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Detection and Classification of Cell using Deep Learning

Every living species has cells and based on those cells scientists observe and make some predictions or observations. The identification and classification of cells is a highly crucial part of medical research and involves human efforts to a huge extent, which is tiresome, repetitive in nature, and may predict inaccurate results. This time-consuming process can be eliminated if machine learning algorithms detect and classify the cells without human efforts. This research aims to train an ML algorithm to detect and classify cells based on a number of branches.

This research accepts images of a group of cells as input to the algorithm for training purposes. The training of the model is accomplished based on the labeled images of cells. The trained model identifies and classifies the cells images in three different classes Class A, Class B, and Class C. Class A cells do not have any branches, Class B cells have fewer branches and Class C cells include cells with many branches. To eliminate the inaccurate results, the

labeling of the images could be done manually. Manual labeling can be a laborious job so this research leverages semi-supervised learning. The training has been conducted using YOLO (You Only Look Once) algorithm, which is the single-stage detector. YOLO uses the convolutional layer for the image classification problems. The training part involves extracting features from the training dataset. The extracted features then act as the input to the convolutional layer to predict the class labels.

Medical practitioners could be benefitted from the outcomes of this research for making decisions in disease diagnosis and prognosis processes. In future, different other deep learning architectures will be explored to classify the cells and analyze the classification report to provide better predictions regarding the cells.

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