Neural Networks Pattern Recognition and Image Analysis in Cellular Rotation Studies

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Abstract— Biological cells may be distinguished by type according to their behavior in AC electric fields. Currently, cells are characterized by human observation in laboratory experiments. The problem of discerning the rotational motion of a cell in a rotating electric field lends itself to computer pattern recognition, particularly through the use of a sensed neural network. The primary objective of this study is the development of computer vision capabilities sufficient to solve this pattern recognition problem. Accomplishment of this objective will allow the characterization of cell types according to their unique frequency-dependent behaviors. The backpropagation network described in this study can classily arbitrary test images of a cell according to their relative angular displacement after it had been trained within sufficient constraints. It is hoped that these processes may be extended to the eventual automation of cell classification by type in cellular pathology studies