

## **Dedication**

**I dedicate my thesis to my family and many friends.**

**A special feeling of gratitude to my loving parents: Mohamed Elmustfa and salwayosuof whose words of encouragement.**

**My brother ammar and my sister sara, have never left my side.**

**I also dedicate this dissertation to my many friends who have supported me throughout the process. Nazik Ibrahim , Heba Dolib , Reem Emad , Mongiya Nasr Eldeen .**

**I dedicate this work and give special thanks to my Teachers.**

**And to all patient of diabetic disease in word.**

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## **Abstract**

Diabetes mellitus is a chronic disease which occurs when the pancreas does not produce sufficient insulin, or when the body cannot effectively use the insulin it produces. It is an important and relatively common medical condition and is a risk factor for many other medical conditions like stroke, renal failure, blindness, kidney disease and coronary artery disease.

Physicians have to elicit a comprehensive medical history and thorough physical examination before diabetes mellitus can be suspected. In this study a lot of data has been collected on the diseases diagnosis

The use of neural networks for diabetic Diagnosis has also attracted the interest of the medical informatics community because of their ability to model the nonlinear nature, the goal of this study is to design a novel approach for diagnosing diabetes using Artificial Neural Networks. The study aims also identify the best ANNs type which is more suitable for diagnosing diabetes. So three ANNs were designed which are feed forward back propagation, Recurrent and Elman network to be designed which one has the best performance.

Using MATLAB BPF was designed and trained in the BP NN, RNN, and Elman network, first one hidden layer between input and output layer with changed about (3,4,5,6,7,8,9) neuron in hidden layer. Type of activation function which chooses firstly is log sigmoid and tan sigmoid function.

The result obtained that amounts the three neural networks.

1- The Elman network with 5 neuron in the hidden layer with TAN sigmoid activation function has performance 0.00083289 2- For the BPNN with 7 neuron in the hidden layer with TAN sigmoid activation function has performance 0.00011178 that is best performance network in this study. 3- For the RNN with 8 neuron in the hidden layer with LOG sigmoid activation function has performance 0.00019097.

## المستخلص

داء السكري هو مرض مزمن يحدث متى ما أن البنكرياس لا ينتج الأنسولين الكافي ، أو عندما لا يستطيع الجسم استيعاب الأنسولين المنتج . هوالةصحية مهمة ومشتركة نسبياً للعديد من الحالات الصحية الأخرى مثل الدبحة ، الفشل الكلوي والعمى وامراض الكلى ومرضاتريازالتاجي

الأطباء يجب أن يستخرجو تأريخ طبي شاملو فحص طبي عيش شامل قبل تشييت مرضا السكر للشخصا مشكوك فيه . في هذا الدراسة جمعت الكثير من البيانات التي تمكن من تشخيص المرض.

إستخدام الشبكات العصبية في تشخيص السكر ريجذب اهتمام في مجال تقنية المعلومات الطبية بسبق قدرته على تشكيلا لطبيعة الالخطية ، الهدف من هذه الدراسة هو تصميم نظره مبتكره لتشخيص مرض السكري باستخدام الشبكات العصبية وكذلك من الاهداف التعرف على أفضل ثلاث شبكات من نوع ار ان اس تشخص مرض السكري مصممه من نوع شبكه خوارزميه التوليد الخلفي ، و شبكه الاعاده ، و شبكه ايلمان التي حققت أفضل أداء .

باستخدام برنامج الماتلاب لتصميم وتدريب شبكه ال بي بي ان ان ، ار ان ان ، و شبكه ايلمان ، بطبقه واحدة مخفيه بين طبقتي الدخل والخرج مع التغير في عدد نيرونات الطبقة المخفيه (3,4,5,6,7,8,9) ، انواع الدوال الوظيفيه المستخدمه هي تان و اللوق.

أفضل ثلاث نتائج متحصله للشبكات الثلاث هي كالتالي:

1- شبكه ايلمان مع 5 نيورونات في الطبقة الخفيه مع الداله الوظيفيه تان وكان الاداء 0.00083289

2- شبكه بي بي ان مع 7 نيورونات في الطبقة الخفيه مع الداله الوظيفيه تان وكان الاداء 0.00011178 وكانت هذ الشبكه أفضل أداء على الاطلاق خلال هذه الدراسة

3- شبكة ار ان مع 8 نيورونات في الطبقة الخفيه مع الداله الوظيفيه لوق وكان الاداء 0.00019097