Application Of Deep Learning in Free Space Optical Communication Using Malaga Channel

Publisher: IEEE Cite This PDF

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Abstract:
The use of Free Space Optical (FSO) communication systems is growing as a result of their ability to deliver high data speeds through unlicensed spectrum with large bandwidth, higher power efficiency, and more security. These systems are also suitable candidates for backhaul lines for the next-generation communication networks, as well as for bottleneck and last-mile applications. However, the performance of FSO systems is harmed by atmospheric turbulence, which is caused by variations in the temperature and pressure of the atmosphere along the propagation path. As a result, researchers and communication system designers can benefit while investigating and enhancing the performance of FSO links with Malaga distribution. At the receiver end the received signal is fed into an ML detector with CSI, theoretically the Maximum Likelihood (ML) detector is the ideal detector and channel State Information (CSI) that can be provided either in perfect or blind forms. From the simulation results, we observe that Bit error rate decreases with increase in average electrical SNR for Malaga turbulence channel. The outcome of the research done shows that Malaga Distribution fits best for a wide range of atmospheric turbulence conditions also the DNN detector gives better results for Bit error rate vs Signal to noise ratio plot.

Published in: 2023 3rd International Conference on Advancement in Electronics & Communication Engineering (AECE)

Date of Conference: 23-24 November 2023

DOI: 10.1109/AECE59614.2023.10428215

Date Added to IEEE *Xplore*: 15 February 2024

Publisher: IEEE

ISBN Information:

Conference Location: GHAZIABAD, India

Authors

Figures

References

Keywords

Metrics