Neural Network based Transceiver for Non-Coherent OFDM Optical Modulation

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***Abstract*—Optical wireless and radio front-haul communication systems are deemed as potential technologies to the radio frequency wireless communications in several applications. Consequently, the clipped non-coherent optical modulation techniques have gained significant attention. The trade-off between the spectral efficiency and the power efficiency of the benchmark techniques such as asymmetrical clipping optical OFDM (ACO-OFDM) and direct clipping optical OFDM (DCO-OFDM), pose a challenge of maintaining enhanced spectral and power efficiency for the design of the optical modulation techniques. In this paper, we propose a deep neural network (DNN) based optical transceiver. It uses simple but efficient DNN to predict the clipped negative parts of the transmitted signal at the receiver side. We evaluate and analyze several DNN-based optical transceiver architectures for different performance aspects. The DNN-based optical OFDM transceiver enhances the spectral and power efficiency compared to the latest works**.

***Keywords*-ACO-OFDM, DCO-OFDM, Deep neural network, Supervised learning, Optical modulation**

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