Synthesis, characterization and study of optical property of $(PANI)_{1-x}(MWCNT)_x$ nanocomposites

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Abstract

The present paper deals with study of $(PANI)_{1-x}(MWCNT)_x$ nanocomposites to find its materialistic possibilities in the application field of actuators, sensors, electronic devices and supercapacitors. The effect of doping concentration of multi walled nanotube (MWCNT) on surface morphology, structural and chemical properties of polyaniline (PANI), samples has been characterized by SEM and FTIR. SEM images show the appearance of lumps and holes into smooth PANI samples by addition of MWCNT nanoparticles. FTIR spectra also confirm the formation of PANI/ MWCNT nanocomposites. UV–VIS–NIR spectrophotometer is used to study the absorption spectra of the composite samples. The band gap energy (E_g) of the nanocomposites is determined using Tauc's relationship. It has been observed that the increasing the MWCNT concentration in composites reduces the optical ban

Study of thermal stability and dielectric behavior of PANI/MWCNT nanocomposite

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Abstract

Oxidative polymerization of aniline was conducted within the temperature range 0°C –5°C using an oxidizing agent: APS (ammonium peroxy disulfate) to obtain PANI and an optimized quantity of MWCNT was added to this solution to obtain PANI/MWCNT nanocomposites of MWNCT concentration (w/w) 2, 4, 6 and 8%. The PANI and nanocomposites were tested for their structural properties using techniques such as X-ray diffraction (XRD). The vibration spectra of PANI and nanocomposites were also verified using a confocal Raman microscope

Financial credit risk evaluation model using machine learning based approach

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Abstract

Credit risk associated with individual at the time of sanctioning credit is one of the most crucial tasks for the banks and financial institutions. Financial organizations use credit score of a customer to decide whether a loan should be granted or it should be declined. Most of the existing machine learning models are trained to compute the credit risk associated with a person. However, the performance of the existing models are limited due to the noisy nature of available training data. Therefore, the pre-processing of the data contributes a crucial role in the performance of the credit risk evaluation model. In this paper, we propose an approach to develop an efficient credit risk evaluation model based on integrating a clustering algorithm with a classification algorithm. More specifically, initially, we transform the data into clusters of similar nature, and further, we develop different classification models for each cluster. Experimental results show that the proposed model improves the performance of the model by reducing the effect of the noise.

Keywords: Credit risk, clustering classification, hybrid model, agglomerative clustering, k-mode clustering.

1. Introduction

Financial agencies including banks are associated with several forms of risks mainly credit risk, investment risk, business risk and operational risk. As the banking sectors are competing with each other, the traditional banking profit is reducing day by day due to biasing towards customer retention while ignoring the risk associated with it [1]. Problem associated with lending money forced banks to move towards consumer banking to make banking institutes more profitable. However, the overall process of loan disbursement is rely on banks itself, and the biasing towards audit procedure generate more risk in lending funds to borrowers. As a result, the probable risk gradually rises.

Accurate and on-time prediction of credibility of borrowers is very crucial in the banks which involves a decision between to grant a loan and to reject the application form. It is a non-trivial and challenging task that requires in-depth analysis of different factors of the customer. Due to exponential and compound rising in the credit department,various statistical and machine learning models have been introduced and implemented by various researchers. Credit scoring is a statistical technique which is used to assess the credit risk of loan applicants. The prime objective of implementation of these credit scoring models is to analysis the risk associated with a loan application and classify them into accepted or rejected categories [2]. It is highly beneficial for the financial organizations to consider credit risk scoring as it reduces the expense of credit analysis, and limits the possible risks.

There are two type of approaches for predicting the credit risk associated with loan applicants, (1) Statistical approaches, and (2) Machine learning algorithms. It is evident in the literature that the machine