2014 年臺灣國際科學展覽會
優勝作品專輯

作品編號 **110021**

參展科別 電腦科學

作品名稱 **New Screening Method for Early Pediatric Cancer Detection Through Automated Handwriting Analysis**

得獎獎項 三等獎

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Abstract

Pediatric cancer has an incidence rate of more than 175,000 per year with a mortality rate of approximately 96,000 per year. One major cause of this problem is late diagnosis. A novel promising way of pediatric cancer screening is handwriting analysis. This method surpasses other methods by detecting pediatric cancer in a very early stage. However, studies are still limited to manual analysis which needs an expert and a long period of time. The aim of this project is to design a computer program to extract handwriting features and build a classification model to classify the user as patient or as control. Dataset was collected from schools and hospitals where all participants could read and write in English. After data cleansing, number of samples was 440 samples. MATLAB (Matrix Laboratory) program was used for extracting geometric features in handwriting. Program was validated using a subset of 50 samples of the dataset. WEKA Package was used to test and build the classifier. Experiments were done using classifiers: Logistic, Multilayer Perceptron, J48, LibSVM, AdaBoostM1 and Naïve Bayes. Best subset of attributes was evaluated and used for each classifier and all calculations were done as the average of cross validation operations of several folds assignments. Best performance was achieved by Logistic classifier with average accuracy of 80.15%, standard deviation of 0.43% and Matthews's correlation coefficient of 0.59. Finally, this project presents a new fast, free, ready, easy and psychologically comfortable method for pediatric cancer detection while keeping suitable accuracy for mass screening.

評語

1. 研究主題具實用性且有其創新性。

2. 研究過程大量閱讀研究論文，且能從文獻佐證所用理論。

3. 建議實驗研究設計能更貼近使用者之書寫能力，使得研究成果能轉為實用的技術。

評語