

# **Abstract**

**Mostafa R Ahmed**

## **Grey Cast Iron Categorization using Artificial Neural Network**

Grey cast iron (GCI) takes part in a wide range of applications in industry specially automotive one due to its unique properties like castability, machinability, low melting point and low cost as well. It's used in manufacturing engine block, clutches, cylinder head, drum brakes, etc. The cooling rate of GCI affects its microstructure. Consequently, mechanical properties of GCI show strong deviation with the change in the texture of its microstructure. The main challenge with GCI is that surfaces are section sensitive i.e. cutting direction of sample gives different shape of microstructure. Although manual assessment to images gives accurate results, it's susceptible to human error, lack of experience and variation of the operators' performance. Thus, automated image processing has a great contribution in this area. It reduces the amount of time required and increases the accuracy of extracted data. Since artificial neural networks (ANN) are always used in cases that are prone to uncertainty and decision making, software for image processing based on artificial neural networks will be introduced to categorize grey cast iron samples.