

## News &amp; Comments

# Federated Learning of Explainable AI Models in 6G Systems: Towards Secure and Automated Vehicle Networking

*Suraksha Pandey*

The market for artificial intelligence (AI), which includes machine learning (ML) as one of its fundamental building blocks, is expanding quickly. This technology will not only make use of modern communication networks but also influence how next-generation networks are defined. A wide range of applications, including the design, operation, and management of future beyond-5G (B5G)/6G networks, are anticipated to significantly benefit from AI. In this paper, we anticipate the usage of the federated learning (FL) concept applied in conjunction with XAI models and analyse its relevance to automated vehicle networking use cases that will be found in B5G/6G deployments, considering the obstacles. The federated averaging protocol (FedAvg), which enables collaborative Stochastic Gradient Descent (SGD) optimization in a federated manner, served as an inspiration for most of the work on FL's model aggregation technique. As a result, FL has been thoroughly examined for models that use SGD as their optimization method, such as Neural Networks (NNs), but it has not yet been sufficiently researched in the context of models that are intrinsically explicable.

The following factors are ignored by current AI-based solutions for wireless network planning, design, and operation: (i) the requirement to always protect data privacy, including wireless transfer and storage; and (ii) the explainability of the relevant models. The application's goal is to use XAI models that have been learned (and updated) in a federated manner based on QoS/QoE data to forecast the QoE experienced by UEs soon. Notably, it has recently been demonstrated that highly interpretable tree-based models can perform competitively in this challenge. Real data must be fed into AI-based algorithms and gathering real-time measurements from the MNO network is essential for the output's dependability. UE measurements are geolocated if a Global Positioning System (GPS) receiver is installed, enabling the collection of anonymous data for statistical analysis. Different colours are provided for the actual radio coverage map of various cells in the 1800 MHz frequency band. This article's goal was to present a thorough picture of 6G networks with AI that will be extraordinarily high performance, intelligent, and reliable by design, with a focus on automated vehicle networking. The FED-XAI concept, which suggests federated learning of XAI models, has been introduced. By fostering end users' trust in in-network AI functionality, the FED-XAI idea, when implemented in advanced 5G systems moving toward 6G, is anticipated to enhance the user experience of the communication services provided.

Source: [Information](#)



**KEYWORDS**

Explainable artificial intelligence, federated learning, 6G, vehicle-to-everything (V2X), quality of service

