

Multi-Level Merging Algorithm of Protein Detection for Two-Dimensional Electrophoresis Gel Images

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Abstract: Two-Dimensional Electrophoresis Gel Images (2DE Images) are the powerful tools to find out unusual protein patterns which are analyzed for getting pathogenicity over several years. In order to provide good detection result, we purpose a novel detection algorithm name Multi-Level Merging (MLM) for 2DE Images. MLM generates several binary images based on a raw 2DE Image and different thresholds. The same protein pattern will locate the same area but show different size in several binary images. Low abundance proteins will be detected by lower threshold. Combined the binary images of higher and lower thresholds, MLM will detect the overlapped proteins and separate them well. MLM choices the state for each protein from several binary images automatically, and merges these states into a final image. ImageMaster 2D Platinum is one of famous computer tool for 2DE Images. Experimental result shows that MLM has a 92% accurate detection rate then ImageMaster 2D Platinum's 42%. The final image will merge by MLM can provide accurate detection result for promoting the efficiency and quality of proteomics.

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