

# "Next-generation Communication Network Capabilities & Developments in All Optical Networks"

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## **Abstract:**

The World is passing through the implementation of the communication systems with huge storage capacity, very high data rates and error free transfer of data from the sender to intended receivers. Across the world, deployment of 5G Mobile networks is under way, at the same time research in 6G & IOT platforms are bringing dreams possible with the transmission impairments glorified in its way. Comparing with the earlier generation systems, the network capability has increased in multiples of ten folds. Development of the security protocols and algorithms has taken place in last few decades, which takes care of malicious attacks and reduces threat of stolen of the data. Although the cloud computing gives the research community acquired data from experiments and observing various phenomenon, the data base management and utilization of data with the desired authentication is important. Research and development in 6 G mobile technology, Wi-Fi 6, and the Internet of Things (IoT) shall lead to expand horizons of expectations.

The use of artificial intelligence, Machine learning algorithm developments, deep learning techniques has brought different disciplines together on a single common platform, where prior history and behavior of system is used, for future predictions. The coding techniques, data science and mathematical modelling scientist's demand will increase in time to come. In next decade, the world will experience the digitization process in almost every application. All developed countries and under developed countries are required to focus on IOT enabled apparatuses and systems, where data transmission rates, storage capacity and security will not be issue at all, since Communication system will have all its provision in it. The critical issues in the field of cyber security and law enforcements has been taken care by AI models and prediction in advance is possible. Information in terms of data, audio and videos can be processed at faster speed. In addition to this, anomaly detection techniques can ascertain possible threats and access can be withheld. Scientist are informed of the happenings, which are far away from the normal behavior. Analytical findings based on data analytics and artificial intelligence can fill the gaps in systems.

The optical systems are introduced in communication system because of its numerous merits, including security, huge storage capacity and data rates handled. In the conventional optical systems up to third generation before introduction of DWDM (Dense wavelength division multiplexing), the conversion at the repeaters and efficiency was critical in nature. But introduction of the All optical systems has proven that the optical systems has better efficiency, less power consumption, huge capacity, space saving, less interference, availability of high frequency bands and security offered. World has experienced tremendous developments in optical component fabrications and systems. Protection and restoration while in online is essential area of interest for network operators.