

Deep learning techniques to enhance the performance of optical sensors

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Deep learning (DL) has become widely used in many optical sensor scenarios during the last few years. Notable progress has been made in integrating deep learning algorithms, which improve accuracy and reduce noise in optical sensor data. Optical sensors are a highly promising technology for modern intelligent sensing platforms. They are used in many different fields, including defence, security, process monitoring, quality prediction, pollution control, and many others. Although optical sensors have many applications, they also face many difficulties. These difficulties include the need to create large datasets and the resulting slow processing speeds. On top of this, these sensor technologies are very expensive. To overcome these obstacles, deep learning systems and optical sensor technologies must be strategically integrated. This work presents a systematic review of recent works that have effectively used DL algorithms in optical sensor applications. It not only sheds light on the state of these integrations today but also highlights some encouraging avenues for DL algorithms' continued development in the context of optical sensor applications. Investigating these integrated systems shows how they can be used to get around the problems of processing speed constraints and big datasets, which will ultimately lead to more effective and affordable optical sensor solutions. This work also acts as a lighthouse for future research projects, pointing the way towards fresh directions and offering opportunities for creativity in the ongoing advancement of DL applications in the field of optical sensors. Overall, this work lays the groundwork for future research and development of AI-enabled optical sensor technologies.

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