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AN AUTOMATED SYSTEM FOR GEL IMAGE ANALYSIS USING IMAGE PROCESSING TECHNOLOGIES AND SIGNAL PROCESSING TECHNOLOGIES

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In biotechnology, gel electrophoresis is a common technique used to separate DNA and proteins according to their size and weight. It has conflated the separation of Deoxyribonucleic Acid (DNA) and protein through differences in electric charge. The separated DNA fragments or proteins of different molecular weights will give a series of bands with positions corresponding to the molecular weight in the gel electrophoresis image. These images can be analyzed automatically by a system. Image analysis of the gels removes much of the subjectivity of manual comparison of band position.

In this project, the routines are written in Microsoft Visual Studio 2008 and for curve fitting, some functions of MATLAB are used. To analysis gel electrophoresis images, image processing techniques and analysis of graphs are used. Developed algorithm first enhances the image, and identifies lanes and bands. The identified bands values are compared with the reference DNA marker using curve analysis techniques.

The developed system separates lanes and gives a table of band values for each lane. According to their similarities, the bands with shared values and similar values are classified as similar types of samples. For saving, the result can be exported as an Excel spread sheet. The system generates correct data easily and quickly. To check the accuracy of the system, a sample of 10 images given for Molecular Biologist was used and 90% data were found correct.