Research Article

Cross-modal Deep Learning for Predicting Atomic Force Microscopy From Optical Microscope Images

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Abstract

In the experimental section, we demonstrate a unique approach to predicting atomic force microscopy (AF-Mic) topography from optical microscope (OptM) images by employing a fully convolutional, multi-domain autoencoder model. Topography prediction, morphology analysis, and dynamic topography transformation simulation are all made possible by the autoencoder's ability to modify input data by extracting significant features and expressing them in an enhanced fashion. The model is detailed with encoder and decoder components, optimised for various OptM image resolutions. There are three main parts to the training process: predicting the topography using the AF-Mic, analysing the morphology quantitatively, and simulating the topography's dynamic changes. Improved performance is shown after transfer learning is put into practise. When making graphene oxide nanoribbons (GON), the autoencoder is used to foretell how

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