

Machine Learning Driven Wireless Communications Research by Prof. Brian L. Evans' Group at UT Austin

ESPL	1. Band Switching	2. Packetized Voice Power Control	3. Downlink Coordinated Multipoint Improvement	4. Self-Organizing Network Alarm Operations	5. Joint Beamforming, Power Control and Interference Coord.
Carrier Frequency	mmWave sub-6 GHz	sub-6 GHz	sub-6 GHz	sub-6 GHz	mmWave sub-6 GHz
Stack Layer	Radio Resource Management	Physical	Physical	Radio Resource Management	Physical
Algorithm	XGBoost and Deep NN	Tabular Q-Learning	Deep NN and SVM classifiers	Deep Q-Learning	Deep Q-Learning
Direction	Downlink	Downlink	Downlink	Downlink	Downlink
User	Multi	Multi	Multi	Multi	Multi

Related Publications by the Embedded Signal Processing Laboratory (ESPL) Under the Direction of Prof. Brian L. Evans in the Wireless Networking and Communications Group

1. Improvement in Handover Success Rates and Data Rates

Faris B. Mismar and Brian L. Evans, "Partially Blind Handovers for mmWave New Radio Aided by Sub-6 GHz LTE Signaling," Proc. IEEE ICC Workshops, May 2018.

Faris B. Mismar, Ahmad AlAmmouri, Ahmed Alkhateeb, Jeffrey G. Andrews, Brian L. Evans, "Deep Learning Predictive Band Switching in Wireless Networks", IEEE Trans. Wireless Comm., submitted.

2. Packetized Voice Power Control

Faris B. Mismar and Brian L. Evans, "Q-Learning Algorithm for VoLTE Closed-Loop Power Control in Indoor Small Cells," Proc. Asilomar Conf. on Signals, Systems, and Computers, Oct. 2018.

Faris B. Mismar, Jinseok Choi, and Brian L. Evans, "A Framework for Automated Cellular Network Tuning with Reinforcement Learning," IEEE Trans. Communications, vol. 67, no. 10, pp 7152-7167, C

3. Downlink Coordinated Multipoint

Faris B. Mismar and Brian L. Evans, "Deep Learning in Downlink Coordinated Multipoint in New Radio Heterogeneous Networks," IEEE Wireless Comm. Letters, vol 8, no 4, pp 1040-1043, Aug. 2019.

Faris B. Mismar and Brian L. Evans, "Machine Learning in Downlink Coordinated Multipoint in New Radio Heterogeneous Networks," Technical Report, Aug. 2016.

4. Self-Organizing Networks

Faris B. Mismar and Brian L. Evans, "Deep Q-Learning for Self-Organizing Networks Fault Management and Radio Performance Improvement," Proc. Asilomar Conf. Sig., Sys., Comp, Oct. 2018.

Faris B. Mismar, Jinseok Choi, and Brian L. Evans, "A Framework for Automated Cellular Network Tuning with Reinforcement Learning," IEEE Trans. Communications, vol. 67, no. 10, pp 7152-7167, C

5. Joint Beamforming, Power Control and Interference Coordination

Faris B. Mismar, Brian L. Evans, Ahmed Alkhateeb, "Deep Reinforcement Learning for 5G Networks: Joint Beamforming, Power Control, and Interference Coordination," IEEE Trans. Comm., submitted.

Acronyms: NN Neural Network SVM Support Vector Machine XGBoost Extreme Gradient Boost

