

## References

- [1] F. C. L. Guevara, “The role of 5g technologies: Challenges in smart cities and intelligent transportation systems,” *Sustainability*, August 2020. doi: 10.3390/su12166469
- [2] D. T. Ngo, D. H. N. Nguyen, and T. Le-Ngoc, “Chapter 6 - intercell interference coordination: Towards a greener cellular network\*\*this work is supported in part by the natural science and engineering research council of canada (nserc) through strategic and discovery grants, the alexander graham bell canada graduate scholarship for doctoral studies (cgs-d), and the mcgill engineering doctoral award (meda).” in *Handbook of Green Information and Communication Systems*, M. S. Obaidat, A. Anpalagan, and I. Woungang, Eds. Academic Press, 2013, pp. 147–182. ISBN 978-0-12-415844-3. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/B9780124158443000061>
- [3] M. Olofsson, *Introduction to Digital Communication*. Linköping, Sweden: Linköpings Insitute of Technology, August 2011. ISBN 0128143231
- [4] 3GPP, “Study on channel model for frequencies from 0.5 to 100 ghz,” Tech. Rep., December 2019. [Online]. Available: <https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3173>
- [5] A. Dertat, “Applied deep learning - part 3: Autoencoders,” 2017. [Online]. Available: <https://towardsdatascience.com/applied-deep-learning-part-3-autoencoders-1c083af4d798#f686>
- [6] S. Paul, ““reparameterization” trick in variational autoencoders,” 2020. [Online]. Available: <https://towardsdatascience.com/reparameterization-trick-126062cfd3c3>

- [7] E. Dahlman, S. Parkvall, and J. Skold, *5G NR: The Next Generation Wireless Access Technology*, 1st ed. USA: Academic Press, Inc., 2018. ISBN 0128143231
- [8] A. Z. M. H. C. Kuhlins, B. Rathonyi, "Cellular networks for massive iot," Tech. Rep. Uen 284 23-3278, January 2020. [Online]. Available: <https://www.ericsson.com/en/reports-and-papers/white-papers/cellular-networks-for-massive-iot--enabling-low-power-wide-area-applications>
- [9] F. R. C. H. D. P. M. A. R. F. Moreno-Cruz, V.T. López, "Use of low-cost printed sensors with rf energy harvesting for iot," April 2019.
- [10] E. O. I. G.-Z. A. Perallos, U Hernandez-Jayo, *Intelligent Transport Systems*. John Wiley Sons, 2016.
- [11] I. Vision, "Framework and overall objectives of the future development of imt for 2020 and beyond," *International Telecommunication Union (ITU), Document, Radiocommunication Study Groups*, 2015.
- [12] "How enterprises can exploit the exposure capabilities of private 5g network," <https://www.ericsson.com/en/blog/2020/7/private-5g-network-capabilities-enterprise>, accessed: 2021-03-09.
- [13] S. Sevgican, M. Turan, K. Gökarslan, H. B. Yilmaz, and T. Tugcu, "Intelligent network data analytics function in 5g cellular networks using machine learning," *Journal of Communications and Networks*, vol. 22, pp. 269–280, 06 2020. doi: 10.1109/JCN.2020.000019
- [14] L. Barona, J. Maestre Vidal, and L. Villalba, "An approach to data analysis in 5g networks," *Entropy*, vol. 19, p. 74, 02 2017. doi: 10.3390/e19020074
- [15] F. B. Mismar, B. L. Evans, and A. Alkhateeb, "Deep reinforcement learning for 5g networks: Joint beamforming, power control, and interference coordination," *CoRR*, vol. abs/1907.00123, 2019. [Online]. Available: <http://arxiv.org/abs/1907.00123>
- [16] G. K. Qing He, György Dán, "Semi-persistent scheduling for 5g downlink based on short-term traffic prediction," *Proc. of IEEE GlobeCom*, December 2020.
- [17] F. S. D. Dardari, E. Falletti, *Satelite and Terrestrial Radio Positioning Techniques*. Elsevier Ltd., 2012.

- [18] H. T. Sencar, M. Ramkumar, and A. N. Akansu, "Chapter 4 - type i (linear) data hiding," in *Data Hiding Fundamentals and Applications*, H. T. Sencar, M. Ramkumar, and A. N. Akansu, Eds. Burlington: Academic Press, 2004, pp. 49–77. ISBN 978-0-12-047144-7. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/B9780120471447500042>
- [19] A. I. Pérez-Neira and M. R. Campalans, "Chapter 8 - orthogonal frequency division multiplexing," in *Cross-Layer Resource Allocation in Wireless Communications*, A. I. Pérez-Neira and M. R. Campalans, Eds. Oxford: Academic Press, 2009, pp. 151–162. ISBN 978-0-12-374141-7. [Online]. Available: <https://www.sciencedirect.com/science/article/pii/B9780123741417000087>
- [20] R. B. Ertel, P. Cardieri, K. W. Sowerby, T. S. Rappaport, and J. H. Reed, "Overview of spatial channel models for antenna array communication systems," *IEEE Personal Communications*, vol. 5, no. 1, pp. 10–22, 1998. doi: 10.1109/98.656151
- [21] 3GPP, "Study on 3d channel model for lte," Tech. Rep., December 2017. [Online]. Available: <https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=2574>
- [22] S. Aldossari and K.-C. Chen, "Machine learning for wireless communication channel modeling: An overview," *Wireless Personal Communications*, vol. 106, 05 2019. doi: 10.1007/s11277-019-06275-4
- [23] D. Neumann, T. Wiese, and W. Utschick, "Learning the mmse channel estimator," *IEEE Transactions on Signal Processing*, p. 1–1, 2018. doi: 10.1109/tsp.2018.2799164. [Online]. Available: <http://dx.doi.org/10.1109/TSP.2018.2799164>
- [24] 3GPP, "Technical specification group radio access network;spatial channel model for multiple input multiple output (mimo) simulations," Tech. Rep., September 2014.
- [25] I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*. MIT Press, 2016, <http://www.deeplearningbook.org>.
- [26] Y. Lecun, *PhD thesis: Modeles connexionnistes de l'apprentissage (connectionist learning models)*. Universite P. et M. Curie (Paris 6), Jun. 1987.

- [27] H. Bourlard and Y. Kamp, "Auto-association by multilayer perceptrons and singular value decomposition," *Biological cybernetics*, vol. 59, pp. 291–4, 02 1988. doi: 10.1007/BF00332918
- [28] G. E. Hinton and R. S. Zemel, "Autoencoders, minimum description length, and helmholtz free energy," *Advances in neural information processing systems*, vol. 6, pp. 3–10, 1994.
- [29] D. P. Kingma and M. Welling, "Auto-encoding variational bayes," 2014.
- [30] D. J. Rezende, S. Mohamed, and D. Wierstra, "Stochastic backpropagation and approximate inference in deep generative models," 2014.
- [31] L. Theis, A. van den Oord, and M. Bethge, "A note on the evaluation of generative models," 2016.
- [32] I. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. Warde-Farley, S. Ozair, A. C. Courville, and Y. Bengio, "Generative adversarial nets," in *NIPS*, 2014.
- [33] M. Mirza and S. Osindero, "Conditional generative adversarial nets," *CoRR*, vol. abs/1411.1784, 2014. [Online]. Available: <http://arxiv.org/abs/1411.1784>
- [34] M. Lee and J. Seok, "Controllable generative adversarial network," 2019.
- [35] <https://www.tensorflow.org/>.
- [36] [https://matplotlib.org/stable/api/\\_as\\_gen/matplotlib.pyplot.html](https://matplotlib.org/stable/api/_as_gen/matplotlib.pyplot.html).
- [37] J. Chou, "Generated loss and augmented training of MNIST VAE," *CoRR*, vol. abs/1904.10937, 2019. [Online]. Available: <http://arxiv.org/abs/1904.10937>
- [38] S. G. PATRO and K. K. Sahu, "Normalization: A preprocessing stage," *IARJSET*, 03 2015. doi: 10.17148/IARJSET.2015.2305
- [39] [https://www.tensorflow.org/api\\_docs/python/tf/nn/softmax\\_cross\\_entropy\\_with\\_logits](https://www.tensorflow.org/api_docs/python/tf/nn/softmax_cross_entropy_with_logits).
- [40] <https://www.tensorflow.org/tutorials/generative/cvae>.

- [41] I. Gulrajani, K. Kumar, F. Ahmed, A. A. Taiga, F. Visin, D. Vazquez, and A. Courville, “Pixelvae: A latent variable model for natural images,” 2016.
- [42] D. P. Kingma, T. Salimans, R. Jozefowicz, X. Chen, I. Sutskever, and M. Welling, “Improved variational inference with inverse autoregressive flow,” 2016. [Online]. Available: <https://proceedings.neurips.cc/paper/2016/file/ddeebdeefdb7e7e7a697e1c3e3d8ef54-Paper.pdf>
- [43] X. Chen, D. P. Kingma, T. Salimans, Y. Duan, P. Dhariwal, J. Schulman, I. Sutskever, and P. Abbeel, “Variational lossy autoencoder,” 2017.
- [44] L. Cai, H. Gao, and S. Ji, “Multi-stage variational auto-encoders for coarse-to-fine image generation,” 2017.

