Multi-phase classification of liquid crystal textures using convolutional neural networks

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Abstract

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1 Introduction

Machine learning (ML) is the term assigned to a wide range of computer algorithms that use data to automatically improve their performance on a specific task. These tasks can take various forms, including decision making, pattern recognition, and prediction. A sub-field of ML known as deep learning (DL) generally consists of applying large-scale multi-layer neural networks, a type of algorithm inspired by the structure of the brain, to tasks involving highly complex abstractions of data. Such intensive algorithms typically require vast quantities of data and powerful computational resources to be trained effectively. With the recent explosion in availability of such data and sophisticated computing technology, DL has seen a surge in interest and application among several fields. Computer vision is one such field that has been impacted greatly. Research and development of convolutional neural networks (CNNs), a type of neural network suited particularly well to grid-based data, have proven extremely successful in the tasks of image classification, segmentation, and object detection.

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References

[1] J. Heaton, "Classification of liquid crystal textures using machine learning," 2020.

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