoevry, he set out to develop new methods to analyze the behavior of the RAN.

Mobile network is growing rapidly

"The use of mobile phones has exploded in the last ten years and the mobile network has evolved at the same pace. In the past, the RAN software was concentrated in single applications and had far fewer features. Today, a distributed microservice architecture is used and thousands of engineers update the software with new features every day. Nevertheless, developers analyze the system in almost the same way as when the mobile phone was first launched," says Tobias Sundqvist.

What we as developers used to need hours or weeks to analyze, AI can now do within a few seconds.

When something goes wrong in the RAN, developers may have to spend weeks analyzing logs to identify possible errors. Tobias Sundqvist

believes that there is now finally a light at the end of the long troubleshooting tunnel.

"What we as developers used to need hours or weeks to analyze, AI can now do within a few seconds. The methods I have developed can quickly find deviations in the huge logs but also help to understand what is happening in the RAN," says Tobias Sundqvist.

Important to understand how AI can help

Today, the developers themselves select the information that can be used for troubleshooting and it is only intended to be read by humans. With thousands of engineers involved in software development, the information will be in different formats in the different parts of the RAN.

"This complicates the ability to analyze the information. We have shown the huge gains that could be made in troubleshooting by following a more general structure. The developers can then get help from machine learning methods to follow what is happening in the system and get help to identify what is an anomalous behavior."

Previous research has mainly focused on how machine learning can help optimize the RAN or find anomalies in the metrics collected. Tobias Sundqvist now takes it a step further by analyzing the RAN behavior in the system logs that have so far been intended for humans. In this way, developers can now more quickly find the many errors hidden in the RAN and accelerate the development of future mobile networks.

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