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Deep Learning for Perception and Recognition

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The rapid advancement of deep learning technology has brought about transformative breakthroughs in perception and recognition systems across a wide range of applications. In addition to driving innovation in industrial sectors, it has opened up significant opportunities in fields such as intelligent transportation, smart cities, healthcare, and robotics.

Deep learning significantly enhances the accuracy and robustness of perception and recognition systems through hierarchical feature extraction in multilayer neural networks, achieving remarkable results in areas such as soft sensing, image classification, natural language processing, and object detection. By training on large volumes of labeled data, deep learning algorithms are able to automatically learn complex feature representations and efficiently recognize objects during the perception process.

As application scenarios grow more complex and data become increasingly diverse, deep learning models continue to face significant challenges in solving real-world perception and recognition problems. These challenges include ensuring model generalization when dealing with noisy, imbalanced, or limited data; enhancing performance through self-supervised, few-shot, or transfer learning in cases of insufficient labeled data; integrating information across different scales, dimensions, and modalities.

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