**Abstract**

**Introduction:**

The fifth-generation (5G) mobile networks are expected to revolutionize wireless communication networks by delivering faster data rates, lower latency, and better network flexibility. However, to enable 5G's full potential, a new network architecture is needed, which is called Open Radio Access Network (Open RAN) technology. This technology involves separating the radio access network (RAN) into different components that can be developed independently by different vendors, promoting interoperability and competition.

Simulation environments are crucial for testing and developing 5G Open RAN systems, enabling researchers and practitioners to evaluate the network's performance and identify potential issues. However, with the increased complexity of 5G Open RAN systems, choosing an appropriate simulation environment becomes a challenging task. Therefore, this research paper evaluates different simulation environments for 5G Open RAN technology and provides insights into their strengths and weaknesses.

The paper is structured as follows: Section 2 provides background information on 5G Open RAN technology and simulation environments. Section 3 describes the methodology used to evaluate the simulation environments. Section 4 presents the results of the evaluation. Section 5 discusses the implications of the results and provides recommendations for future research.

SMO-Framework

rApps

R1 interface

Non-RT RIC Framework

A1 interface

Near-RT RIC

Data Management and exposure function

AI/ML Workflow functions

External terminations

R1 termination

R1 service management and exposure functions

A1 related functions

A1 Termination

Other Non-RT RIC framework functions

Functions that enable rApps