Smarter technology for all

3GPP TSG RAN Meeting #93e
Electronic Meeting, September 13-17, 2021

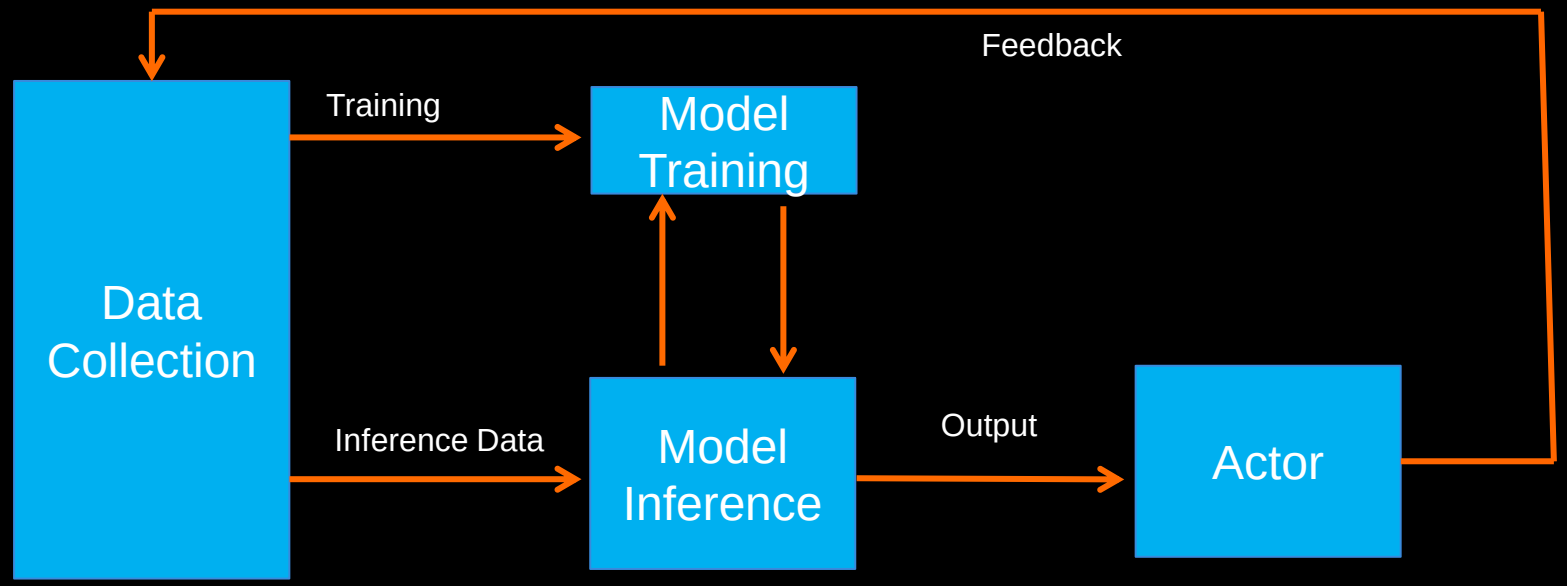
RP-212087

Agenda Item: 9.0.4
Source: Lenovo, Motorola Mobility
Document for: Discussion

Discussion on NG-RAN Evolution for AI/ML in Rel-18

2021 Lenovo. All rights reserved.

AI enabled RAN in Rel-17



Functional Framework for RAN Intelligence in TR 37.817

In Release 17, the study item of study on enhancement for data collection for NR and ENDC are mainly focusing on using AI technology to improve 5G network performance for some certain use cases e.g. ***energy saving****,* ***load balancing, traffic steering/mobility optimization****.*

Lenovo 2021 Lenovo. All rights reserved.

New use cases of AI enabled RAN in Rel-18

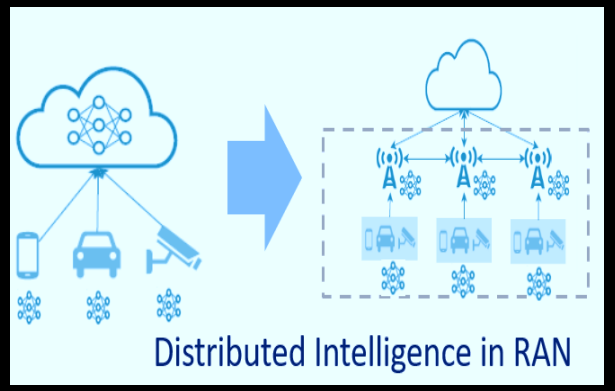
- For Rel-17 ongoing study item, three use cases are prioritized: energy saving, load balancing, and mobility optimization. A R18 WI on AI/ML for NG-RAN should be pursued that is to do normative work for use cases which had conclusion in Rel-17.
- In addition, there are other high-layer use cases that are deprioritized or not included in Rel-17 study: e.g. AI/ML for network slicing, QoE optimization, IAB and etc. It is beneficial to further study the new high-layer use cases.

In Release 18, the study of new high-layer use cases*,* ***e.g. AI/ML for network slicing, QoE optimization, IAB****, should be continued****.***

Lenovo 2021 Lenovo. All rights reserved.

Enable Distributed AI/ML Operation in NG-RAN

- Distributed intelligence in NG-RAN node facilitates AI based services such as intelligent sensing, mobile XR and autonomous driving with AI/ML functionalities deployed among UEs and different RAN nodes in a distributed way. In TR 22.874, many use cases have been studied by SA for 5G system to better support distributed AI/ML operations among UEs and cloud/edge servers such as:
  - Split AI/ML operation between AI/ML endpoints
  - AI/ML model/data distribution and sharing over 5G system
  - Distributed/Federated Learning over 5G system



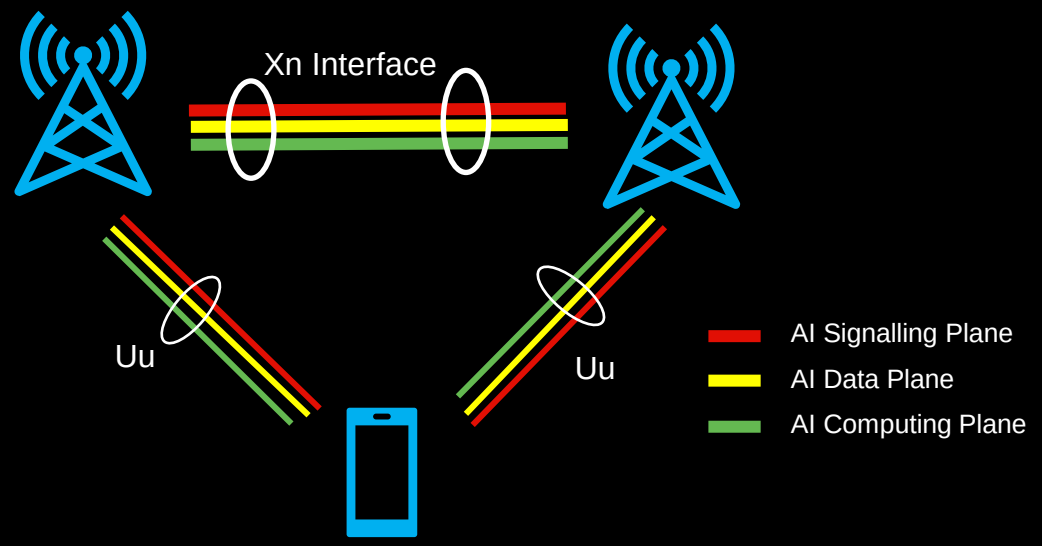
- If we consider the scenario of dense RAN node deployment, distributed AI/ML operation among different RAN nodes and UE devices would be beneficial to improve the AI/ML efficiency, for example:
  - The key factors of intelligence including data, computing power and AI working flow are distributed located in different RAN nodes and/or devices.
  - For a certain AI task, data sharing, computing offloading and learning model sharing among devices and RAN nodes will play a great role in bringing immersive experiences for users.

Distributed AI/ML operation among different RAN nodes and UE devices is beneficial to improve the AI/ML efficiency.

Lenovo 2021 Lenovo. All rights reserved.

Potential Objectives

- For Rel-18, the potential study area regarding NG-RAN evolution for AI/ML:
  - Study and identify the benefits and standardization impacts for new use cases of AI enabled NG-RAN that may include AI/ML for slicing, QoE, IAB and etc.
  - Study distributed AI/ML operation among different RAN nodes and UE devices to improve the AI/ML efficiency including:
    - Study Model management procedures for AI/ML model distributing/update among RAN nodes (and UE);
    - Study Data management procedures for data sharing with security and privacy among RAN nodes (and UE).



Lenovo 2021 Lenovo. All rights reserved.

thanks.

Smarter technology for all

Lenovo