NEURAL NETWORKS APPROACH IN DIAGNOSING CLASSES OF ANAEMIA

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ABSTRAK

Perkhidmatan unit hematologi amat diperlukan dalam mengenalpasti penyakit pesakit melalui kajian dari sampel darah. Pelbagai jenis penyakit dapat dikenalpasti oleh seorang pakar hematologi melalui beberapa analisa terhadap kandungan darah pesakit. Namun ratusan kes yang diterima dan pelbagai faktor yang perlu diambilkira telah melambatkan proses sesuatu keputusan dibuat. Hal ini boleh diatasi dengan menggunakan rangkaian neural sekiranya dilatih dengan sejumlah data yang mencukupi, merangkumi semua faktor yang diperlukan untuk mengkelaskan sesuatu penyakit melalui pengecaman corak. Kajian tesis ini telah menggunakan model "multilayer perceptron" dengan pembelaj aran rambatan-balik untuk pengkelasan anemia. Di samping itu, beberapa pembolehubah yang mempengaruhi prestasi model juga telah dikenalpasti. Model yang dihasilkan dinilai prestasinya dan telah berjaya mengkelaskan anemia dengan 72.78% bagi data latihan dan 71.56% bagi data ujian. Model yang dihasilkan seterusnya dibandingkan dengan model "Radial Basis Function" dan "Regression" dan telah menunjukkan prestasi yang terbaik.

ABSTRACT

Hundreds of haematology forms are directed to Haematology unit every day from various departments from physicians that need the right diagnosis in patient's blood. The processing may take several days depending on the workload and available resources. A combination of various factors has to be considered before a haematologist can diagnose classes of anaemia and is normally performed in several stages. The process can actually be performed using neural network approach, as it is capable in pattern recognition. Knowing the relevant factors that influence anaemia classification, a model of neural network can be produced if it is trained with sufficient data sets. Hence, this thesis presents the neural network model for anaemia classification and identifies parameter that affects its performance using backpropagation. The model is then implemented and the performance of the neural network is assessed. The model was able to diagnose classes of anaemia with 7 1.5 6% generalization. Finally, the model was compared with Radial Basis Function and Regression model to show that Multilayer Perceptron outperforms the other two models.

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CHAPTER 1
INTRODUCTION

In this chapter, the first section describes the context of the study that gives an introduction to neural networks and its application. The second section presents statement of purpose, while the third section presents the objectives of the study followed by study significance. Finally, the scope of the study that includes the limitations of the study is presented.

1.1 The Context of The Study

The development of computers has been very fast and computers have become important tools in this Information Communication Technology's (ICT) world. Nevertheless, it still lack the flexibility of processing in some areas as what the human brain does especially in the area of pattern recognition, prediction or forecasting in business, modelling and diagnosing in medical, and others.

Artificial Neural Network or neural network is relatively recent development in the information science that has the ability to model human like computing strategies to improve the performance of computers. They differ from the usual computer programs in that they "learn" from a set of examples rather than being programmed to get the right answer. Neural networks have been applied in many areas, ranging from business, engineering, medical and others. This study will focus the application of neural networks in haematology, an area in medicine.

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