عنوان مقاله:
Two-Dimensional Gel Electrophoresis Image Registration

محل انتشار:
چهاردهمین کنفرانس مهندسی برق ایران (سال:1385)

تعداد صفحات اصل مقاله: 7 صفحه

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خلاصه مقاله:
Two-dimensional gel electrophoresis (2DGE) is the leading technique to separate individual proteins in biological samples with many biological and pharmaceutical applications, e.g., drug development. The technique results in an image in which the proteins appear as dark spots on a bright background. The analysis of these images is very time consuming and requires a large amount of manual work. So there is a great need for fast, objective, and robust methods based on image analysis techniques in order to significantly accelerate this key technology. To enable comparison of protein patterns between different samples, it is necessary to match patterns so that homologous spots are identified. This project presents an algorithm for the purpose of aligning two different electrophoresis images. The proposed alignment algorithm is based on three different concepts, including segmentation, point matching, and elastic registration. The segmentation technique is based on the Laplacian of the Gaussian filter, using a threshold and connected region processing. The point matching is based on the probabilistic relaxation technique that was proposed in [11]. The final registration is based on the matched points, thin plate Spline interpolation and bicubic interpolation. The proposed algorithm improves the correlation coefficient between the two images by 13% and the mutual information between the two images by 42%.

كلمات کلیدی:
Electrophoresis, Image Registration, Point Matching, Probabilistic Relaxation, Thin Plate Splines

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