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Abstract

Convolutional neural networks for classification of transmission electron microscopy imagery

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One of Vironova's electron microscopy services is to classify liposomes. This includes determining the structure of a liposome and presence of a liposomal encapsulation. A typical service analysis contains a lot of electron microscopy images, so automatic classification is of great interest. The purpose of this project is to evaluate convolutional neural networks for solving lamellarity and encapsulation classification problems. The available data sets are imbalanced so a number of techniques to overcome this problem are studied. The convolutional neural network models have reasonable performance and offer great flexibility, so they can be an alternative to the support vector machines method which is currently used to perform automatic classification tasks. The project also includes the feasibility study of convolutional neural networks from Vironova's perspective.

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