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Stem Cell Bio-Image Resolution Enhancement Using a Polynomial Transformation YOONJEONG KWON, St. Paul's School, SEOYOUNG JO KYUNG, Princeton University — For a certain bio images obtained from a device, the bio-image process requires more work for morphological reconstruction than mere quantitative analysis, such as measurements. To apply various enhancement methods to produce a better image of a stem cell, we gathered the raw data and images on stem cells. We are able to improve the quality of the bio-image in a pixel scale by using a computational and mathematical method employing spectrum modification. By performing linear and quadratic transformation, a strategy for enhancement of bio-imaging technique is presented in this paper. Using histogram equalization of stem cells, which provides quantitative information about the condition of the cells, the shape, size, and coloration were studied. This research, by combining the histogram analysis and the proposed transformation, is conducted to observe an improved algorithm that increases the stem cell image quality. Previous attempts of enhancing bio-images by preprocessing, watershed segmentation, and morphological image processing had no significant effect on the quality of images. This research shows more effective algorithms in resolution enhancement and better segmentation of the stem cell as well as corneal epithelial cells using spectrum modification.

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