



RWS-230098

Views on Rel-19 AI/ML Enhancement

Agenda Item: 5

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Document for: Discussion for decision

Background – Use cases studied in Rel-18

AI/ML based CSI

- CSI compression (2-side model)
- CSI prediction (UE-side model)

AI/ML based BM

- Spatial-domain beam prediction (NW-side model and UE-side model)
- Temporal beam prediction (NW-side model and UE-side model)

Positioning

- Direct positioning (NW-side model and UE-side model)
- AI/ML assisted positioning (NW-side model and UE-side model)

ML based CSI

Motivation

- Certain performance gain has been observed for ML based CSI compression and CSI prediction (UE side model) in Rel-18
- Potential spec impacts for CSI compression have been studied in Rel-18
 - Spec impact on model transfer has not been well studied
- Spec impacts for CSI prediction have not been well studied in Rel-18

Proposal

- Study, and if needed, specify the enhancement of CSI measurement, CSI report configuration, CSI report procedure and functionality based LCM for AI/ML based CSI compression
- Specify the CSI report with UE-side model based CSI dwelling time prediction
 - UE can report the predicted CSI dwelling time as a reference for the gNB to decide the CSI report triggering scheme

ML based BM

Motivation

- Performance benefit has been observed for ML based spatial-domain and temporal beam prediction
 - It can reduce the power consumption in UE side and reduce the latency for beam report
 - AI/ML based beam prediction rely on measurement results for a set of beams, which may be in very low SINR.
- Current spec supports NW-side spatial-domain beam prediction

Proposal

- Spatial-domain beam prediction
 - Specify the SSB/CSI-RS repetition to improve the measurement accuracy
 - Specify beam-codebook based beam report for UE-side model
- Temporal beam prediction
 - Specify the TCI/Spatial relation info activation/indication enhancement with temporal beam prediction and ACK/NACK enhancement
 - ACK/NACK indicating whether the predicted beam outperforms current beam

ML based Positioning

Motivation

- Performance gain has been observed for ML based positioning
- AI/ML based positioning can provide benefit based on existing spec
- Ground-truth label is hard to be acquired, which may also cause privacy issue

Proposal

- Study and if needed, specify the ML based positioning with NW-side model
 - Study and if needed, specify the CIR and L1-SINR report based on PRS

Conclusion

- Proposal 1 (CSI compression): Study, and if needed, specify the enhancement of CSI measurement, CSI report configuration, CSI report procedure and functionality based LCM for AI/ML based CSI compression
- Proposal 2 (CSI prediction): Specify the CSI report with UE-side model based CSI dwelling time prediction
 - UE can report the predicted CSI dwelling time as a reference for the gNB to decide the CSI report triggering scheme
- Proposal 3 (Spatial-domain beam prediction): Specify beam measurement and report enhancement for spatial-domain beam prediction based on UE-side model
 - Specify the SSB/CSI-RS repetition to improve the measurement accuracy
 - Specify beam-codebook based beam report for UE-side model

Conclusion (Cont'd)

- Proposal 4 (Temporal beam prediction): Specify beam indication enhancement with AI/ML based temporal beam prediction based on both Rel-16 TCI framework and Rel-17 unified TCI framework
 - Specify the TCI/Spatial relation info activation/indication enhancement with temporal beam prediction and ACK/NACK enhancement indicating whether the predicted beam outperforms current beam
- Proposal 5 (Direct positioning): Study and if needed, specify the AI/ML based direct positioning with NW-side model
 - Study, and if needed, specify the CIR and L1-SINR report based on PRS