

Multi-response Optimization of Process Parameters of TIG Welding for Dissimilar Metals (SS-304 and Fe-410) using Grey Relational Analysis



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Abstract - The aim of this research work is to weld the dissimilar metals, stainless steel and mild steel (SS-304 and Fe-410). Joining of mild steel and stainless steel finds wide applications in chemical, oil and petroleum industry in the fabrication of pressure vessels and the storage tanks. But the joining of dissimilar metals is a major challenge as the amount of contamination in the weld area is very high which affects the weld properties. TIG welding process is generally applied to the wide range of metals which uses non consumable tungsten electrode. The tensile strength and the percentage elongation of the welded joint should be higher. The various process parameters selected for joining the metals affect the mechanical properties of the welded joint. Hence, to find out the optimum values of the tensile strength and the percentage of elongation is the main objective of this research work. Grey Relational Analysis is used to optimize the multiple responses simultaneously.

Key Words: TIG welding, Mild Steel, Stainless Steel, Multi-response optimization.

1. INTRODUCTION

Welding is the manufacturing process generally used for joining metal parts. Welding is used for joining the metals when the lengths of standard sections are more or to fabricate the desired structure by joining the different parts together. TIG welding process is commonly used for joining of two similar or dissimilar metals which uses a non-consumable tungsten electrode for producing the arc and an inert gas or mixture of gases to protect the weld contamination. TIG welding is also popularly known as Gas Tungsten Arc Welding (GTAW). TIG welding finds its application in joining of mild steel and stainless steel pipes as well as sheets of different thickness and standard dimensions. Pressure and filler wire may or may not be used in the TIG welding process. The stainless steel and mild steel dissimilar metal joints are very common structural applications and the joining of these metals is very critical as carbon precipitation and chromium loss leads to increase in porosity and affects the strength of the joint [1]. The quality of the weld is mainly dependent on bead geometry features, metallurgical and mechanical characteristics and various aspects of weld chemistry [3]. The output welding properties are extensively influenced by input parameters like current, voltage, gas flow rate, filler rod material, weld position and the welding speed.

By varying the combination of input process parameters, the output properties obtained would be different for the welded joints. The arc welding is generally characterized as a multiple-input, multiple-output system.

1.1 TIG Welding Operation

TIG welding is an arc welding process. Wherein coalescence is produced by heating the work piece with an electrical arc struck between a tungsten electrode and the job. The electrical discharge generates a plasma arc between the electrode tip and the work piece to be welded. The arc is normally initialized by a power source with a high frequency generator. This produces a small spark that provides the initial conducting path through the air for the low voltage welding current. The arc generates high-temperature generally about 6100 °C and melts the surface of base metal to form a molten pool. To avoid atmospheric contamination of the molten weld pool a welding gas (argon, helium, nitrogen etc) is used. As the molten metal cools, coalescence occurs and the parts are joined. The obtained weld is smooth and requires minimal finish [13]. To obtain the optimum values of the desired mechanical properties it is important to select the proper levels of the input parameters. The input parameters selected are current, gas flow rate and the root gap. While the output responses analyzed are tensile strength and % elongation by using Grey Relational Analysis.

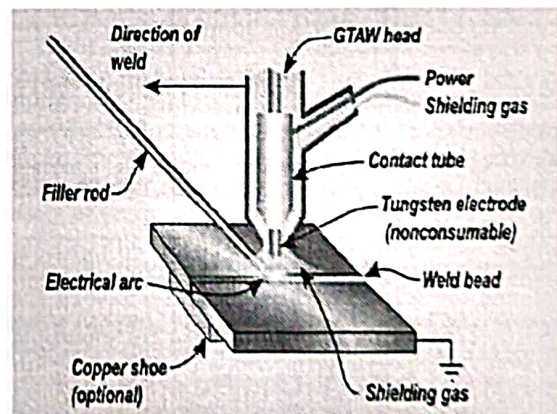


Fig-1: TIG welding set-up

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EFFECTS OF DIFFERENT SOAKING TIME ON WEAR RESISTANCE OF CRYO-TREATED PTFE MATERIAL

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Abstract - The objective of paper is to study effects of cryogenic treatment by varying soaking time of its cryo-treatment process on wear resistance of virgin PTFE. PTFE sample were cryo-treated at -196°C for different soaking time of 4, 8, 12 and 16 hours. Mechanical properties like hardness and wear resistance were studied. Wear test was performed on Pin-on-disc machine and average wear in terms of weight loss for all samples were considered. X-ray diffraction test performed to find the changes in percentage crystallinity at microstructural level. From the experiment it was found that cryogenic treatment was an effective method to improve the wear resistance of material and increase in hardness and percentage crystallinity of material after cryogenic treatment was responsible factors for improvement in wear resistance of PTFE material.

Key Words: Cryogenic treatment, Crystallinity, Hardness, PTFE material, Soaking time, Wear.

1. INTRODUCTION

PTFE is widely used fluoropolymer in different engineering applications like coating material, sealing material, tubing, valve body manufacturing, chemical transfer hoses, nozzles manufacturing etc. due to its excellent properties like high chemical resistance to corrosive reagents, self-lubrication, low coefficient of friction, stability at high temperatures etc. but along with this properties PTFE shows poor resistance to wear, easily gets deform and shows dimensional instability of components which leads to early failure or malfunctioning of components during its application. According to R. Thornton, et al. cryogenic treatment is an effective heat treatment process for improving the wear resistance of materials [1]. According to J. Indumathi, et al. increase in hardness and crystallinity plays important role in improvement wear performance of the polymers [2]. In this paper attempt has been made to study effects of cryogenic treatment by varying soaking time during cryogenic process of PTFE material and its wear test was conducted on pin-on-disc machine, changes in hardness value for each sample was observed and find relationship between harness and wear resistance of PTFE material. Microstructural changes were observed by X-ray diffraction to study changes in crystallinity and amorphous nature of PTFE material.

1.1 Cryogenic treatment

The importance of deep cryogenic treatment process is increases from last few decades in various engineering applications. Cryo process is considered as an add-on process over the conventional heat treatment process. Three sub-zero heat treatments processes can be categories according to their temperature ranges as:

1. Cold treatment (0 to -80°C),
2. Shallow cryogenic treatment (-80 to -160°C),
3. Deep cryogenic treatment (160 to -196°C) which is also referred to as DCT [1].

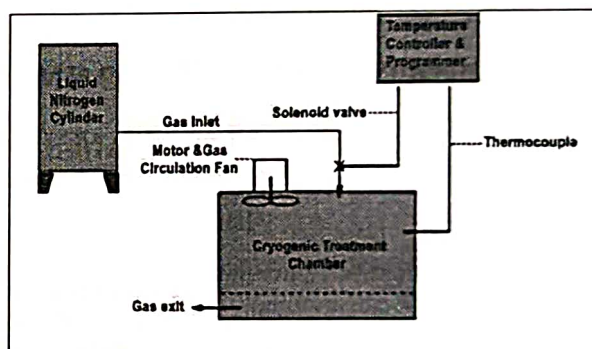


Fig-1: Schematic Diagram of Cryogenic setup

Material which is to be cryotreated was kept inside the cryostat chamber (cryobath) and temperature of cryostat chamber is maintained. This low temperature is maintain by various cryogenic fluid like liquid helium, liquid nitrogen, liquid hydrogen, liquid neon, liquid argon, liquid krypton etc. but liquid nitrogen is most commonly used in engineering applications. In this experimentation also liquid nitrogen is used as cryo fluid. Material is held inside chamber for specific soaking time as per requirement of experiment and then material temperature gradually bring back to room temperature. As Cryogenic processing is a sub-zero heat treatment that affects the entire cross-section of materials or component. Cryogenic treatment process is performed with the objective of improving mechanical properties such as hardness, wear resistance by causing micro structural changes into different stable or meta- stable states of material.

Experimental Investigation of Thermal Conductivity, Wear Behavior and Hardness of Cryogenically Treated H13 Tool Steel Material

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Abstract - H13 material is used in extrusion, forging and casting industry. H13 has low thermal conductivity amongst all the tool materials used in the industry. For increasing the thermal conductivity of H13 cryogenic treatment is used. In this paper we studied the changes in thermal conductivity, wear resistance and hardness due to the various holding time of the cryogenic temperature at -196°C like 12 hours, 16 hours and 20 hours. Test samples were subjected to wear tests on the pin-on-disc machine in dry sliding condition and also the thermal conductivity of the samples is determined. Hardness and X-ray diffraction are also studied. From the test results, it is found that cryogenically treated samples at 16 hours give the best result amongst all the treated and untreated samples for hardness, wear resistance and thermal conductivity.

Key Words: H13 Tool, Cryogenic treatment, Thermal conductivity, Hardness, Wear rate

1. INTRODUCTION

In cryogenic treatment, microstructure changes occur. Retained austenite is converted to the martensitic phase. Cryogenic treatment is conducted at a negative temperature.

Cryogenic treatment is mainly classified into two types;

1. Shallow cryogenic treatment,
2. Deep cryogenic treatment.

In shallow cryogenic treatment, the samples are soaked at a temperature between -50°C to -100°C and then held at this temperature for a particular time. Similarly, for deep cryogenic treatment, the soaking temperature is between -150°C to -198°C and then held at this temperature for a particular time.

H13 tool material is mainly used in extrusion and forging industries but temperature transfer due to heating of

tool material is less. Due to this crack occurs at tool i.e. on die and punches. Hence, continuous cooling is required for die and punches.

2. MATERIALS AND METHODS

The material selected is H13 tool steel. H13 is chromium hot worked steel. This material is mainly used in extrusion and forging industries. The chemical composition of the material is in Table

Table -1: Chemical Composition

Material	H13
C	0.39
Mn	0.35
Cr	5.17
Ni	0.10
Mo	1.38
S	0.005
P	0.011
Si	1.05
V	0.87

2.1 Cryogenic Treatment

The cryogenic treatment is conducted on samples at -196°C for 12 hours, 16 hours and 20 hours. Cryogenically treated samples are used for the measurement of thermal conductivity, wear resistance. The cryogenic set up is shown in Fig 1.

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Impact of Training on Productivity Of Employees: A Case Study Of Life Insurance Corporation Of India (With Special Reference To Marathwada Region)

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ABSTRACT

The study was undertaken at Life Insurance Corporation of India In Marathwada Region on the topic ““Impact of Training on productivity of employees: A case study of Life Insurance Corporation of India(With special reference to Marathwada region)””.

The purpose of the study was to investigate whether training and development would have an effect or impact on the productivity of employees with. The methodology that was used for the study was survey. Primary data was collected from a sample of 1550 employees. Self – administered questionnaire was used in the collection of data for analysis. Multiple questions were framed keeping the objective and hypothesis in linked, total numbers of 20 questions were framed with multiple sub-questions under various main questions. The formats of the questionnaire were designed from the guidelines of various research books. All the questions in the questionnaire were closed ended questions, so as to direct respondents to the preset option. It was also found that training and development had positive impact on employees of the LIC. I conclude it briefly with suggestions of avenues for future frontier work.

I. INTRODUCTION

In current scenario, more importance is being given to “people” in organizations; this is mostly because organizations are realizing that human assets are the most important of all assets. This importance can also be partly attributed to the new emerging values of humanism and humanization. Moreover, with the increasing importance to creativity, and autonomy, which people are increasingly acquiring and enjoying in the society, the expectations of people are fast changing.

Training is the process of providing employees with specific skills or helping them to correct deficiencies in their performances. The term development refers to the nature and direction of change induced in employees, particularly managerial personnel, through the process of training and educative process. It involves systematic procedures for transferring technical knowledge to the employees so as to increase their knowledge and skills for doing specific jobs with proficiency. In the modern world of technological changes the need for training is increasingly recognized so as to keep the employees in touch with new development. Training programmes

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A Comparative study of effective way to modify different object in Image and Video

using different Inpainting methods



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Abstract- The inpainting method is popular for various applications like images, videos, multimedia etc. the inpainting can be helpful for the hiding the useful information from the source it can be used in security purpose, intelligence bureau. inpainting can be used for coding of images as well as hiding useful information from mischievous, now days CCTV footage include mischievous contents that can be modified before it getting viral in society to evade unwanted consequences in society, this techniques can be useful to extract useful information from old photos and videos without any extra effort this extracted information can be process for further accountability, inpainting techniques modify old images that's are like to be contemporary so using this techniques lot of information could be modified and perceive.

Keywords— Video Inpainting, Image Inpainting, Occlusion Removal, PDE based Inpainting, Exemplar Based Inpainting

I. INTRODUCTION

Videos are important medium of communication and expression in today's world. In spite of this, most of the video editing done manually at the expense of huge amount of time and money. Hence, the automatic restoration of old movies and automatic object removal and editing for video has begun to attract the attention of many researchers. Here we focus a constrained but important case of this problem. The constraint is that the camera is fixed and the scene essentially consists of stationary and violent dynamic background with some moving foregrounds. Embedded text in associate in nursing passing video sequence provides valuable information. Texts generally appear as logos, subtitles, captions or banners among the video sequence. Such information embedded texts area unit usually Largely found among the news and totally different common place and in cricket broadcastings that text might necessary

components of a video. There got to be the need to erase the unwanted text from the video The various in painting are discussed here to recover the missing pixel in an image. Inpainting is the process of reconstructing lost or deteriorated Parts of images and videos. For instance, in the museum world, in the case of a valuable painting, this task would be carried out by a skilled art conservator or art restorer. In the digital world inpainting also known as image interpolation or video interpolation refers to the refers to the application of sophisticated algorithms to replace lost or corrupted parts of the image data mainly small regions or to remove small defects the global picture determines how to fill in the gap. The purpose of inpainting is to restore the unity of the work. The filling of lost information is essential in image processing with applications as well as image coding and wireless image transmission, special effects and image restoration is to fill-in these regions with available information from their environment [1] application of sophisticated algorithms to replace lost or corrupted parts of the image data mainly small regions or to remove small defects the global picture determines how to fill in the gap. The purpose of inpainting is to restore the unity of the work. The filling of lost information is essential in image processing.

II. TYPES OF INPAINTING

Inpainting can be done in various applications but mainly over images and videos

A. Image Inpainting

The region of unwanted information in the bounded variation image is removed by using image inpainting. Partial Differential Equation (PDE) based Bertalmioetal [2] have proposed a digital image inpainting algorithm based on Partial Differential Equation (PDE) in which the direction of the lines

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A Review on Smart System for Security from Theft and Other Kind of Hazard

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ABSTRACT: In our day-to-day life Security is a too much important thing to be concerned with home or shop. As we concern with the security not only the theft but also we want to protect our home assets from any kind of hazard. Hence we required the system which detects the theft, fire, leakage of gas or smoke. Different methods and technologies like Bluetooth based, Voice recognition based, ZigBee Based, GSM Based, Internet of things (IoT) based and EnOcean based, etc. are used in the recent years to provide the security from theft as well as any kind of hazard. The main goal of this type system is to protect individuals and property from various hazards such as fire, crime and loss. This paper presents the theft prevention and security system in the recent years.

I. INTRODUCTION

In recent time Home monitoring and security systems are becoming very important and also applicable for any organization, Banks and homes. Due to the today's busy life style it is becoming very hard to keep home or office safe. Especially in industry areas there is need to protect certain goods and the electronic security based services are required. [1]. Day by day Home security is becoming necessary. Nowadays, as the possibilities of intrusion are increasing as well as safety from theft, leaking of raw gas and fire are the most important requirements of home security [2]. These types of systems provide the owner security, energy efficiency, comfort and convenience. The main goal of this type system is to protect individuals and property from various hazards such as fire, crime and loss. These types of system are integration of technology and services through home networking for a better quality of living and used different technologies to equip home parts for more intelligent monitoring and remote control. IoT based system provides the remote control of the user in an easier, more convenient, more efficient, safer, and less expensive way. These systems improve home comfort, convenience, security and energy management as well as it can be used for elder people and those with disabilities, providing safe and secure environments [3].

II. LITERATURE SURVEY

Ms. Devkar A. R. et al [4] designed the an advanced electronic security system by using small PIR and IR sensors built around the Arduino controller, in which PIR (Pyroelectric Infrared Sensor) and IR sensors sense the presence of intruder & Controller reads the signal from sensors and if intruder is detected it turns on the buzzer & the lights in the room as well as making a call to predefined number through a GSM modem. This system contains two types of sensors PIR and IR sensors and is used to detect the presence of human intruder in the room. When the sensor senses the presence of intruder it gives signal to the Arduino controller and immediately system turn on buzzer, lights & makes call through GSM modem. Dhara Gandhi et al. [5] implement a smart industry system by controlling the electronic devices at company remotely with an android app of smart phone and to receive alerts message on phone whenever any sensor is active. N. Sriskanthan, F. Tan, and A. Karande [6] develop a home automation system based on Bluetooth



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Implementation on Sentiment Analysis of Bollywood Movies Reviews by Using ML-Classifier Algorithm

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ABSTRACT: Sentiment analysis is related to the analysis of human emotions and their opinions from the text. Analysis of the sentiment finds and justifies the sentiment of that person with respect to the content. Online sites and Social media contains the data in the form of Reviews, tweets, posts etc. The tweets in the twitter contents are maximum 280 character long. In this research it is tried to build sophisticated model for analyzing the review and tweets regarding Bollywood movies and Songs. As the classifier used are Naïve Bayes, Random Forest, and they are classified as hit, flop, and average by extracting the sentiment from each of the tweet.

KEYWORDS: Feature Vector, MLC, Naïve Bayes & Random Forest. Classifier, Movies Review etc

I. INTRODUCTION

As we know the social networking is online platform. Which connect People with each other using internet through the online media message, blog post, real time review, Google review, conversation forums, and many more. Various review as well as tweet are also available on this platform using which it is possible to predict the status of movie or the song before deciding to go for it. This all can be done with the help of sentiment analysis and opinion mining and techniques.

II. RELATED WORK

There are two techniques which are widely used to detect the sentiments from text are following.

- A. Symbolic techniques (ST)
- B. Machine Learning techniques (MLT).

A. Sentiment analysis using Symbolic Techniques

Suggested an approach for sentiment analysis called 'bag of words' [4]. In the mentioned approach, individual words are neglected and only collections of words are considered [6] which determines an emotional matter in a sentence. Word Net is used for getting synonyms and distance metric to find the orientation of adjectives.

B. Sentiment analysis by using Machine Learning Techniques

In Sentiment analysis by using Machine Learning Techniques: machine learning algorithms allow computers to evolve behaviours based on empirical data from sensor or databases [16]. A major focus of machine learning research is to automatically learn to recognize complex patterns and make intelligent decisions based on data. The difficulty lies in the fact that the set of all possible behaviours given all possible inputs is too large to be covered.



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ANALYSIS OF PERFORMANCE AND EMISSION CHARACTERISTICS BY ARTIFICIAL NEURAL NETWORK FOR SINGLE CYLINDER VARIABLE COMPRESSION RATIO DIESEL ENGINE USING JATROPHA AND COTTONSEED BIODIESELS

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ABSTRACT

This paper presents an artificial neural network (ANN) model to predict various performance parameters and emission characteristics of a single cylinder variable compression ratio diesel engine using Jatropa, Cottonseed and Jatropa-cottonseed mix biodiesel. Calorific value, viscosity, density, compression ratio, engine speed and load are input parameters while brake thermal efficiency, brake specific fuel consumption, exhaust gas temperature, NO_x, CO, CO₂, HC and smoke opacity are output parameters. Levenberg Marquardt training algorithm is used for multilayer perception to minimize the error for the particular training pattern. The network is trained and observed that the ANN model can predict the engine performance parameters and emission characteristics quite well with correlation coefficient as R 0.99524.

Keywords: Artificial neural network, biodiesel, performance, emission

Nomenclature

ANN Artificial Neural Network

BSFC Brake Specific Fuel Consumption

BTE Brake Thermal Efficiency

CB Cottonseed Biodiesel

CR Compression Ratio

JB Jatropa Biodiesel

JCB Jatropa-Cottonseed Biodiesel

LMA Levenberg Marquardt Algorithm

W Load

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Soil Erosion Estimation Modelling by Revised Universal Soil Loss Equation and Soil and Water Assessment Tool on Geographic Information System Platform

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Abstract

Soil erosion is a threat to the economy of countries whose economy is dependent on agriculture. It is very difficult to stop the soil erosion; however, if the causes of soil erosion and the quantum of it are calculated then with few appropriate soil conservation measures it can be reduced. This study is an attempt to estimate soil erosion by Revised Universal Soil Loss Equation (RUSLE) and Soil and Water Assessment Tool (SWAT), in which urgent need of conservation measures was suggested for GV-41 watershed having a geographical area as 366.01 km², which lies in Aurangabad, Maharashtra, India. The data input used for developing the model were collected from various sources, and land use land cover data were prepared in ERDAS Imagine software. The watershed was classified according to erosion into three classes that are severe zone (erosion > 30 t/h/y), which is estimated as 7.5% by RUSLE and 4.04% by SWAT. The second category is the moderate zone (erosion 3–30 t/h/y), RUSLE estimated this as 79.7% area and SWAT estimated it as 81.83% area. The third zone is minimum zone (erosion < 3t/h/y), RUSLE estimated this area to be 12.83% area and SWAT estimated it to be 14.13% area.

Keywords: ERDAS Imagine, GIS, RUSLE, soil erosion, SWAT

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INTRODUCTION

Indian economy is an agricultural-based economy and the agricultural production mainly depends upon the quality of soil available. About 80% population of rural India is dependent on agriculture and its allied activities for their livelihood. The employment opportunities provided by the agriculture sector are about 52% of total opportunities available in the country. The contribution of this sector to gross domestic product is between 14% and 15% [1]. The soil available in nature is finite and non-renewable natural resource. The agriculture productivity is getting affected due to increasing soil erosion. The soil erosion is one of the worst forms of land degradation, due to which there is a loss of crop productivity. It is observed that the loss of productivity is estimated as 13% of total production across all the states [1]. This loss affects the food availability in the country and may cause food security issues in near future.

It is estimated that 32% of the land is affected by various forms of degradation. The soil, which is precious for cultivation, is lost due to soil erosion and also causes serious issues of siltation of reservoirs and natural streams [2]. The soil erosion due to water as the weathering agent is 61.7% and that due to wind is 10.24%. In Maharashtra, about 97.26 Mha out of 307.71 Mha of available agriculture land is prone to erosion [3]. In few of the studies, it is projected that due to land degradation, urban expansion and conversion of agricultural land into non-agricultural land, the land available for agriculture is likely to get reduced by 20% by the year 2050 [4].

The models developed for the estimation of soil erosion mostly compare information that is extracted from remotely sensed data, such as digital elevation model, land use land cover maps, cover and management factor maps and others, for reaching to certain conclusions. In addition, the geographic information system (GIS) performs tasks such as automatic

A Survey on Twitter Sentiment Analysis of Bollywood Movie Reviews

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Abstract: Sentiment analysis is basically concerned with analysis of emotions and opinions from text. We can refer sentiment analysis as opinion mining. Sentiment analysis finds and justifies the sentiment of the person with respect to a given source of content. Social media contain huge amount of the sentiment data in the form of tweets, blogs, and updates on the status, posts, etc. Sentiment analysis of this largely generated data is very useful to express the opinion of the mass. Twitter sentiment analysis is tricky as compared to broad sentiment analysis because of the slang words and misspellings and repeated characters. We know that the maximum length of each tweet in Twitter is 280 characters. So it is very important to identify correct sentiment of each word. In our project we are proposing a highly accurate model of sentiment analysis of tweets with respect to latest reviews of upcoming Bollywood. With the help of feature vector and classifiers such as Naïve Bayes and Random forest we are correctly classifying these tweets as hit, flop and average to give sentiment of each tweet.

Key Words: Feature Vector, Machine Learning, Twitter, Sentiment analysis, Unigram.

1. INTRODUCTION:

With the increase in the popularity of social networking, micro-blogging and blogging websites, a huge quantity of data is generated. We know that the internet is the collection of networks. The age of the internet has changed the way people express their thoughts and feelings. The people are connecting with each other with the help of the internet through the blog post, online conversation forums, and many more. The people check the reviews or ratings of the movies before watching that movie in theatres. The quantity of information is unreasonable for a normal person to analyze with the help of naive technique. Sentiment analysis is mainly concerned with the identification and classification of opinions or emotions of each tweet. Sentiment analysis is broadly classified in the two types first one is a feature or aspect based sentiment analysis and the other is objectivity based sentiment analysis. The tweets related to movie reviews come under the category of the feature based sentiment analysis. Objectivity based sentiment analysis does the exploration of the tweets which are related to the emotions like hate, miss, love etc. In general, various symbolic techniques and machine learning techniques are used to analyze the sentiment from the twitter data. So in another way we can say that a sentiment analysis is a system or model that takes the documents that analyzed the input, and generates a detailed document summarizing the opinions of the given input document. In the first step pre-processing is done. In the pre-processing we are removing the stop words, white spaces, repeating words, emoticons and #hash tags. To correctly classify the tweets machine learning technique uses the training data. So, this technique does not require the database of words like used in knowledge-based approach and therefore, machine learning techniques is better and faster. The several methods are used to extract the feature from the source text. Feature extraction is done in two phases: In the first phase extraction of data related to twitter is done i.e. twitters specific data is extracted. Now by doing this, the tweet is transformed into normal text. In the next phase, more features are extracted and added to feature vector. Each tweet in the training data is associated with class label. This training data is passed to different classifiers and classifiers are trained. Then test tweets are given to the model and classification is done with the help of these trained classifiers. So finally we get the tweets which are classified into the positive, negative and neutral.

2. LITERATURE REVIEW:

There are two techniques widely used to detect the sentiments from text. They are Symbolic techniques and Machine Learning techniques.

A. Sentiment analysis using Symbolic Techniques

A symbolic technique uses the availability of lexical resources. Turney [4] suggested an approach for sentiment analysis called 'bag of words'. In the mentioned approach, individual words are neglected and only collections of words are considered. He gathered word having adjectives or adverb for the polarity of review from a search engine Altavista. A lexical database called WordNet [6] which determines an emotional matter in a word. Word Net carries synonyms and distance metric to find the orientation of adjectives. To overcome obstacles in lexical substitution task, et al [7]

B. Sentiment analysis using Machine Learning Techniques

Under this technique, there are two sets, namely a training set and a test set. Generally the dataset which is