

# The Role of AI in Device Modeling and Characterization

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## ABSTRACT

AI usage in device modeling and characterization is becoming more prevalent and research in the area has increased. Artificial Neural Network (ANN) and Deep Learning (DL) techniques have enabled quick and accurate extraction in noise, DC, small-signal and large-signal fitting to data in the modeling of the state-of-the-art technologies such as Gallium Nitride. AI-based characterization and process-monitoring techniques have also been introduced for improved efficiency and accuracy. However, AI techniques are not perfect and remain at their initial stages and further investigations and improvements are needed for them to become mainstream.

I will begin by comparing AI with commonly used terms such as Data Science and Machine Learning and will follow that with an overview of current AI methods. This will include examples of AI usage in DC and small-signal modeling and characterization. I will also point out the increasing usage of ANN as a modeling tool in common EDA platforms such as Keysight Advanced Design System (ADS) and the use of open-source Machine Learning (ML) platforms for creating Deep Neural Network (DNN). I will conclude by providing insights into what could be happening in the future.