CELL TRACKING CHALLENGE

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INTRODUCTION AND PROPOSED WORK-

Segmenting and tracking moving cells in time-lapse video sequences is a difficult process that is required in many scientific and commercial applications. Understanding the mechanobiology of cell migration and its various consequences in both normal tissue development and many illnesses requires a thorough understanding of how cells change form and migrate when they interact with their surroundings. We use real (2D and 3D) time-lapse microscopy videos of cells and nuclei, as well as computer-generated (2D and 3D) video sequences simulating whole cells and nuclei moving in realistic environments, to objectively compare and evaluate state-of-the-art whole-cell and nucleus segmentation and tracking methods in this challenge.
The proposed work will use Naïve Bayes classifier. Naïve Bayes classifier could improve the prediction and can eventually the result of the dataset.

INTELLECTUAL MERIT AND BROADER IMPACT-

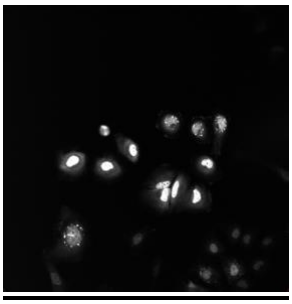
The suggested study will aid in the knowledge of cell motility processes and their regulation. The key idea is to detect all cells in the whole time-lapse video sequences first, and then associate the discovered cells to succeeding frames using a probabilistic objective function. The latter's method entails locating cells in the initial frame and updating their position, shape, and orientation throughout the time-lapse series while taking the preceding frame's result into account. Each cell to be monitored is represented by a model that evolves over time to fit the cell in consecutive frames [1]. This project will aid in this endeavor.

SOFTWARE AND DATA REQUIREMENTS-

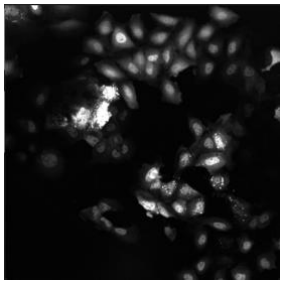
The project will be written in Python3, the software and libraries required for the project are Python with SciPy packages, TensorFlow, NumPy, scikit-image and keras. The platform used will be macOS.

The dataset of 2D video sequences of fluorescent counterstained nuclei or cells moving on top or immersed in a substrate, along with 2D Bright Field, Phase Contrast, and Differential Interference Contrast (DIC) microscopy videos of cells moving on a flat substrate. Data set used for the project is publicly accessible and is available in the Cell Tracking Challenge page. The sample size of dataset is 29 for training and challenge respectively [2].

Training Data



Challenge Data



REFERENCES-

1. http://celltrackingchallenge.net/description/
2. Human hepatocarcinoma-derived cells expressing the fusion protein YFP-TIA-1, Dr. Alessia Ruggieri and Philipp Klein, Centre for Integrative Infectious Disease Research (CIID), University Hospital Heidelberg, Germany