

Qualcomm

3GPP TSG RAN meeting #93e
Electronic meeting, Sept. 13-17, 2021
A.I. 9.0.4

RP-212371

Views on AIML for NG-RAN for Rel-18



Background

- Based on pre-plenary email discussion, the moderator proposed the following conclusions
 - Possible project structure for AI/ML related projects in Rel-18, including **AI/ML for NG-RAN** and AI/ML for Air-Interface
 - For a candidate Rel-18 SI on AI/ML for Air-Interface, the following areas have been discussed at length and we have a much better understanding now which will be helpful for the drafting of a potential SID:
 - Use cases of interest
 - Evaluation methodology and KPIs
 - UE and Network involvement including various degrees of collaboration between participating nodes
- The scope of AI/ML for NG-RAN was not fully discussed by the email discussion

Project structure for AI/ML related projects in Rel-18

- We propose to have the following study for Rel-18 RAN AI/ML.
- Following focusses on RAN3 parts (#1 and #3)

	Temporary title	SI/WI	Primary WG	Secondary WGs	Notes
1	AI/ML for NGRAN	WI	RAN3	RAN2	Based on the outcome of RAN3-led Rel-17 SI <i>FS_NR_ENDC_data_collect</i>
2	AI/ML for Air-Interface	SI	RAN1	RAN2, RAN4	SI for entire Rel-18 timeframe focusing on limited identified use cases
3	Additional Use Cases for AI/ML for NG-RAN	SI	RAN3		Study of additional higher layer use cases and further architecture and framework enhancement

R18 Work Item: AI/ML for NG-RAN

- The conclusion of R17 AI/ML study by RAN3 should be used as base for R18 AI/ML work item
- Expected conclusion of R17 study
 - Data collection enhancements for the three use cases: network energy saving, load balancing and mobility optimization
 - Inter-node information enhancements for AI/ML model output of the three use cases
 - Performance monitoring of AI/ML based solutions.
- R18 work item should also include general purpose basic procedures:
 - Model management procedures, e.g. model configuration, model update, model activation/deactivation, model training, model/analytics querying
 - Data management procedures, e.g. data request/subscription, data/event reporting, data querying.

R18 study item: AI/ML for NG-RAN

- In addition, R18 should study architecture enhancements for AI/ML, including
 - Network entities and interfaces for model training/inference, data management, model management
 - Procedures for online training and federated learning
 - Procedures for inference configuration
- R18 should continue the use case study
 - If possible, some standardized neural network functions like $Y = F(X)$ can be defined based on the use case study
 - The AI/ML model supporting the neural network function should be up to implementation.

Summary

- **Proposal 1: R18 work item of AI/ML for NG-RAN is based on conclusion of R17 study item**
 - Expected conclusions
 - **Data collection enhancements:** for the three use cases: network energy saving, load balancing and mobility optimization
 - **Inter-node information enhancements:** for AI/ML model output and enforcement for the three use cases
 - **Performance monitoring:** for the AI/ML based solutions.
- **Proposal 2: R18 work item includes general purpose basic procedures**
 - **Model management procedures:** e.g. model configuration, model update, model activation/deactivation, model training, model/analytics querying
 - **Data management procedures:** e.g. data request/subscription, data/event reporting, data querying.
- **Proposal 3: R18 should study architecture enhancements for AI/ML**
- **Proposal 4: R18 should continue the use case study**



Thank you

Follow us on: **f**  **in** 

For more information, visit us at:

www.qualcomm.com & www.qualcomm.com/blog

Nothing in these materials is an offer to sell any of the components or devices referenced herein.

©2018 Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved.

Qualcomm is a trademark of Qualcomm Incorporated, registered in the United States and other countries. Other products and brand names may be trademarks or registered trademarks of their respective owners.

References in this presentation to “Qualcomm” may mean Qualcomm Incorporated, Qualcomm Technologies, Inc., and/or other subsidiaries or business units within the Qualcomm corporate structure, as applicable. Qualcomm Incorporated includes Qualcomm’s licensing business, QTL, and the vast majority of its patent portfolio. Qualcomm Technologies, Inc., a wholly-owned subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of Qualcomm’s engineering, research and development functions, and substantially all of its product and services businesses, including its semiconductor business, QCT.