3GPP TSG-RAN WG3#125bis R3-245683

Hefei, China, 14-18 October 2024

Agenda Item: 8.1

Source: ZTE Corporation

Title: Summary of Discussion on CB: #AI/ML\_Training

Document for: Discussions & Approval

# Introduction

**CB: # 1\_AI/ML-Training**

**- Whether to send LS to SA5 on the meaning of AI/ML training? Any spec updates needed?**

(moderator - ZTE)

Summary of offline disc [R3-245683](file:///D:\3GPP\TSGR3_125-bis\TSGR3_125-bis\Inbox\CB%23%20Term\Inbox\R3-245683.zip)

# For Chairman’s notes

<TBD>

# 3 Discussion

## 3.1 Model testing

In the TR37.817 (RAN3 TR), the definition of the AI/ML model training is described below:

*Model Training is a function that performs the AI/ML model training, validation, and testing which may generate model performance metrics as part of the model testing procedure.*

In the Section 3 “Term” in the TS28.105 (SA5 Spec), the definition of the ML training is described below:

***ML model training:*** *a process performed by an ML training function to take training data, run it through an ML model algorithm, derive the associated loss and adjust the parameterization of that ML model iteratively based on the computed loss and generate the trained ML model.*

In the Section 4a “AI/ML management functionality and service framework” in the TS28.105 (SA5 Spec), ML model training and ML model testing is described below:

## *4a.0 ML model lifecycle*

*AI/ML techniques are widely used in 5GS (including 5GC, NG-RAN, and management system), the generic AI/ML operational workflow in the lifecycle of an ML model, is depicted in Figure 4a.0-1.*

**

*Figure 4a.0-1: ML model lifecycle*

*The ML model lifecycle includes training, emulation, deployment, and inference. These steps are briefly described below:*

***- ML model training:*** *training, including initial training and re-training, of an ML model or a group of ML models. It also includes validation of the ML model to evaluate the performance when the ML model performs on the training data and validation data. If the validation result does not meet the expectation (e.g., the variance is not acceptable), the ML model needs to be re-trained.*

***- ML model testing:*** *testing of a validated ML model to evaluate the performance of the trained ML model when it performs on testing data. If the testing result meets the expectations, the ML model may proceed to the next step If the testing result does not meet the expectations, the ML model needs to be re-trained.*

During the online session, several companies proposed updating our specification to further clarify the definition of AI/ML model training, e.g., mentioning “ML model testing” in the specification.

**Question 1**: Companies are invited to share their views on whether it is necessary to explicitly mention "ML model testing" in our specification.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | No | Model testing is a part of model training. From a technical perspective, during ML model training, the dataset is typically divided into a training set, validation set, and testing set. Only when the model successfully passes the testing phase is it considered well-trained and ready for deployment. In RAN3, it has been acknowledged that the process of AI/ML algorithms is out of scope. Therefore, we do not believe it is essential to include details of the ML model training process in our specification, as it relates to AI/ML model implementation.  Moreover, ML model testing, as described in SA5, is part of Lifecycle Management (LCM). RAN3 has not discussed LCM, and introducing model testing could lead to further discussions in RAN3 regarding 'model inference evaluation' and other related topics. |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 2**: If yes, companies are invited to share their views how to explicitly mention "ML model testing" in our specification.

* Option 1: Update references: AI/ML Model Training: comprises of “ML model training” and “ML model testing” as specified in clause 3.1 of TS 28.105.
* Option 2: Add the Note for ML model testing, e.g. AI/ML Model Inference is performed after the AI/ML model is well-trained. (Can be modified much better).

|  |  |  |
| --- | --- | --- |
| Company | Option 1 or Option 2 | Comments |
| ZTE | Not needed |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 3**: If we update something in our RAN3 specification, do we need to send LS to SA5 to inform them about our updates.

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| ZTE | Not needed |  |
|  |  |  |
|  |  |  |
|  |  |  |