Few Shot Hematopoietic Cell Classification

Author name(s) withheld EMAIL(S) WITHHELD
Address withheld

Editors: Under Review for MIDL 2023

Abstract

The classification of hematopoietic cells is a difficult problem in digital pathology because of the rarity of many aberrant cell classes. We propose a *few shot learning* approach for this problem. Existing generative few shot learning methods augment the training data by synthesizing more samples from a few real samples of each class: each image is represented by a class information vector, and a style vector. The class information predicted from the few shots of the novel classes can be used for synthesizing new samples of these classes. However, the class information for novel (rare) classes might be noisy due to the lack of samples. In hematopoiesis, the classes correspond to the different stages of the cellular maturation process. We propose RelationVAE which incorporates the predefined, natural relationships between hematopoietic cell classes to improve the robustness of the class information encoder. We organize these relationships using a graphical model. Our generative model optimizes the likelihood of the graphical model and robustly disentangles the class information and the intra-class variance from input images. The experiments on our collected hematopoietic dataset show the improved results of our proposed RelationVAE over a baseline VAE model and other few shot learning methods.

Keywords: List of keywords, comma separated.

1. Introduction

© 2023 Anonymous.