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Review of Machine Learning Techniques That Enable Network Slicing in Open RAN

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The evolution of 5G networks and the anticipated capabilities of 6G have placed significant emphasis on intelligent Radio Access Network (RAN) slicing to meet the diverse and stringent requirements of services such as enhanced mobile broadband (eMBB), ultra-reliable low-latency communications (URLLC), and massive machine-type communications (mMTC). This paper reviews state-of-the-art techniques, with a particular focus on the application of machine learning (ML) approaches in RAN slicing. The study categorises ML algorithms based on their primary functions: time series networks for traffic prediction, federated learning for security and privacy, supervised learning for slice admission control, and reinforcement learning for resource allocation and management. It also highlights the complementary nature of these techniques, as demonstrated by hybrid models such as federated deep RL and LSTM-integrated distributed deep RL.