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NEURAL NETWORKS BASED TYRE IDENTIFICATION FOR A TYRE INFLATOR OPERATIONS

A Thesis submitted to the
Department of Electrical Engineering, University of Moratuwa
On partial fulfilment of the requirement for the
Degree of Master of Science in Industrial Automation

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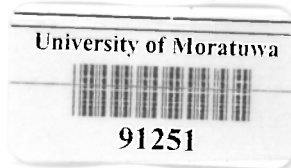
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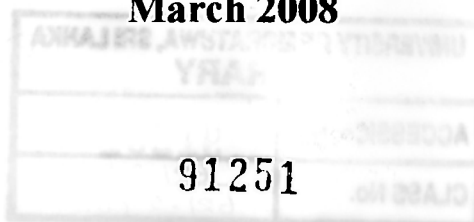
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DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

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Abstract

Tire industry has become one of the huge industries at present since the number of vehicles are rapidly increasing. Since the tire directly related to the vehicle safety, durability, running cost and comfort level of the passengers tire selection and maintenance addressed widely. Maintaining a tire is a duty of the vehicle user and he may has to check the tire rapidly for wear, cuts and other irregularities. The most important activity of tire maintenance is to maintain the pressure of the tire.

The tire pressure is an important issue since it directly relates to the safety of the vehicle, durability, running cost and comfort level of the passengers as mentioned above. A rapid check for tire pressure is essential since tire pressure may reduce

normally with the time apart from losing pressure when the tire drives over a pothole or hump. Checking the tire is done using a machine called tire inflator. This machine must be accurate and user friendly since the operator has to trust on it. Tire inflators are available mostly in tire shops and in gas stations. Tire inflators are mainly two types, Analog tire inflators and Digital tire inflators. Digital tire inflators arrived the market recently and analog tire inflators are getting replaced with digital tire inflators as the convenience of operation.

Digital tire inflators read the pressure with a pressure sensor and with this sensor the dynamic pressure readings are not possible. Hence to get the static pressure the inflation process has to be stopped. In other words, while in the inflation, the tire inflator has no idea about the tire pressure until the inflation stops. In this case, to have an idea about the rise of pressure, there must be a method to identify the type of the tire.

The tire identification mechanism must be fast, accurate and reliable. The other requirement is that the tire has to be identified online and this process must not delay the inflation process.

The main tusk of this exercise is to develop an artificial neural network based tire identification method. A developed tire inflator model was used to collect information and to test the tire identification process.

To develop the network, three inputs were considered. By expanding the number of layers in the network experiment was carried out. The results were successful and that the network with two hidden layers zero percent error achieved.

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