

ALFI: Cell cycle phenotype annotations of label-free time-lapse imaging data from cultured human cells, Scientific Data

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Abstract

Detecting and tracking multiple moving objects in a video is a challenging task. For living cells, the task becomes even more arduous as cells change their morphology over time, can partially overlap, and mitosis leads to new cells. Differently from fluorescence microscopy, label-free techniques can be easily applied to almost all cell lines, reducing sample preparation complexity and phototoxicity. In this study, we present ALFI, a dataset of images and annotations for label-free microscopy, made publicly available to the scientific community, that notably extends the current panorama of expertly labeled data for detection and tracking of cultured living nontransformed and cancer human cells. It consists of 29 time-lapse image sequences from HeLa, U2OS, and hTERT RPE-1 cells under different experimental conditions, acquired by differential interference contrast microscopy, for a total of 237.9 hours. It contains various annotations (pixel-wise segmentation masks, object-wise bounding boxes, tracking information). The dataset is useful for testing and comparing methods for identifying interphase and mitotic events and reconstructing their lineage, and for discriminating different cellular phenotypes.