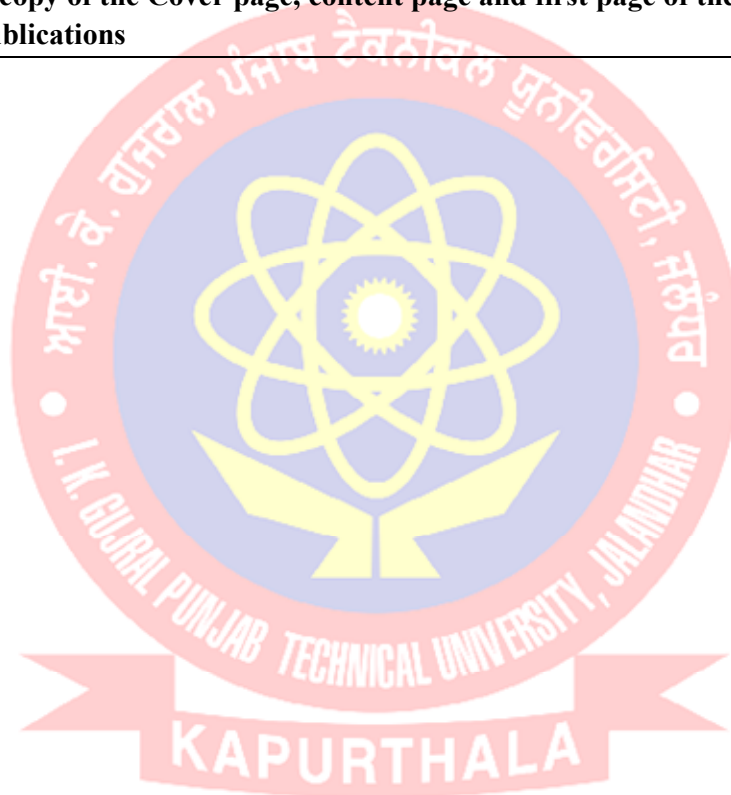


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# Prediction of Thermal Aspects for Brass Material-Based Natural Convection Heat Transfer System by Using Adaptive Neuro-fuzzy Inference System



Surjeet Singh, Shashi Bahl<sup>✉</sup>, Sandeep Trehan, Deepam Goyal, and Ashok Kumar Bagha<sup>✉</sup>

**Abstract** In this paper, a model based on adaptive neuro-fuzzy inference system (ANFIS) is developed to predict the behavior of a natural thermal convection system. ANFIS model is able to successfully imitate the effects of variation in input parameters such as current and voltage on the response parameters such as temperature at different locations of the thermal system. The results obtained with the help of the developed ANFIS model are compared with the findings of the experiments in the form of graphs and also numerically by determining the error norms. Comparison of the ANFIS model-based predictions with the actual experimental results shows that the proposed model is able to identify the behavioral characteristics of the natural convection thermal system very accurately. The outcome of the proposed model is found out to be the best for the prediction of temperature at the location of fourth temperature sensor where the level of temperature is low. The proposed ANFIS model can be used further to develop a control system in order to control the temperature at different locations of the thermal system by varying the current and voltage parameters.

**Keywords** Thermal aspects • Brass heat transfer system • Adaptive • Neuro-fuzzy inference

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# State Space Method to Predict the Modal Model of a Five Degree of Freedom Spring Mass Vibratory System



Nitin Gupta, Ashok Kumar Bagha<sup>✉</sup>, and Shashi Bahl<sup>✉</sup>

**Abstract** In this paper, a state space method is used to predict the modal model of a five degree of spring-mass vibratory system. To predict the modal model, various MATLAB commands such as 'lsim' to obtain the response in time domain and 'freqresp' to obtain the response in the frequency domain are used. In this work, state space formulation is used to convert the five degree coupled equations into single degree an un-coupled second order differential equations. Then the state space entities such as system matrix, input matrix, output matrix and direct transmission matrix will be predicted. The main objective of this work is to predict the response of the system at different masses by applying unit impulsive load excitations. To solve the Eigen value problem MATLAB 'eig' command is used. It is observed that the state space formulation is very simple and easy to apply for n-degree of freedom system model. Also, it can be concluded that the state space method formulation along with MATLAB commands is very effective to predict the response of the system either in time domain or in frequency domain.

**Keywords** State space method • Coupled equations • Time domain • Frequency domain • Vibrations • Modal analysis

## 1 Introduction

The mechanical vibratory system has multiple inputs and outputs and it becomes more complex with differential equations and transfer functions. The vibration analysis of multi degree engineering system requires the solution of partial differential equations, which is difficult to solve. In fact, many partial differential equations does

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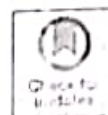
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# Artificial Intelligence (AI) and Its Applications in Indian Manufacturing: A Review



Ali Tarab Rizvi, Abid Haleem<sup>✉</sup>, Shashi Bahl<sup>✉</sup>, and Mohd Javaid<sup>✉</sup>

**Abstract** Artificial intelligence (AI) is globally acknowledged as innovative technology. Today, many corporations and individuals are making an effort to harness the capabilities of AI in almost all sectors viz. healthcare, education, manufacturing, smart cities, agriculture, etc. The concept of 'Smart Factories' and 'Industry 4.0' has prompted many global enterprises to use automation and intelligent robots to improve manufacturing and enhance the quality of the finished product and overall productivity. Indeed, artificial intelligence is a vital tool to augment manufacturing by facilitating the R&D, enhancing the quality, reducing the errors, and maintaining the supply chain by projecting demand forecasting and simulation of outcomes to foster higher margins in stiff competition. However, the requirement is to build an industry that should be compliant with such disruptive changes and a workforce compatible enough to create a collaborative environment for both men and technology to work productively. Thus to conduct this study, several keywords and their combinations were used and explored using Google Scholar. The relevant articles, papers, and journals obtained were examined, and data pertinent to the study were collected, examined, and aggregated. Furthermore, specific changes in the current policies and the working parameter were also suggested. In this paper, the scope of artificial intelligence and its applications in today's manufacturing sector of India is discussed. Here, the Indian manufacturing sector's present status is focused primarily, the limitations are identified and how they can be dealt with.

**Keywords** Artificial intelligence (AI) · Industry 4.0 · Smart manufacturing

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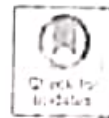
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825

# Prospects of Jewelry Designing and Production by Additive Manufacturing



259

Nosheen Fatma, Abid Haleem<sup>✉</sup>, Shashi Bahl<sup>✉</sup>, and Mohd Javaid<sup>✉</sup>

**Abstract** Innovation in the designing process and its strategic implementation opens diverse possibilities. This concept in the jewelry and artifacts can reap enormous benefits when used with additive manufacturing (AM) technologies. AM has established its proficiency in various manufacturing sectors, medical fields, and art as it offers freedom, customization, and quick changes in design. This study investigates the use of additive manufacturing in jewelry modeling, jewelry design, and manufacturing. Additionally, modeling of ornaments has been carried out by using Rhinoceros software. We also provide a brief overview of the use of smart jewelry. These days, smart medical alert devices like smart watches could be developed as an ornamental and health device. These are used to check various health conditions like temperature, heart rate, calorie burn data, and sleep cycle. Furthermore, with AM, they can be customized and manufactured based on the individual customer's requirement. Similarly, for other ornamental devices, this will open a new field with enormous scope.

**Keywords** Additive manufacturing • Jewelry designing • Jewelry modeling • Rhinoceros software • Smart health care

## 1 Introduction

Today additive manufacturing is the most common terminology of the industry, while three-dimensional printing is mostly useful in the consumer market. The distinct benefits of additive manufacturing make it an accessible technology. According to the standard ASTM F42 Committee, additive manufacturing is defined as 'process of joining material to make objects from the 3D model data, usually layer upon layer,

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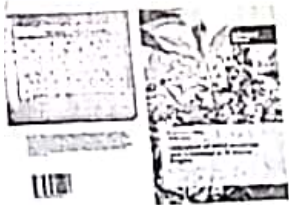
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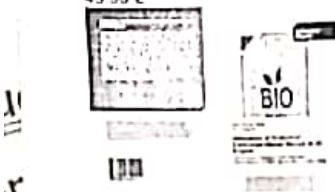
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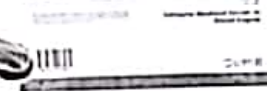
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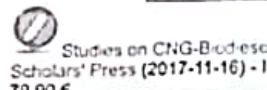
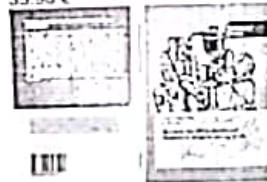
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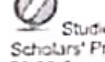


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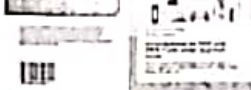
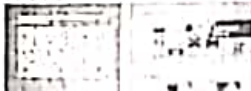
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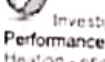


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# A Study and Comparison of Sentiment Analysis Techniques Using Demonetization: Case Study

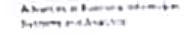
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## Abstract

Sentiment analysis is an analytical approach that is used for text analysis. The aim of sentiment analysis is to measure the opinion and subjectivity of any given text (review or tweet). The aim of this chapter is to study and compare some of the techniques used in sentiment analysis using sentiment analysis. In this chapter, different techniques of sentiment analysis have been discussed with the case study of demonetization in India during 2016. Based on the sentiment analysis, people's opinion can be classified on different categories such as positive, negative, or neutral. These techniques will be classified on different categories based on the use of data, document type, and complexity. In addition, this chapter also discusses various applications of sentiment analysis techniques in different domains.

## Chapter Preview

## Introduction

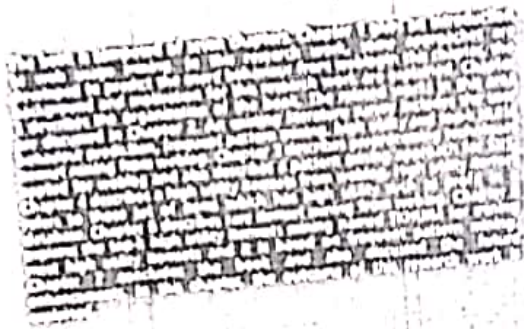
The aim of sentiment analysis (SA) is to discover the emotional evaluation of user opinion or review of the product or service provided to it (p. 1). Sentiment analysis is different from traditional text mining in that we focus on a particular topic for mining where sentiment analysis is much complex. Sentiment analysis can be considered as a classification process in which opinion or review is classified as positive, negative or neutral (Jain et al., 2010). Sentiment analysis has played an important role in various applications of text mining for consumer opinion analysis, business model and management, brand and product positioning and investment analysis. Based on the sentiment analysis, the business companies track the status of their product and take different decision based on it in business.

There are a lot of research has been done in the field of sentiment analysis (Jain et al., 2014) which is mostly heavily reviewed based on their polarity. In general, a review can be categorized by different topics. For example, the review may say, "I like the taste of a food item such as a pizza, burger."

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Erjesh Bakarya  
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Erjesh Bakarya Assistant Professor in Department of Computer Science and Engineering, IIT Guwahati (Pursing) has his Ph. D. Degree from IIT, Thiruvananthapuram in Computer Applications (2016). He has been teaching since 2009 and guiding M.Tech/Ph.D. students. In the mean time he published many research papers in SCI publications.



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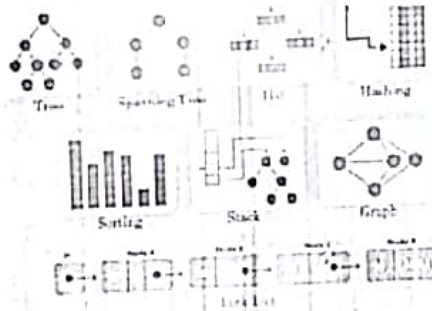
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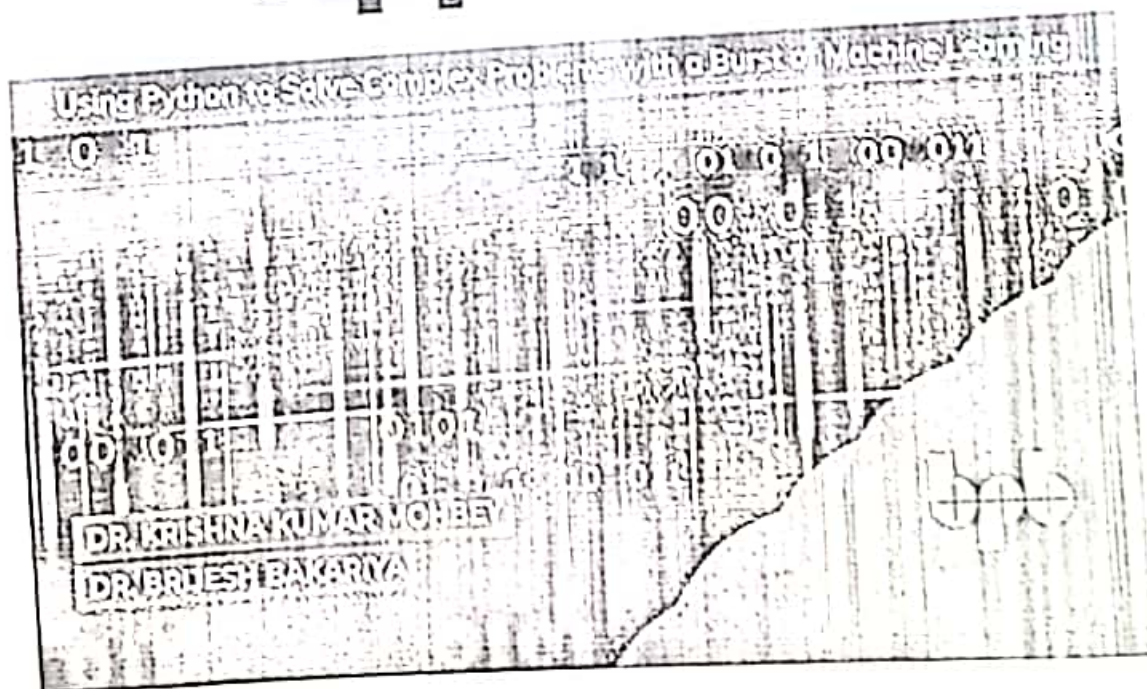
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