FORUM FOR RESEARCH AND INTERDISCIPLINARY STUDIES

MES COLLEGE MARAMPALLY
Aluva – 683 107, Ernakulam

Fortis
An Interdisciplinary / Multidisciplinary Biannual Journal
Fortis is a peer reviewed, multi-disciplinary print research journal bearing International Standard Serial Number (ISSN) 2320-6989. The principal aim of the journal is to strengthen research by publishing articles in Science and Technology, Social Sciences and Humanities. The journal lays stress on knowledge dissemination and offers a platform for scholars, students and faculty to publish their original research work.

EDITOTIAL

Fortis; The Journal published by MES College Marampally has always stood a signatory of research by publishing relevant research articles in the fields of Science, humanities and literature. The decisive objective of this journal is the reporting of new upshots in order to disseminate that information to the larger community encompassing students, researchers, academicians, scientists, and literary experts.

This issue of fortis include research papers from disciplines of Computer science, Management studies, Commerce and Psychology. We have tried our level best to carve this issue into a meaningful blend of articles included current trends and thoughts in the above mentioned disciplines.

Dr. A. BIJU
Chief Editor

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IRIS-A NOVEL APPROACH TO BLIND FRIENDLY KITCHEN

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Abstract: *In our world, people with visual impairment find it difficult to live without any support of others. They need support from others even for their basic needs like food preparation, identifying different objects etc. Our mobile application system developed using technologies like IoT and Deep learning can decrease their difficulties up to a certain extent. One feature is to detect the content present in a particular vessel or container. People with visually impaired find it difficult to recognize the items present in a container. So by implementing this system, it will be more helpful for them since this system is capable of speaking out the contents present inside a container by just touching the container by hand. A Quick Bucket list function is provided to find commodities with diminishing quantities . So, it gives an alert message when a particular commodity is below a preset threshold weight. This system also provides facilities like usage analysis and product suggestions for efficient shopping. Data Analysis make people aware about their consumption of commodities in each month. Product suggestions can give details about new products available in the market.An object detection method is implemented using the YOLO v3 and Tensor Flow Lite for real time object detection. Our App is designed in a manner so that both normal people and visually challenged people can utilize our application for easy cooking and shopping groceries. The application also consists of an LPG leak detection mechanism and LPG flame controller which helps to remotely control LPG gas stove using our application for adjusting flame intensity and automatically shut off gas in case of leaks.The hardware portion of our project consists of a kitchen container attached to a load cell platform from which data is transferred to fire base using NodeMCU.The gas leak detection mechanism is implemented using a gas sensor and solenoid valve attached to a raspberry pi.our project mainly aims at bringing a blind friendly kitchen environment*

Index Terms - IoT, Flutter, Firebase, Blind.

1. INTRODUCTION

The human life is contingent on all five sensory organs and most important of it all is vision. To understand life without vision we have to place ourselves in the shoes of visually impaired people. They do live a normal life similar to us but in their own way. In United States, 1.1 million people are blind and about 50,000 lose their sight each year. These things can be avoided to a certain extent such as most of the cases where people are being blind is preventable. Visually impaired people also have hard time in recognizing consumables and keeping track of quantities. The difficulties addressed by the people that are disabled in some way are vast. The objective of our project is to create something that would make the life of visually impaired people a little bit better than it was used to be. The items that they consume have an expiry date which they might consume. This consumption of expired food is harmful. It might be the root cause of unknown diseases. They also need to keep track of the quantities around the house and for that, we have come up with our project. As we have mentioned about the tribulations that visually impaired our primary aim is to reduce the problems faced by them and to make their life much simpler which we humans are having due to the findings of new technology. The assistive technology helps in understanding what type of consumable is present within a container which is connected to android application and provides the necessary information regarding the consumable. When the item has an expiry date then that information is also provided. All these things are integrated together and provide a complete solution to the visually impaired people. In this project we are developing a smart container integrated with a mobile application that helps visually impaired people to recognize consumables in the container by just touching it. At that time an audio output will produce in our mobile application giving the information of the contents in that container. Alert messages are also provided to give information on the expiry date of consumables and also for the low quantity substances. This system is very helpful for people with dementia and also helps to avoid accidental consumption of medicines by visually impaired people. We are also providing a system that detects the leakage in gas cylinders and the ON and OFF operations of the gas stove and the control of flame intensity is made possible through our mobile application. We are also providing object detection and product suggestions in our mobile application to help people in purchasing new and good products.

2. RELATED WORKS

The existing work discuss the intelligent kitchen system based on the Internet of Things technology and combined with modern means for management using sensors, ZigBee, web applications, mobile development and other technologies to manage and monitor the kitchen information, providing an effective intelligent management platform for people's home life. The sensor information

in the kitchen is gathered through the ZigBee network and communicate with gateway through the ZigBee coordinator [2]. After certain tests, the results shows that the load cell has high accuracy and high stability under certain combined errors such as hot-cold temperature [3]. Thus load cell is highly suitable for weighing substances. The normally used touch sensor buttons can be replaced by a more cost effective assembly that uses variation in amount of infrared radiations falling upon the photodiode to sense the proximity of human finger [1]. Over the past few years, there are various methods based on Convolutional Neural Network for object detection. As SSD uses convolution filters for detecting the objects depth it lose its accuracy if the frame is of low resolution [7]. YOLO V2 algorithm is comparatively more adaptable for object detection. Raspberry pi is used to configure that is, it converts analog values into digital value and passes this value into database [5].

3. PROPOSED SYSTEM

The following Figure 1 shows the workflow of our proposed system as to how the connections are made.
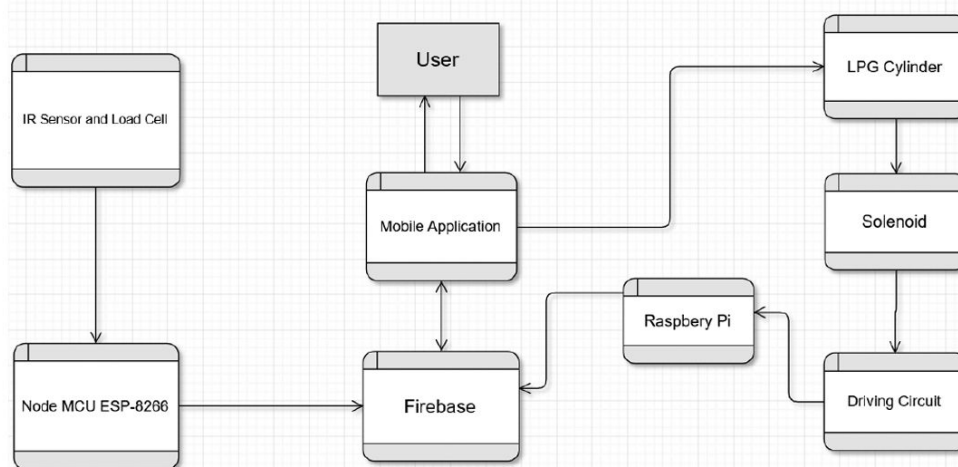
Fig. 1. Workflow Diagram

Our proposed system consists of the following modules:

A. Sensor Attached Container

A Load Cell and IR sensor attached container is implemented to measure the amount of content present in that particular container. Here we use load cell instead of Ultra Sonic Sensor to produce an accurate result.

The application is designed in such a way that there are two login options, one for blind or visually impaired people and other for common people. After installing the application, user has to enter their basic details provided in it and have to choose the appropriate login option. After all the details are entered, the user can enter into the homepage in which four options are provided. They are:

- Add to The Container:- To add details of the container
- View Container:- To view the container details
- Quick Bucket List:- To find low quantity products

- Usage Analytics:- To analyse the usage of each month

When we click on The Add to The Container button a QR Code scanner is opened. We have to scan the QR code pasted on the container. The QR Code contains details about the container including Container ID, maximum weight and so on. After submitting all the details, that corresponding container is ready to use. When we touch the container, the IR sensor attached to it will send a HIGH signal to the MCU to let it know that someone has touched the container. Then container parameters such as weight (calibrated to container level), expiry date etc. Read by MCU is sent via Wi-Fi to Firebase real-time database. From the database the data is read by the mobile application. This idea makes blind people to be self-sufficient up to a certain limit. It provides an easy text to speech mechanism for them. This product also helps people to keep an update about the items and their expiry date. It also prevents accidental consumption of medicines. We are also providing a recommendation system in our application which help people to purchase new and good products. A custom built recommendation system on the usage insights and a collaborating filter model is used which is based on the assumption that people like things similar to other things they like and the things that are liked by other people with similar taste.

C. LPG Flame Intensity Controller And Gas Leak Detector

Visually impaired people find it very difficult in using LPG gas stove and to overcome their problems we have devised a mechanism for controlling the LPG flame intensity through their mobile phone to their desired value while cooking. A solenoid valve is used for this purpose to control the gas flow and the solenoid valve is controlled by raspberry pi unit via a solenoid driver circuit and the LPG flame intensity can be controlled using the level slider button present in the mobile application so that visually impaired people can correctly recognise the flame intensity and set timers for cooking via smartphone application. The gas tube is fitted via a solenoid valve which is connected to the main gas cylinder, the smartphone application can send messages to the raspberry pi via the cloud firebase, based on the input from the user the valve can be fully shutoff or fully option or anything in-between solenoid driver is built using a tip122 NPN transistor, tip 122 act as a switch to control the voltage going through the solenoid valve thereby controlling the gas flow through the valve. A 1n4007 diode is used as a fly back diode to prevent the transistor/raspberry pi from overloading from reverse current. The solenoid driver is connected to a GPIO pin of the raspberry pi and PWM output can be used simulate an analogue voltage value which in then controls the valve. By programmatically controlling the duty cycle of PWM we can simulate an analogue voltage from raspberry pi. MQ-6, a sensor specialized in the detection of LPG and gases whose constituents are propane and butane is used in the proposed system [4]. Being a highly sensitive sensor, it detects the presence of LPG in concentrations from 200–10 000 ppm. It has an outer membrane coated with Tin Dioxide (SnO_2).Upon contact with the components propane and butane, in

LPG, this coating reacts with them and results in an output which is converted into an electrical voltage [4]. The digital output is then given to another GPIO pin of raspberry pi. When the gas limit crosses a certain threshold the MQ6 circuit will generate a digital high signal through digital pin which can be read by the raspberry pi. When this rising edge is detected as an interrupt and the program control will start a interrupt service routine that will shut off the valve completely and thereby hindering any flow of gas, thereby preventing an explosion.

4. RESULT

Iris is capable of providing talk back facility about the contents of the container once the proximity of the user is detected through the IR sensor. Moreover the LPG gas stove can be controlled by using Iris mobile application for functions like controlling the intensity of flames and to turn off the gas stove. In case of gas leaks the solenoid valve gets automatically closed and an alert occurs in the application. The mobile application consists of two sign in functions including google and biometric login which leads to the homepage and the homepage which navigates to the previously defined functionalities mentioned above. All the data from the hardware is stored and retrieved from the firebase and the same data is used for analysis purpose for getting the consumption insight so that the user can track the usage insights. the same principle using loadcell platform used for measuring the quantity of contents in the container can be used to measuring the LPG gas quantity present in the gas cylinder by using a bigger platform and a 20kg Load Cell. Hence a smart kitchen model can be implemented using our hardware and mobile application.

5. CONCLUSION AND FUTURE WORK

In this paper, IoT technology is mainly focused along with deep learning. A mobile application is being developed for visually impaired for making them independent in kitchen. A majority of visually impaired people especially women face many difficulties while cooking such as recognising various groceries. They often forget to go to grocery shops, or about grocery list, or how much grocery items are available in their home [6]. From their testimonials it was found that they also find difficulty in using LPG gas stove and mostly gas leaks would occur which would lead to accidents. This system provides an out of the box solution to all these problems in a user friendly manner. The mobile application is designed in a manner so that both visually impaired people and normal people with vision for their inventory management in kitchen. By using this system, it becomes easier to shop for groceries even on a daily basis as well as to keep tract on groceries and also helps in object detection. The team behind Iris is planning to develop a smart spectacle based system for object detection, navigation and facial recognition in the near future to make this product more effective and available for customer.

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SEXUAL HARASSMENT AMONG STUDENTS IN HIGHER SECONDARY SCHOOLS: A STUDY ON AWARENESS LEVEL OF TEACHERS & STUDENTS

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Abstract: Sexual harassment was earlier called 'eve teasing' or a frivolous pastime for boys and a petty misdemeanour. It took time for high profile cases and protests to be called sexual harassment and to be seen as an offence. Sexual harassment can be seen in anywhere in the world. Even our gods own country Kerala is also experiencing the pain and stain of sexual harassment in various fields. In the present study the researcher throws light into the awareness level of teachers and students of higher secondary schools in Kerala.

1. INTRODUCTION

Sexual harassment means unwanted and unwelcome sexual behaviour. Physical behaviours m includes touching that is uncomfortable, embarrassing, and/or offensive (such as unwanted groping, pinching, or patting). Sexual harassment is not limited, however, to physical acts. Using crude or sexually inappropriate language can be considered sexual harassment if it creates an uncomfortable environment for someone else.Sexual harassment may also include offensive jokes, comments,greetings, verbal teasing etc.Sexual harassments are common in almost all the fields. It becomes more critical and unethical when it is among students.

It was in 1997 that the Supreme Court had redefined sexual harassment in the following terms:- "Sexual harassment includes such sexually determined behaviour such as: physical contact, a demand or request for sexual favours, sexually coloured remarks, showing pornography, any other unwelcome physical, verbal or non-verbal conduct of a sexual nature." This means that

- Sexual harassment is different from sexual desire, mutual romance or love
- It is unwelcome sexual behaviour
- Sexual harassment can come in many forms like physical, psychological,

verbal or non-verbal
- Sexual harassment is a serious criminal offence

Forms of sexual harassment that pertain to a campus environment include; demands for sexual favours accompanied by veiled or open promises of preferential treatment or threats concerning an individual's employment or student status, physical and verbal aggression arising from the above, communicating or displaying obscene letters, posters, cartoons, or photographs, disparaging remarks and gestures made with prejudicial intent in the work or study places, which specifically relate to the issue of gender, harassment through unwelcome telephone calls or e-mail, uninvited chasing or following/blackmailing in or outside the campus.

Kerala is in a shock of seeing innumerable cases over the recent past where even those who are morally and socially obligated to protect children put on the garb of oppressors. As such, the state is witnessing and reporting an alarming rise in sexual crimes against children. As per state crime records bureau, till September 2012, 286 children were raped in the state. The number was 423 in 2011 when 47 children were murdered and 129 kidnapped. Surveys are coming with alarming figures like, 35-40% of all children in the state having faced some or the other sexual abuse.

2. RELEVANCE OF THE STUDY
International studies reveals that almost 80% of students in higher secondary schools report experiencing sexual harassment at schools (Ellie L Young, 2005). While taking the Indian scenario,the latest reports of Higher Education Council reveals that Indians schools are experiencing sexual harassment but the depth and the width may not be properly exhibited since lack of clear cut studies on this area. For the systematic analysis as well as the eradication of such issues it is very essential to create an awareness and understanding among the teachers, parents, and students about what sexual harassment actually is, how to respond to it, and how to prevent it.

3. OBJECTIVES OF THE STUDY
- To measure the awareness level of teachers about sexual harassment students in higher secondary schools in Kerala.
- To measure the awareness level of students about sexual harassment existing inhigher secondary schools in Kerala.
- To make a comparative analysis of awareness level of male and female students of higher secondary schools on sexual harassment.
- To identify whether there is any difference in the awareness level of rural and urban higher secondary schools in Kerala.
- To know whether any cell is working in higher secondary schools to handle these types of issues arising in the higher secondary schools in Kerala.

4. METHODOLOGY

Primary as well as secondary data source is used for the smooth conduct of this study. Structured questionnaires are used to measure the awareness level of the teachers as well as the students about the sexual harassment prevailing in the higher secondary schools. Awareness testing score card is used for checking the awareness level of students. Direct personal interviews are conducted with the school authorities, heads of the institutions etc. Secondary data source such as journals ,magazines, newspapers, other reports are also utilized for the successful completion of this study.

The study is conducted among 20 Higher Secondary Schools of Thrissur District in Kerala. The convenient stratified sampling methods were used and from each school 10 students and 5 teachers are selected and in total 200 students and 100 teachers are included in the sample. Among this sample 10 school belongs to urban sector and 10 from rural.

5. LITERATURE REVIEW

Adolescent Education: An Inspiring Success story from vocational higher scecodary levels of the kerala,Report of KSACS and DVHSE,2008.
Several incidences of risky behaviour, sexual harassment and abuse of adolescent girls and boys has been reported inrecent years from Kerala. The suicidal death of three girls due to sexual harassment by their peers at a coastal higher secondary school of Alappuzha District is a recent example. The incidence motivated the Directorate of Vocational Higher Secondary Education (DVHSE) to accept the offer of technical and financial support by KSACS and undertake possible life-skill education programmes and counselling services to children studying in higher secondary classes.

The above report pointing towards the fact that students in higher secondary level of Kerala is experiencing the problem of sexual harassment.

A Study on Sexual Harassment in Colleges in Mumbai: An Executive Summary.
In India, every day a woman is harassed every 51 minutes and sexually molested every 26 minutes. We have no idea of the unreported cases which make up the remaining part of the iceberg's tip. Most people will argue that sexual harassment either happens in isolated and dark roads or large organisations. What they mean is that not all women face it. Let us look at college campuses, which are protected, learning institutions. The Gender Study Group of the University of Delhi, 1996 shows that 92 percent of women in hostels and 88 percent of women day scholars have faced sexual harassment on campus. A 2006 survey of colleges in Mumbai found that 39 percent of women students have experienced harassment (Ara Johannes & Nandita Gandhi, Akshara, 2006).

The above study reveals that Indian schools and colleges are also experiences sexual harassment.

Gender, sexual abuse and risk behaviours in adolescents:A cross-sectional survey in schools in Goa ,(Vikram Patel & Gracy Andrew,2001).

This paper describes the findings of a study on adolescent health needs focusing on the prevalence and associations of the experience of sexual abuse' in school-based adolescents. Abuse and violence in school-based adolescents is a common experience and is associated with poorer health and greater prevalence of risk behaviours. Interventions aimed at improving adolescent reproductive health must incorporate personal safety, prevention of abuse, communication skills and mental health issues.(Natl Med J India 2001; 14:263-7).

The above study put forward the need for preventing sexual abuse in schools through proper awareness campaigns.

Aawaaz-The newsletter of Tulir-centre for prevention and healing of child sexual abuse Apr-sept 2005.
Even though research on child sexual abuse has gained momentum abroad, it is still a neglected area in Indian and South Asian context. For any issue to be appropriately addressed, it is very important that an adequate body of knowledge be built to make informed decisions as far as policy and practice are concerned; and research is a very relevant process in this direction.

The above study pin points towards the unavailability of sufficient research contribution to this context in India and also recommends quality research projects in this area.

6. ANALYSIS
For the purpose of data collection students and faculty were asked a series of questions to find out what they thought amounted to sexual harassment. Undoubtedly, there is a shift from the earlier understanding of sexual harassment as 'eve teasing' or what our law says'outraging the modesty of a woman'.

Sample profile
Sample for the present study constituted 200 students and 100 teachers of higher secondary schools of Thissur district, Kerala. The detailed sample profile is given

Table 1. Sample profile-Based on gender-students

Students	Number	Percentage
Male	100	50
Female	100	50
Total	200	100

Table 2. Sample profile-Based on gender-Teachers

Teachers	Number	Percentage
Male	40	40
Female	60	60
Total	100	100

Table 3. Sample profile-Based on School-Location

Category	Number	Percentage
Urban	10	50
Rural	10	50
Total	20	100

The first objective is to analyse the awareness level of teachers. For this structured questionnaires are distributed among 100 teachers from 20 higher secondary schools in Thrissur district.Analysis reports states that:

- 70% of the teachers are not aware about the sexual harassment definition given by supreme court.
- 89% of the teachers having the opinion that sexual harassment is existing in the higher secondary schools.
- 75% of the teachers are having the opinion that no serious sexual harassment issues are occurring in their schools.
- 90% of the teachers states that sexual desire, mutual romance or love can be commonly seen in higher secondary schools.
- Majority of the teachers respondents, teasing is common in schools but sexual harassments are not common.
- Less than 5% of the students are informed or registered complaints with teachers about sexual harassment.
- Teachers believe that In actual scenario 20-25% of the students are experiencing sexual harassment

The second objective is to analyse the students perceptions and awareness level about sexual harassment. For this 200 sample are selected from 20 higher secondary schools in Kerala.

From the response of the students we can understood the following factors:

- 41% of the students are aware about supreme court definition of sexual harassment.
- 65% of the students believe that sexual harassment is exisiting in the higher secondary schools.
- Based on the score card 40% of the students were achieved 5-10 points on the awareness testing score card.
- From the selected sample 22% of the students are responded that they experienced sexual harassment in schools.
- Only 3% of the students were informed sexual harassment issues to their teachers.
- 92% of the students responded that eve teasing is common in schools but it is neglected by the students.
- 5% of the respondents feel mental harassment through eve teasing.

When comparing this findings with research studies of other states like Maharastra, Uttarpradesh,Karnataka, etc , I can clearly mention the fact that higher secondary schools in Kerala is having better percentage of awareness

about sexual harassment..But in Kerala eve teasing is considered not as a sexual harassment since it is relatively harmless behaviour committed usually. These findings show that it becomes important to distinguish between sexual harassment and eve teasing clearly.

Table 4. Comparitative analysis of awareness level of
male and female students (based on score card)

Gender	5 -10 points	Percentage
Male students	30	37.5
Female students	50	62.5
Total	80	100

The table reveals that awareness level of female students are high comparing with male students.62.5% of the female students scored 5-10 points whereas only 37.5% of the male students achieved the above listed score.

Table 5. Comparison of Awareness level of students based on Area

Gender	5 -10 points	Percentage
Male students	30	37.5
Female students	50	62.5
Total	80	100

From the table it is clear that the awareness level of students of urban area is higher than that of awareness level of students of rural area on sexual harassment issues. Out of 80 students who obtained high score in awareness level 65% belongs to urban community and the remaining 35% rural.

Next objectives of this study is to find out whether there is any cell or authority is working in the higher secondary schools for the   Prevention of sexual harassment and the promotion of the general well being of female students.

Table 6. Table showing Preventive authorities or
working cells for sexual harassment in schools

Preventive authorities	Number of schools	Percentage
Women cell	16	80
Anti-Harassment Cell	1	5
Counselling Cell	10	50
Anti-Ragging Cell	13	65
Other cells like karunya, Talir	5	25

Higher secondary schools of Kerala is constituted so many cells for the proper control and prevention of sexual harassment in the schools. Based on the data collected we can see that:
- Almost all the higher secondary schools are having any one of the cell working for preventing sexual harassment in the schools.

- Majority of the schools have a women cell but as per the interview reports it is clear that majority of this women cells are name sake and dormant in the schools.
- 50% of the schools are having counselling cell working for maintaining and enhancing the mental health of the students
- 25% of the schools having other related cells like karunyya, Talir, mahila, janani,etc for protecting the school students from sexual harassment
- Only 5% of the schools are having Anti-harassment Cell for preventing all types of harassment against the students.

7. FINDINGS IN A NUTSHELL

200 students including male and female and 100 teachers from 20 higher secondary schools were interviewed using the qualitative and quantitative methods. The results includes

- The majority of men and women students and faculty did not have a holistic awareness of the definition and issue of sexual harassment. Their understanding was a mix of commonly held views. The majority 64.1% were not aware of the Supreme Court guidelines and definition of sexual harassment.
- Both the faculty and students admitted that there exists sexual harassment in higher secondary schools.
- Awareness level of female students are more than that of male students in higher secondary schools.
  Awareness level of students of urban higher secondary schools are higher than that of students of rural higher secondary schools
- Majority of the schools are having at least one of the Cell for preventing sexual harassment, but none of them are properly working.

8. RECOMMENDATIONS FOR FURTHER ACTION AND RESEARCH
Awareness

- Need for awareness generating programs for teachers and students in schools with respect to the history behind sexual harassment laws, the state policy and definition of sexual harassment.
- Organization of seminars and workshops for the creation of general awareness and for the orientation of both male and female teachers for their participation in the activities of the cell.
- Organization of various types of training programs and self-employment schemes for the encouragement of self-reliance among female students
- Sexual harassment leads to absenteeism, lowering of grades and loss of self confidence are some of the impacts of sexual harassment on women.
- College authorities should make available services of counsellor.
- There is a need for effective working of women cell and other Cells for preventing sexual harassment in schools. It could also periodically enquire about the Cell and trouble shoot problems.

9. CONCLUSION
Sexual harassment is a sensitive topic. It is a pervasive issue which can be seen

in any where without any national international discrimination.In our Kerala also we can see the stains and ashes of sexual harassment in houses, schools, public places and so on. When the issue of sexual harassment pertains to a school environment, it so critical .merely providing students, parents, and staff with information about the school's sexual harassment policy is insufficient. Schools must provide positive, proactive behavioural supports, ongoing training, and discussions on this area.

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MODIFICATION IN SENTI-LEXICON ALGORITHM FOR SENTIMENT ANALYSIS

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Abstract: Social media is one of the most significant information exchange technology of the 21st century. People of all ages use social media to post messages, photos and videos about their daily activities. Social media channels, such as Twitter and Facebook, provide very convenient and efficient ways of communicating and sharing information publically. Social media are rapidly becoming a source of information for early warning systems in public safety. Sentimental analysis, also known as opinion mining, is a natural language processing technique used to extract the feeling or attitude of general masses regarding a given subject or product. We have also proposed a method to ensure accuracy to the existing Senti-lexicon algorithm to find the polarity of a review as positive or negative.

Index Terms: Opinion Mining, Orientation, Polarity, Sentiment Analysis, Senti-Lexicon algorithm.

1.INTRODUCTION

Whenever a person wants to purchase something ,going for a movie or to do something he will asks for opinions from his friends or someone experts in that particular area. Nowadays increased use of internet, people starts searching reviews of a products or a movie or something else online. However as there is an enormous development in the generation of review information online, we have now started to consider the internet as a big source of opinion evaluation. Now, we check the comments, star ratings, likes and customer reviews of the product before buying it. One of the key challenges with the user today is that the review data is so enormous that it makes nearly impractical for a person to visualize the cumulative result. The discovering, analyzing and cleaning of the information on the opinion sites is a frightening job due to the sanitization of the different sites. The customer's hunger and reliance on the online recommendations is a major reasonbehind the sudden increase in the interest of corporate

giants, politicians, individuals and researchers in this field . The analysis result can be further employed for evaluation of customer choices; product quality improvement; yardstick databases; market research; advertising, recommendation systems and facilitate future research. In this paper, we are suggesting a modification to the lexicon algorithm used for opinion mining. By implementing this modification,we can improve accuracy of the existing algotithm.

2. LEVELS AND TYPES OF OPINION MINING

Based on the polarity, an opinion is said to be of three main types; positive, negative or neutral. A positive opinion is one which contains positive sentiment words e.g. nice, excellent, beautiful etc. likewise, an opinion can be of negative orientation if it contains words with pessimistic emotions like hate, angry, bad etc. Apart from these words, there are negation words such as not, no, didn't, which when combined with the keywords reverse the polarity of the sentiment. It is important to take care of such words as their presence can have a massive effect on the final sentiment results. Levels of opinion mining: A. Document level mining: in this level,the whole document is taken into consideration, the resultant opinion presented by the opinion holder is categorized as neutral, positive or negative . A hypothesis is made that every document expresses a sentiment about a particular subject from the point of view of a single opinion holder. In forums and blogs, document level analysis is not employed as comparative sentences may be present and opinion holders may contrast an entity with any other which has comparable features. B. Sentence level mining: In this level, the aim is to explore the sentence and obtain its orientation. There are two objectives; first, to determine if the sentence is objective or subjective. An objective statement is one that is totally unbiased. It does not contain the previous experiences or likings of the speaker. A subjective statement is the one which is mould by the character of the author. It often reflects the perception or opinion or view of the opinion holder. C. Entity level mining: The above mentioned levels don't find out precisely what is liked or disliked about an entity. Entity level performs a refined analysis, instead of analyzing the language constructs, it evaluates at the opinion itself . There are following objectives associated with it; recognize and obtain the features of the object, establish the orientation of the sentiment and ultimately generate an opinion summary based on features.

3.TECHNIQUES FOR OPINING MINING

Sentiment analysis is a flourishing research topic. The techniques for opinion mining can be categorized as:

3.1 Machine Learning Approach

Machine learning is a branch of computer science that gives electronic machines the capability to learn and understand by setting predictions on the given data without being explicitly programmed. Some of the popular classifying algorithms are:

A. Naive Bayes classifier is based on Bayes' theorem. It assumes that the value

of a specific feature is independent of the value of any other feature. This classifier is straightforward, uncomplicated and efficient for large datasets, without any complex iterative parameter estimation.

B. Maximum entropy is a classifier which is based on probability distributions of the data. The primary rule is that when no information is known then the distribution should have maximal entropy.The labelled training data offers restriction on the distribution and find out where to have minimal non-uniformity.

C. Support vector machines are supervised techniques together with learning algorithms that observe data used for classification provided with training examples, which are clearly labeled for belonging to one of the types. An SVM training algorithm develops a system that assigns unique examples to each group, making it a nonprobabilistic, binary linear classifier. The main disadvantage of machine learning approach is that the training data set is difficult to obtain. One way to handle this problem is to automatically produce a training set, however, these give inaccurate and unrealistic results.

A. Manual approach: It is a lengthy, labor intensive and an exhaustive technique to builda lexicon. Hence it is combined with one of the following two approaches.

B. Dictionary-based approach: In this approach, initially a basic group of seed words which have known polarity is assembled manually. Then, a program is run that collects synonyms and antonyms for these words and hence expand the dictionary. In each iteration, new words are added to the dictionary until no more new words can be found. Once the first cycle is completed, the list is manually examined for clean up. Even though the approach seems simple, the key limitation of this method is that it generates general words which are independent of the background or context.

C. Corpus-based approach: In this approach, a domain specific lexicon is built. Such dictionaries can be built by two methods. A primary seed list of general-purpose sentiment words is generated and then the different opinion words along with their orientations are acquired. The second method is to convert a generalpurpose dictionary to corpus-based dictionary by a field corpus for opinion mining applications in the domain. Since a word in the same domain can be negative in one context and positive in another the process is too complicated. Machine learning approaches are more accurate than the lexicon-based approaches but they are timeconsuming and their performance greatly depends on the training dataset. On the other hand, lexicon approach is relatively fast, straightforward and easy to program. They work well for simple data sets with a clear difference between positive and negative orientation sentences.

4.ALGORITHM PROPOSED
Input: D {review data}; PWord{positive words lexicon}; NWord- {negative words lexicon}; PEmoticon {positive emoticon lexicon}; NEmoticon {negative words lexicon}; NegationW {negation words lexicon} Variables: PScore {positive word

score}; NScore{negative word score};

Step 1: Pre-processing and data cleansing

Step 2: For each Review paragraph(s) in D, do Split D into separate sentences

Step 3: Initialise words belong to NWord, NEmoticon and NegationW as 0 and words belong to PWord and PEmoticon as 1.

Step 4: For each word in the sentence compare the first word with the second word using bitwise XNOR operator. Continue this process until the encountering of the '.' Operator.

Step 5: If the value get at the end of the evaluation of a sentence is 1 then increment PScore. Else increment NScore. Continue this process until the end of the given paragraph end for

Step 6: Display Final Sentiment if (PScore>NScore) Sentiment=Positive else Sentiment=Negative.

5. IMPLEMENTING TECHNOLOGY

In this approach we are first inputting the dictionaries which consist of positive words, negative words, positive emotions and negative emotions. Then we input the paragraph to be evaluated. Then divide paragraph into sentences and from the sentence we take each of the words separately. Then we will identify to which dictionary the word belongs to and will assign a 1 or 0 to each word as described in the algorithm. Then we will compare the first word with the next and evaluate a 1 or 0 using bitwise XNOR operator. Then this 1 or 0 is compared with the third word. This process will be continued until a.' Operator is encountered. So we will get a 1 or 0 as output for a sentence. If we are getting a 1 then we will increment the PScore which indicates the count of positive words or emotions and if we get 0 we will increment the NScore which denotes the count of negative words or negative emotions. This process will be continued until the end of paragraph. The final results are obtained by comparing the PSore and NScore. If PScore is greater than NScore the the outcome is positive.Otherwise the outcome will be negative.

Senti-Lexicon algorithm was implemented using R-studio and R programming languages.For implementing the modified version of Senti-Lexicon algorithm we are suggesting Python programming language which is more flexible than suggested R-studio and R programming language.The Python having the capability of reading multiple paragraphs as a single paragraph.

6.CONCLUSION

Our paper suggests a modification to exixting Senti-Lexicon algorithm which is used for evaluating the movie reviews on online social media platforms. We are suggesting this modification to increase the accuracy of the existing algorithm. Challenges such as the presence of sarcasm, blind negation, complex sentences, spam detection, forged reviews, sensitivity over time, handling hidden features could be taken up as research areas.

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SECULARISM IN INDIA: REFLECTION OF RELIGIOUS PERSPECTIVES AND CHALLENGES

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Abstract: *India is a land of religions, languages and customs. Many religions are flourishing here since long back, which have their own traditions and beliefs. Therefore India is a multi-religious and multi-cultural country from its known history. It was never mono-religious or mono-cultural. The number of invasions and incursions from Aryans to Mughals added to religious, cultural and linguistic pluralism. British colonialism also contributed to its cultural and religious multiplicity. Thus with every invasion and incursion Indian society became more and more complex and rich. Perhaps no other society of the world is as multi-cultural and multi-religious as Indian society. It is rightly said that 'here the Aryans, the non-Aryans, the Dravidians and the Chinese, the tribes of Scythians and Huns, the Afghans and the Muguls have all merged into one body'. Indian society is like a mighty river fed with many tributaries and the main stream flows on and on. Hence, Indian society is very rich, and well known for wisdom and great thoughts. Secularism is an important aspect of Indian society, for which it is also well-known in the world. The present paper sheds the light on Secularism, its concept, history and challenges in the context of India.*
Key Words: *Secularism, Religion, Society, India*

ORIGIN OF THE WORD SECULARISM

According to modern literature secularism has its origin in western countries and it is related to the separation of the church from the state, which gives the state a position of neutrality between different religions, while at the same time, it guarantees all citizens right to adhere any religion. According to Gahrana, 1998; Kar, 1998; Sharma, 2000; Talesra, 2002;and Yerankar, 2006, G.H. Holyoake has been regarded as the originator of the concept of secularism because of his important work such as, 'Principles of Secularism' and 'The

Origin and Nature of Secularism'. A secular state as defined scientifically, means a state which recognizes every citizen as equal and does not recognize any social or religious stratification for any political benefit. But what is generally projected as secularism is tolerance of all religions with special emphasis on the protection of minorities and preservation of communal harmony. However, in the words of Rizvi (2005) the essence of secularism rests on two basic principles:

(i)   Separation of religion from politics.
(ii) Acceptance of religion as purely and strictly private affairs of individuals having nothing to do with the state.

Sometimes, the word secular is used as a contrast with the word religious, which lead people to believe that secularism is opposed to religion. But in reality rather than remaining opposed to religion, secularism takes a dispassionate view in running the affairs of the state. In the context of India, it basically connotes treatment of all religions on a footing of equality and ruling out any discrimination. Hence, secularism means separation of the state, politics and non-religious areas of life from religions and religions being treated as a purely personal matter (Chandra, 2008). So, when India is said to be a secular state, it only means that the state will not identify itself with any particular religious faith and that no person shall suffer any disability or discrimination on the basis of religion.

SECULARISM IN THE HISTORY OF INDIA
Secular traditions are very deep rooted in the history of India. Indian culture is a composite one which is based on the blending of various spiritual traditions and social movements. In ancient India, the Santam Dharma (Hinduism) was basically allowed to develop as a holistic religion by welcoming different spiritual traditions and trying to integrate them into a common mainstream. The development of four Vedas and the various interpretations of the Upanishads and the Puranas clearly highlight the religious plurality of Hinduism.

Emperor Ashoka was the first great emperor to announce, as early as third century B.C. that; the state would not prosecute any religious sect. In his 12th Rock Edit, Ashoka made a appeal not only for the toleration of all religion sects but also to develop a spirit of great respect toward them. He pleaded for restrain of criticism of other religious sects. He asked people to become perfect in the scriptures of other religions. The religious tolerance expressed by Ashoka more than 2,300 years ago has been one of the cherished Indian Social Value. Ashoka's secular outlook is one of the landmarks not only of Indian civilisation but also of the human civilisation itself (Yerankar, 2006). Even after the advent of Jainism, Buddhism and later Islam and Christianity into the Indian soil, the quest for religious toleration and co-existence of different faiths continued.

In medieval India the Sufiand Bhakti movements bond the people of various communities together with love and peace . The leading lights of these move-

ments were Khwaja Moinuddin Chisti, Baba Farid, Sant Kabir Das, Guru Nanak Dev, Saint Tukaram and Mira Bai. They contributed to the development of a composite culture in such a manner that nobody dares to challenge them. The remarks of Guru Nanak, when he says that 'There is no Hindu and no Musalman, as there is no distinction between man and man'(Rizvi, 2005), give support to the roots of secularism.

The Mughal emperor the great Akbar also to a great extent promoted the policy of toleration of different religions. His propagation of Din-e- Illahi (Divine faith) and Sulh-e-kul (Peace with all) were highly inspired by the spirit of secularism. Most of the Mugal kings were tolerant and liberal in their approach. Mansingh a Hindu was the commander of Akbar's Army. There were forty thousand Rajput soldiers and more than five hundred were Hindu Sardar. During the period of Shahjahan 22.4 percent were Hindu Sardar. In Aurangazeb's regime, 31.6 percent were Hindu Sardar. He appointed Raja Jaswant Singh (Rajput) as a head of Afghanistan. His first Prime Minister was Raghunathdas and he remained as a Prime Minister till his death. The Muslim rulers were not as anti-Hindu as pictured by some chauvinist Hindu leaders (Yerankar, 2006). On the other hand Hakim Singh Suri a Muslim was the commander of Ranapratap Singh's Army and in the regime of Chatrapati Shivaji, Siddhi Halal and Nur Khan both Muslim were Sardars (Tara, 1991).

The spirit of secularism was strengthened and enriched through the Indian freedom movement too. In the initial part of the Indian freedom movement, the liberals like Sir Feroz Shah Mehta, Govind Ranade, Gopal Krishn Gokhale by and large pursued a secular approach to politics. The Brahma Samaj started by Sri Raja Ram Mohan Roy and the Arya Samaj led by Swami Dayanand Sarswati never treated other religious faiths with any antipathy. On the other hand, they tried to purify the wrong traditions which had gradually sapped the vitality of Hindu religion.

The constitution drafted by Pandit Moti Lal Nehru as the chairman of the historic Nehru Committee in 1928, had the following provision on secularism as, 'There shall be no state religion for the commonwealth of India or for any province in the commonwealth, nor shall the state, either directly or indirectly, endow any religion any preference or impose any disability on account of religious beliefs or religious status'

The principal advocates of secular ideology in modern India were Mahatma Gandhijiand Pandit Jawahar Lal Nehru. Gandhi 's secularism was based on a commitment to the brotherhood of religious communities based on their respect for and pursuit of truth. Whereas, Pandit J. L. Nehru's secularism was based on a commitment to scientific humanism tinged with a progressive view of historical change. Pandit Jawaharlal Nehru has been a leading champion of the concept of the secular state. The creation of India as a secular state has been accepted as one of his greatest achievements. Moreover he was especially concerned with transforming India from a 'caste ridden society' in which

communalism constitutes a major threat to all the values that he cherished to a 'national state' which includes people of all religions and shades of opinion and is essentially secular as a state.

At present scenario, in the context of Indian, the separation of religion from the state constitutes the core of the philosophy of secularism. The expression 'secular' has also a special significance in the context of the historical development of Indian polity. It is of pivotal importance in the context of political realities on the ground as they exist now. In India, the word secular is identified with tolerance among the different religions. In a secular state, no one enjoys any special privilege in national life or in any type of conduct for international relations. No group of citizens arrogates to itself the rights and privileges which it denies to others. No person suffers from any form of disability or discrimination because of his religion but all alike to be free to share the fullest degree of freedom in his the common life.

Explaining the notion of secularism in India, Das (1991) quotes D.E. Smith, and writes that, 'The secular state guarantees individual and corporate freedom of religion, deals with the individual as a citizen irrespective of his religion. It is not constitutionally connected to a particular religion nor does it seek to either promote or interfere with any religion'. According to Rizvi, (2005) on a close analysis of the secular state in India, it involves three distinct but inter-related sets of relationships concerning the state, religion and individual. These are (i) Religion and the individual, (ii) The state and the individual, and (iii) The state and religion.

In a secular state, the relationship between religion and individual is an independent variable in the sense that each and every citizen is free to choose his or her own religion or even refuse to adhere any one of them. The state has no business to disturb in the right to conscience. The relationship between the state and the individual is also another independent variable in the sense that it is dispassionately decided under some constitutional guidelines. Thus religion has practically no role to intervene in such a social relationship. The state and religion both are independent to decide their course of action about their own norms. Indian constitution arranges that both keep a respectable distance between each other. Yet in case of any clash of interests among different religions, the state has every right to arbitrate and even regulate their activities.

SECULARISM IN THE CONSTITUTION OF INDIA

Constitution of India has adopted a system of political philosophy that all forms of religious faith and worship are of equal status and has accepted the view that public education and other matters of public policy should be conducted without the introduction of religious sentiments. Indian constitution has elaborated the principle of secularism in great detail. It specifies that the state should refrain from either penalizing or favouring any of its people on religious

considerations. In fact, India adopted secularism to facilitate the promotion of religious tolerance and cultural co-existence (Majid, 1985).

It is true that the word 'secular' did not first occurs either in article 25 or 26 or in any other article of Preamble of the constitution. By the forty-second Constitution Amendment Act of 1976, the preamble was amended. Since then India becomes a sovereign, socialist, secular and democratic republic. The constitution says that, there shall be no 'state religion' in India. The State will neither establish a religion of its own nor confer any special patronage upon any particular religion. It follows from this that;

The state will not compel any citizen to pay any taxes for the promotion or maintenance of any particular religion or religious institution (Article 27).

No religious instruction shall be provided in any educational institution wholly provided by state funds Article 28(1).

According to Article 28, every person is guaranteed the freedom of conscience and the freedom to profess, practice and propagate his own religion, subject only (a) to restrictions imposed by the state in the interests of public order, morality and health , (b) to regulations or restrictions made by state relating to any economic, financial, political or other secular activity which may be associated with religious practice, but do not really appertain to the freedom of conscience, (c) to measures of social reform and for throwing open of Hindu religious institutions of a public character to all classes and sections of Hindus. Subject to above limitations, a person in India shall have the right not only to entertain any religious belief but also to practice the observances dictated by such belief. (Article 25)

PRACTICE OF SECULARISM IN INDIA

After a long struggle against Britain's colonial rule, when the Indian subcontinent gets a status of independent country, then it becomes a pluralistic nation and welcomed religious and cultural diversity. According to Rambabu,(2006)at the time of the partition it was estimated that there were 361 million people living within India's borders; of these people 315 million were Hindus, 32 million Muslims, 7 million Christians, 6 million Sikhs, one million Buddhists, 100,000 Parsians and a small minority of Jews. Therefore it was the need of the hour to save this multi-ethnicity of India, for which later on our Constitution have opted the way of secularism.

In real practice too, the governments in India always tried to follow a secular path, although it had some setbacks from time to time. In our country, we had as many as four non Hindu Presidents, three Muslims namely, Dr. Zakir Husain, Fakhruddin Ali Ahmed, Dr. A. P. J. Kalam and a Sikh, Gyani Zail Singh. Supreme Court of India has had Muslims as Chief Justices, one of them M. Hidayatullah, was also Vice-President for a term. Presently Dr. Hamid Ansari, a Muslim is at the position of Vice President of India. Air Chief Marshal I. H. Lateef was a Muslim. Several others have reached very high positions.

There have been invariably more than one Muslim minister at the centre and in most of the states. Similarly governors, vice-chancellors, leaders in the field of science and technology, and a number of ambassadors are from different religious communities. Therefore, in general the Indian government has not been indifferent to religion but has attempt to treat and foster each religion in the country equally (Juergensmeyer, 1994).

The minority communities in India are well represented in the top cadres of the armed forces. Muslims, Christians, Sikhs and the other minorities have given the country some outstanding civil servants, artists and sports persons in sixty seven years since independence. The general non-discriminatory climate in the country ensures that ability and performance should be given due weightage and nobody should be held back because of his/her religion.

CHALLENGES OF SECULARISM IN INDIA

Indian is known for its cultural heterogeneity with respect to language and religion. Hindus constitute the majority, while the Muslims constitute the largest minority. The animosity between the Hindus and Muslims was largely the creation of the British rulers. In order to keep themselves in power, they adopted a policy of 'divide and rule' and tried to promote feelings of hostility among the members of these two communities. After a long history of inde-pendence, at present too, the lack of proper adjustment between them has often resulted in violent outbursts and communal riots, which unfortunately becomes a serious challenge to the secular identity of our country.

On the other hand, very often the political parties, including the national parties, too sometimes, do not allow secularism to take precedence over their political interests. The electorate in India, guided by tradition, tends to be responsive to appeals based on caste, religion and language. By announcing various schemes favouring a particular community, political parties, openly violate the idea of secularism they claim to stand for. While distributing tickets during elections, nearly all political parties take religion of a candidate into consider-ation. Such a practices in India poses the greatest threat to secularism.

CONCLUSION

After a long history of communal incident in India, still now, Secularism Is seen as the only possible option that would be able to provide harmonious and peaceful survival for the different religions and casts of Indian society.

It is point to note that we need proper educational plan too, to slightly redesign our existing curriculum in the schools and colleges. The text books presenting distorted historical facts have to be changed and secular ideas will have to be inculcated in the innocent minds of our young generation. All religions should get their weightage in the textbooks of history. The culture, traditions and festi-vals of any particular religion should not be over-projected. The sacrifices and hardships of all religious communities and their contribution towards freedom and development of the country need to be focused in the books of the history

at school and college level. The importance of various culture and traditions of different religions in the peculiarity of the country should have to be discussed properly. At last since, India has been declared a secular state by its written constitution, therefore it is the responsibility of every Indians to stand by and believe in this declaration.

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A PREDICTIVE FRAMEWORK FOR
WIND SPEED USING STACKED LSTM NETWORKS

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Abstract: The use of renewable energy sources has increased significantly due to the depletion of fossil fuels. The usage of conventional energy sources is making the environment more polluted. So, recently, wind and other renewable energy sources have got more significance and demand. Low cost, eco-friendliness, and availability are the most important factors which make wind an important renewa-ble energy source. Deep Neural networks are special types of neural networks that can process and analyze huge datasets and are capable of making predictions based on past data. This paper suggests a deep learning-based model using stacked LSTM (Long Short Term Memory) to forecast wind speed on an hourly basis. The statistical error indices, Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and Coefficient of Determination (CD) are adopted to estimate the ac-curacy of the predictive system. The performance of the proposed model is com-pared with Support Vector Regression (SVR) and Artificial Neural networks (ANN)... The experimental results prove that the proposed model is more efficient for wind speed forecasting.

Keywords: Wind Speed Forecasting, Deep Learning, Recurrent Neural Networks, Long Short Term Memory.

1. INTRODUCTION

Energy sources are an inevitable part of every developing country for their industrial and agricultural activities. Wind energy is one of the greatest promising and environ-ment-friendly sources of renewable energy. Wind speed pre-diction is an important ac-tivity as the wind has many applications in various domains such as agriculture, indus-try, marine applications, and power gener-ators. In wind power generators, effective and precise wind speed prediction

is an important activity as the wind has many applications in various domains such as agriculture, industry, marine applications, and power generators. In wind power generators, effective and precise wind speed prediction is a necessity for generating electricity. The intermittent nature of wind speed makes accurate predictions a challenging task. The advent of information technology and the abundant accessibility of massive datasets have motivated researchers to learn hidden patterns from datasets. Deep neural network architectures can learn high-level abstract features from big datasets precisely. Deep learning structures like Recurrent Neural Networks (RNN) and LSTM are reliable models for time series forecasting, especially wind speed forecasting.

The forecasting models can be grouped into physical, statistical, artificial intelligence, and hybrid systems. Based on the duration of forecasting, the models can be categorized as short, medium, and long term. Numerous wind speed forecasting sys-tems are implemented so far using machine learning, deep learning, and hybrid models. Filik et al. [1] developed an artificial neural network model by utilizing weather parameters such as wind speed, temperature, and pressure. Tarade et al. [2] carried out an extensive survey on the existing wind speed prediction models using ARIMA, ANN, and Polynomial Curve Fitting. Ramasamy et al. [3] detailed an ANN-based system to predict wind speed at eleven locations in Himachal Pradesh. Labati et al. [4] sug-gested a wind power forecasting model based on the decision support system and neural networks. Nury et al. [5] proposed a prediction model using wavelet-ARIMA and wave-let-ANN to predict the monthly highest and lowest temperature in North-eastern Bangladesh. Liu et al. [6] suggested methods for optimizing the hyper-pa-rameters of SVM for recursive multi-step ahead wind speed forecasting. Ni-ya et al. [7] presented a hybrid short-term wind speed forecasting model based on WT and SVM to predict several hours of wind speed.

Deep learning architecture has to be employed for training a neural network with more hidden layers. Deep learning utilizes both developments in comput-ing power and special types of neural networks that can automatically extract essential features from massive datasets. Coa et al. [8] presented a complete review of various wind speed prediction models using univariate and multivari-ate ARIMA models and Recurrent Neural Network (RNN). Khodayar et al. [9] proposed a stacked autoencoder DNN model for extremely short-term forecasts of wind speed in Colorado, USA. Sergio et al. [10] described deep learning-based models for forecasting wind speed. Siami-Namini et al. [11] conducted an extensive survey on various time series prediction models using LSTM and ARIMA. Su et al. [12] developed an ultra-short-term wind power forecast model based on data decomposition techniques and Elman neural network.

The studies establish that deep learning architectures like RNN and LSTM have strong self-learning capability and are improved models for time series prediction. LSTM based architectures are proved to be reliable models for capturing long term dependencies present in datasets. Hence, in this paper, a

deep learning-based forecast-ing model using stacked LSTM to predict wind speed of a wind farm at Dhanushkodi, Tamilnadu, India, is proposed, and the efficiency of the model is compared with other standard machine learning models such as SVR and ANN. The experimental results verified the impor-tance of LSTM networks in wind speed forecasting.

The organization of the paper is as follows. The proposed methodology is explained in section2. The results achieved by the system is described in section 3, followed by conclusions in section 4.

2. METHODOLOGY

The proposed methodology is described in this section with an introduction to recurrent neural networks, precisely long short term memory networks. This study aims to predict the hourly wind speed using a stacked LSTM architecture.

2.1 Recurrent Neural Networks

Deep learning is a subcategory of the machine learning technique that com-prises many layers of neural networks capable of extracting abstract features from massive data sets. Deep neural networks have a hierarchical structure of neural networks, where data can be structured or unstructured or unlabeled. Deep learning architectures like RNN and LSTM are well-established models for time series prediction. For time-series data, successive inputs are time-de-pendent, and output at a particular time step depends on cur-rent and former inputs. However, recurrent neural networks are not appropriate for learning long term dependencies present in time series data. This is because recurrent neural networks are suffering from vanishing and exploding gradients [13]. This unsta-ble gradient problem may occur when the gradient of the transfer function becomes too small or too large. This makes RNN hard to train and also fails in catching long term dependencies. These shortcomings can be rectified using LSTM networks, a variant form of recurrent neural networks. LSTM based architecture is capable of capturing long term dependencies more precisely.

LSTM networks were familiarized by Hochreiter and Schmidhuber in 1997 [14]. These networks can learn long term dependencies. In addition to input and output lay-ers, LSTM networks can have one or more hidden layers. Each LSTM cell in a hidden layer consists of three gates, namely the input gate, output gate, and forget gate. The layout of an LSTM cell is depicted in Fig. 1. Forget gate tries to enrich the efficiency of the network by eliminating less important information from the cell state. The input gate is designed to pass new information to the cell state, whereas the output gate transfers useful information from the memory cell to the output. The mathematical representa-tion of an LSTM network is given in equations (1) to (6).

$$o_t = \sigma(W_o h_{t-1} + U_o x_t + b_o) \qquad (1)$$
$$i_t = \sigma(W_i h_{t-1} + U_i x_t + b_i) \qquad (2)$$

$$f_t = \sigma\left(W_f h_{t-1} + U_f x_t + b_f\right) \qquad (3)$$

$$\widetilde{s_t} = tanh(W h_{t-1} + U x_t + b) \qquad (4)$$

$$s_t = f_t \odot s_{t-1} + i_t \odot \widetilde{s_t} \qquad (5)$$

$$h_t = o_t \odot tanh(s_t) \qquad (6)$$

where s_t is the state of the network at time step t. x_t is the input at time step t, and h_t is the output at time step t. i_t, o_t and f_t represent input gate, output gate, and forget gate, respectively. $S_t{\sim}$ represents a temporary state. U, V, and W are the weights, and b is the bias. Element wise multiplication is represented using $\odot$.
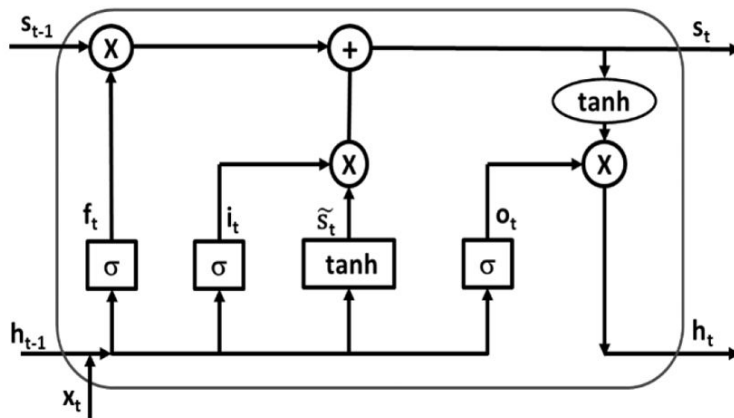

Fig. 1. Layout of LSTM cell

Stacked or deep LSTM consists of multiple layers of LSTM, where the output of the previous layer will be the input to the next layer. The structure of a stacked LSTM network with three hidden layers is demonstrated in Fig. 2. The idea of stacked or deep LSTM was first suggested by Graves et al. [15]. Stacked LSTM cells can store more information through hidden layers. Each LSTM layer processes some portion of the job and passes the output to the next layer. Lastly, the results are taken from the output layer. Stacking of hidden layers make the recurrent model deeper and can learn features more correctly. Stacked LSTMs are found to be a powerful technique for sequence prediction problems.
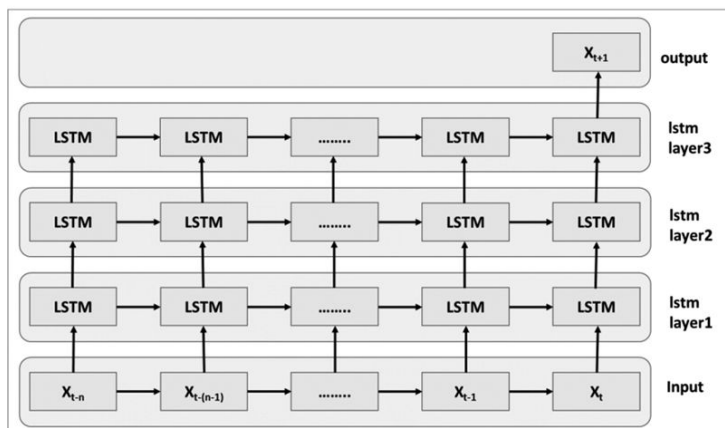

Fig. 2. Architecture of stacked LSTM

2.2 The proposed framework

The various steps in the proposed method are shown in figure 2. The proposed frame-work consists of five steps- data acquisition, data preprocessing, model training, per-formance validation and visualization and is explained below:
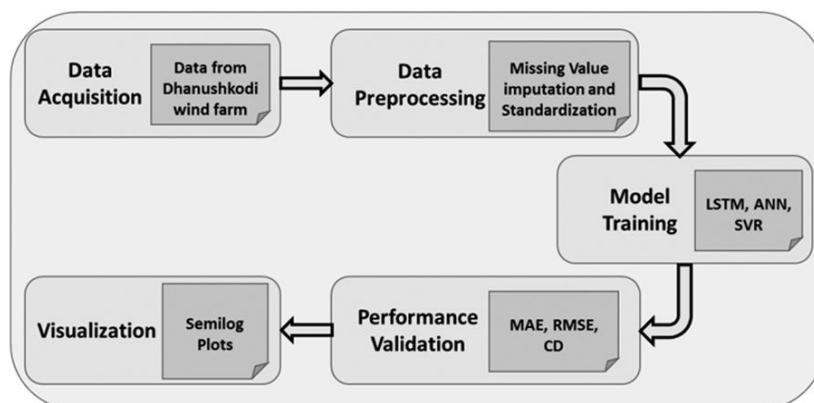

Fig. 3. Framework of the proposed methodology

1. Acquire wind speed data with a sampling interval of ten minutes from the wind farm located at Dhanuskodi, Tamil Nadu, India, from 01.10.2013 to 30.09.2017. Since the aim of this study is to predict wind speed for the next hour, the data is converted to a one-hour interval by taking the average of six entries with ten minutes interval. The accuracy of the proposed deep learning-based forecasting models is assessed using these datasets.

2. Impute missing values before data is processed using mean values as it may affect the quality of results. Then employ z-score normalization, one of the data transfor-mation techniques, to convert data to a standard scale without degrading the results. The rescaled data will have a mean of 0 and a standard deviation of 1. The equation for z-score normalization is shown in (7) where x is the original data, x' is the nor-malized data, ⊠ is the standard deviation, and μ is the mean value.

$$x' = \frac{x - \mu}{\sigma} \qquad (7)$$

3. A stacked LSTM network is designed and trained to forecast wind speed. A three-layer stacked LSTM network with 100 neurons in the hidden layers is employed for this study. As the accuracy of a time series prediction model depends heavily on the previous history added to the input frame, the lag value plays a vital role in time series prediction problems. An optimal lag value of 24 is selected for the experiments. This means that the previous one-day data is utilized to forecast wind speed for the next hour. The entire dataset is divided into training and testing data sets by a 70:30 ratio. The model is trained using training datasets, and the efficiency of themodel is evaluated using test sets. Backpropagation Through Time (BPTT) algo-rithm is applied to update the weights in the proposed model.

4. Evaluate the performance of the proposed deep learning-based model using statistical error indicators such as MAE, RMSE, and CD. The accuracy of the proposed model is then compared with machine learning models such as SVR and ANN models.

5. Visualize the experimental results of the models using semilog plots. Semilog plots are used to visualize the difference between predicted and actual values more pre-cisely.

2.3 Evaluation Criteria

The accuracy of the forecasting model can be effectively assessed using the metrics, MAE (Mean Absolute Error), RMSE (Root Mean Squared Error), and CD (Coefficient of Determination). MAE is defined as the absolute difference between the predicted value ($\hat{y}$) and the actual value(y), as shown in equation (8). RMSE is described as the square root of the average of squared differences between predicted value ($\hat{y}$) and the actual value(y), which is given in equation (9). CD, the Coefficient of Determination, is a statistical measure that evaluates the goodness of fit of the model and is computed using equation (10). Higher CD values represent smaller differences between the actual and the predicted values.

$$MAE = \frac{1}{n}\sum_{j=1}^{n}|y_j - \hat{y}_j| \qquad (8)$$

$$RMSE = \sqrt{\frac{1}{n}\sum_{j=1}^{n}(y_j - \hat{y}_j)^2} \qquad (9)$$

$$CD = \frac{Variance\ Explained\ by\ the\ model}{Total\ Variance} \qquad (10)$$

2.4 Parameter Settings of the models

The proposed model employs a three-layer stacked LSTM network with 100 neurons in the hidden layers, Relu activation function, and Adam optimizer. The effectiveness of the suggested model is compared with SVR and ANN models. The ANN model is developed with three hidden layers with 50, 25, and 10 neurons in the first, second, and third hidden layer, respectively. The SVR model applied for comparison is designed with RBF (radial basis function) kernel function. The parameter settings of the above models are illustrated in table 1.

Table 1. Parameter settings of the models

Forecasting Models	Parameters	Number or Type
LSTM	Number of hidden layers Number of neurons in the hidden layers Activation function of the output layer Optimizer	3 100 Relu Adam
SVR	Kernel function	radial basis function
ANN	Number of hidden layers No of neurons in hidden layers Learning rate	3 (50,25,10) 0.001

3. RESULTS AND DISCUSSION

3.1 Wind speed data analysis

Table 2 provides the statistics of the data collected from the wind farm at Dhanuskodi, Tamilnadu, India, from October 2013 to September 2017. The distribution of wind speed data is depicted in Fig. 4.

Table 2. Statistical information of data collected from Stanford Station

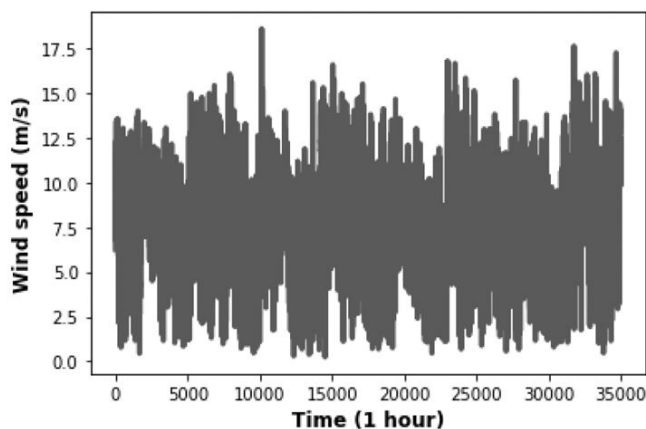| Feature	Units	Count	Mean	std	min	max
Wind speed	m/s	35013	7.808225	3.011609	0.228	18.628

Fig. 4. Distribution of wind speed

3.2 Comparison of models

The proposed deep learning-based model to predict wind speed is compared with standard machine learning models such as ANN and SVR to evaluate its effectiveness. The predicted and actual values are compared to measure the superiority of the developed model using statistical error indices. Table 4 describes the prediction accuracy of the various models based on MAE, RMSE, and CD. Lesser values of MAE and RMSE signify higher accuracy of the forecasts, while larger values of CD show a better linear relationship between the predicted and the actual values. The results presented in the table illustrate that the proposed model is efficient for predicting hourly wind speed with a minimal error of 0.5847 as MAE and 0.7918 as RMSE. The higher CD value of LSTM also substantiates the effectiveness of the developed model compared to other models. Fig.5 describes the forecasting accuracy of the models based on MAE and RMSE. It can be perceived from the figure that the proposed LSTM model yields lower MAE and RMSE values compared to other models.

Table 3. Comparison of results of various forecasting models

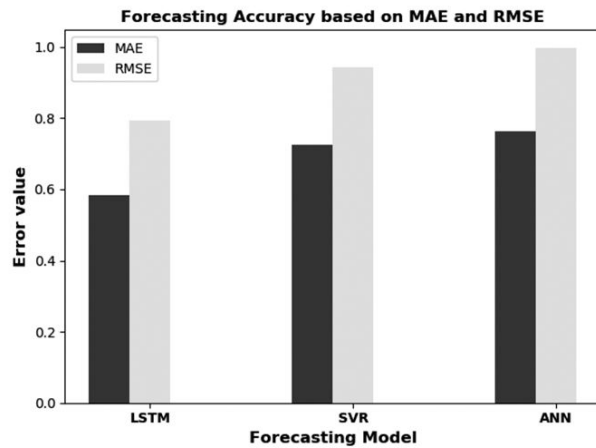| Algorithm	MAE (m/s)	RMSE (m/s)	CD (%)
LSTM	0.5847	0.7918	92.47
SVR	0.7255	0.9432	89.34
ANN	0.7624	0.9976	88.05

Fig. 5. Comparison of prediction accuracy based on MAE and RMSE

The prediction capability of the developed LSTM, SVR, and ANN models are graphically analyzed by plotting the predicted values against the actual values. Semi-log plots are used to visualize the deviation between predicted and actual values more precisely. The semi-log plots of predicted wind speed data against the actual data of LSTM, SVR, and ANN models are illustrated in Fig. 6 (a), (b), and (c), respectively. Fig. 7 illustrates the semilog plots of the actual and predicted values of LSTM, SVR, and ANN models. For ANN and SVM models, there is more deviation in predicted values from the actual values compared to the LSTM model. The outputs establish that long short term memory networks can be effectively applied to predict hourly wind speed as its predic-tion accuracy is higher compared to SVR and ANN models.
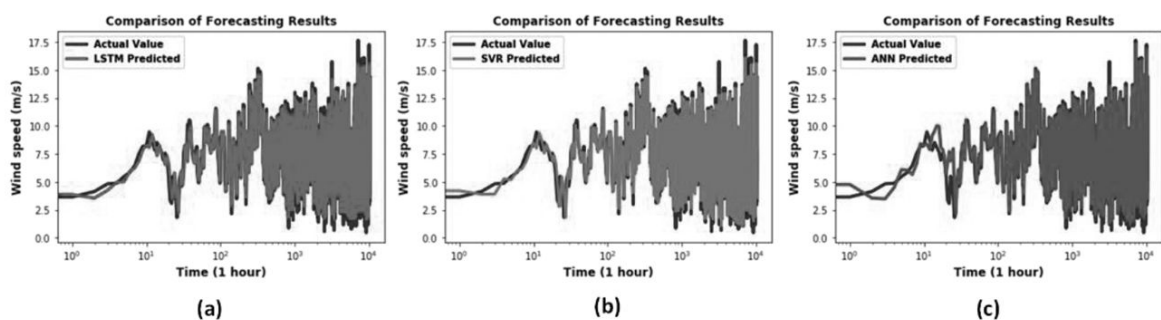

Fig. 6. Comparison of prediction accuracy of LSTM, SVR, and ANN models
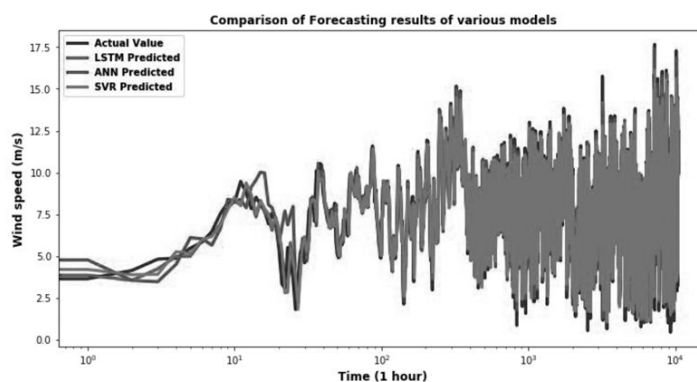

Fig. 7. Comparison of prediction accuracy of various models

4. CONCLUSION

In this paper, a deep learning-based wind speed forecasting model based on stacked LSTM is proposed. The efficiency of the suggested model is compared with SVR and ANN models. The developed model outperforms the other prediction models with min-imum MAE of 0.5847, RMSE of 0.7918, and maximum CD value of 92.47%. Analysis of the experimental outcomes illus-trates the effectiveness of the proposed model in pre-dicting hourly wind speed. The accuracy of the predictive system can be further im-proved by employing deep learning-based hybrid models.

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SELFIES: IS NARCISSISM A FACTOR?

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Selfies has become a trademark trend of the modern age. Recent newspaper reports have shown that particular instances of taking selfies have reached a level of psychopathology and in some cases even fatality. It's a cause of concern that such incidents might indicate a degree of narcissism (excessive interest in or admiration of oneself and one's physical appearance). The aim is to identify people who are addicted to selfies, its relation with narcissism and to find the rate of people possessing narcissistic traits among youngsters in Kerala. The study is conducted among 107 students of age 13 – 25 who are categorized into four. The study is conducted in two stages. The first stage is to identify people who are addicted to selfies using a self-prepared Selfie Addiction Interview Schedule. The 2nd stage is to confirm & analyze the degree of narcissism by the Narcissism Personality Inventory developed by Raskin and Hall. The result was found that narcissism is a major factor in taking insignificant selfies. The degree of relatedness between selfie & narcissistic traits is positively correlated. Keywords: Selfie, narcissism, addicts, narcissistic traits.

Narcissism refers to a personality trait that is marked by grandiosity and an overly positive self-view, especially of the individual's own social popularity and physical appearance (Buss & Chiodo, 1991). Narcissistic individuals are more likely to present self-promotional content on social networking sites (SNSs) (Carpenter ,2012; Liuand Baumeister ,2016; Mehdizadehm 2010) to elicit positive response from others. Since selfie-posting behaviour allows individuals to selectively present attractive and self-promoting photos of themselves (Chua & Chang 2016; Diefenbach & Christoforakos, 2017; Fox & Rooney 2015; Fox & Vendemia, 2016), it is feasible that such behaviour would be more common in those with high narcissism. This can be explained by the dynamic self-regulatory processing model of narcissism (Morf & Rhodewalt 2001).

According to the dynamic self-regulatory processing model of narcissism, narcissists attempt to gain positive feedback from other people by regulating their behaviour, which further leads to the ultimate goal of maintaining their grandiose and positive self-views (Morf & Rhodewalt, 2001). For narcissists, their primary use of social networking sites (SNSs) is associated with a range of strategic behaviours aimed at maintaining their grandiose and positive self-views (Buss & Chiodo 1991; Campbell Et Al.2002). The act of selecting attractive selfies and posting them on social networking sites (SNSs) may function as a self-regulatory behaviour through which narcissistic individuals attempt to meet their self-regulatory objectives—enhancing their grandiose and positive self-views (McCain et al. 2016; Weiser 2015). As a result, individuals who score higher on narcissism post more selfies on social networking sites (SNSs) than those who score lower. Previous empirical studies support the positive relation between narcissism and selfie-posting behaviour. Specifically, narcissism is a significant positive predictor of the frequency of posting selfies (Kim & Chock 2017; Sungetal.2016; Weiser 2015), the number of selfies posted on SNSs (Fox & Rooney 2015), selfie-posting intention (Kim et al. 22016; Sungetal2016), and actual selfie-posting behaviour (Kim et al. 2016).

Selfie was named as "Word of the Year" in the year 2013 due to its sudden popularity (Brumfield 2013) and is defined as 'a Photograph that one has taken of oneself, typically one taken with a smartphone or webcam and shared via social media' (Oxford Dictionaries 2013). Since Instagram's first selfie hashtag (#selfie) emerged in 2011, selfies have become the most popular photos posted on Instagram (Jang et al. 2015).

More specifically, taking selfies has become a popular activity through which people present themselves to the public. They usually upload selfie photos to social networking sites (SNSs), such as Facebook and Instagram, and share them among friends in their networks. Although selfies allow individuals to promote self-disclosure, there has been criticism concerning some unhealthy personality traits associated with this behaviour (Weiser, 2015). For example, a few journalists have criticized taking selfies as a selfish act because people tend to care too much about their appearance in the photos and that sometimes makes them ignore the people around them. Some have also indicated that addiction to selfies may cause individuals to develop narcissistic behaviours and may negatively affect their relationships with others (Fox & Rooney, 2015; Weiser, 2015).

In a survey, 98% of the 18–24-year-old interviewees stated that they had taken selfies at least once in their lives and 46% revealed that they had shared a selfie that day (Katz & Crocker, 2015). Young adults (aged 20–30) are even more likely to engage in selfie taking and sharing compared to adolescents and adults (Dhir et al., 2016). While researchers have begun to investigate individuals' social and psychological motivations for taking and sharing selfies online (e.g., Weiser, 2015; Sung et al., 2016; Barry et al., 2017; Wang et al., in

press), very little is known about the perception of selfies. Despite the apparent popularity of taking selfies, the reception of selfies may seem to be predominantly negative.

Piotr Sorokowski (Sorokowski et al., 2015, 2016; Dhir et al., 2016; Sorokowska et al., 2016) conducted a study on Sex differences in online self-ieposting behaviors predict histrionic personalityscores among men but not women , results on selfies, suggest that gender is an important variable which might need to be considered when trying to explain the perception and evaluation of selfies. These findings on the production of selfies enable hypothesis to be derived regarding the perception of selfies, as observers' evaluations will vary according to their general expectations, which are based on viewing habits.

Another relevant question is whether potential detrimental effects of selfies compared to photos taken by others will also apply to group selfies. Here, mechanisms might differ (a) because less narcissism is attributed when a person is not presenting him/herself alone and (b) because-in general-it has been shown that a person is evaluated as more attractive when she or he is located close to an attractive friend (Kernis & Wheeler, 1981). This has also been demonstrated in a similar form for photos on Facebook (Walther et al., 2008).

The word "selfie" didn't even exist until the year 2002. The term specifically refers to the use of a digital camera to take a self-portrait. Because digital cameras (or smartphones with cameras) can take pictures so quickly and easily, selfies have become a staple of the modern online landscape. Selfies have also spawned an entire selfie product industry, with selfie sticks, remote controls, and even selfie drones flooding the digital market. At the same time, selfies have gotten a bad reputation for being something that "narcissists" do. Taking a self-photograph isn't always an exercise in self-love. Sometimes it is simply a convenient way to take a photo when no one else is around to take the snapshot.But if a person wakes up in the morning, brushes their teeth, showers, and then takes 10-20 selfies to choose which one to post to Instagram that morning, it might just be a problem.

Recent newspaper reports have shown that particular instances of taking selfies have reached a level of psychopathology and in some cases even fatality. It's a cause of concern that such incidents might indicate a degree of narcissism. People with narcissistic traits tend to possess an exaggerated sense of self- importance and they show an inability or unwillingness to recognize the needs and feelings of others. They believe that they are superior and can only associate with equally special people. They behave in an arrogant manner, coming across as conceited, boastful and pretentious. Recent accidents caused by selfie taking has increased which made the investigator inquisitive to know whether Narcissistic tendency is a causal factor for such events.

Statement of the problem:
To identify people who are addicted to selfies are high in trait narcissism.

Objectives

- To find the relationship between selfie taking behavior and narcissism.
- To identify the gender based differences in selfie taking behaviour and narcissism.

Hypothesis

- There will be no significant correlation between selfie taking behaviour and narcissism
- There will be no significant difference between gender towards selfie taking behaviour and narcissism.

METHODOLOGY

Participants:

The present study focused on people of age 13-25 of Ernakulam district and a total of 107 individuals were randomly selected of which 49 were females and 58 were males.

Measures:

1. Selfie Addiction Interview Schedule

   A self-prepared questionnaire named Selfie Addiction Interview Schedule (SAIS) was made by the investigators.A standardized questionnaire was not available so the investigators made a questionnaire consisting of 18 items. The items were verified for its content by experts in the field. Questions related to posting of selfies in social networking sites and the frequency of taking solo-selfies were included in the interview. In addition to it, information related to the participant's attitude towards the likes and comments when posted, and the situations and chances of insignificant selfies were also collected.

2. The NPI-40 (Narcissistic Personality Inventory) is a standardized scaled which is used to measure "normal" or "subclinical" (borderline) narcissism. This is a forty item scale; the subjects are required to tick ( ) the statements which are closest to their feelings. The questionnaire was administered to the samples and the scoring was done based on the standardized scoring scale of this inventory.

PROCEDURE

The study was carried out via interviews and questionnaires. The participants were randomly selected and the interview took about 10 to 15 minutes per individual. All the materials were presented in English language. The study was conducted in two stages: The first stage is to identify people who are addicted to selfies using the self-prepared SAIS. The 2nd stage is to confirm & analyze the degree of narcissism by the Narcissism Personality Inventory developed by Raskin and Hall. The scores are tabulated and analyzed using methods of correlation and OnewayAnova.

To study the objectives various statistical analyses was done and the scores

were tabulated. To explore the trends, the mean and Pearson Correlation coefficient was calculated. Oneway ANOVA was done to identify differences in the scores of both the tests of groups classified on the basis of their education. ANOVA was also used to find significant gender based differences in both the SAT and the NPI-40. 107 participants of age group 13-25 were taken from Ernakulam district. The following results were obtained and are discussed below.

RESULT AND DISCUSSION

The dynamic self-regulatory processing model of narcissism, narcissists attempt to gain positive feedback from other people by regulating their behaviour, which further leads to the ultimate goal of maintaining their grandiose and positive self-views. People who are narcisstic are likely to take selfies and post it in different media like facebook , instagram whatsapp etc the likes they get reinforces these people which will promote them to take selfies again and again. To explore such aspects this study was initiated.

Table 1. Correlations between the scores of Selfie Addiction Interview Schedule and Narcissism Personality Inventory

Selfies	Narcissism
Pearson Correlation	109

Table 1 shows the correlations between the scores of Selfie Addiction Test and the Narcissism Personality Inventory and it is clear that there is a correlation between Narcissism and Addiction to Selfies. There is a positive correlation between selfie taking behaviour and Narcissism, (Pearson's correlation coefficient= 0.109), but it is not strongly correlated. The correlation shows that as narcissism increases, selfie taking behavior also increases.

Based on their NPI scores, the participants were divided into three; that is; participants who scored high, average and low in narcissism.

Table 2. ANOVA table to compare Selfies Taking behaviour with High, Average and Low on the trait Narcissim

	Sum of Squares	df	Mean Squares	F	Sig
Between Groups	622.625	2	311.312	5.007	0.008
Within Groups	6466.534	104	62.178		
Total	7089.159	106			

Table 2.1:Post hoc table

Narcissism	N	Subset for alpha = 0.05	
		1	2
Average	50	35.32	
Low	29	38.90	38.90
High	28		40.96
Sig.		0.186	0.566

From table 2 and table 2.1, the scores indicate that there is a significant difference between the 3 groups based on their narcissism score on selfy taking behavior and those possessing high narcissism score and average significantly differ among themselves in selfy taking behaviour. From this result it is confirmed that high score in selfie taking behavior indicates a comparatively high score in narcissism. There is no significant difference between the other groups and selfie taking behavior.

The participants were divided into four groups based on their education; that is, high school, higher secondary, undergraduate, and postgraduate and above (based on the course they are studying).

Table 3.ANOVA done to compare participants based on their education

		Sum of Squares	df	Mean Square	F	Sig
Selfy taking behaviour	Between Groups	645.389	3	215.130	3.439	0.020
	Within Groups	6443.770	103	62.561		
	Total	7089.159	106			
Narcissism	Between Groups	29.379	3	9.793	0.325	0.807
	Within Groups	3099.051	103	30.088		
	Total	3128.430	106			

Table 3 shows participants categorized based on their education and comparison between the scores on selfy taking behavior and narcissism. By taking the mean score of selfy taking behaviour, it was seen that there is a significant difference in Undergraduate (mean=35) and High school students (mean=41.5). The highest score was for high school and lowest for undergraduate. This shows that selfy taking behavior is high in high school students when compared with higher secondary school students, undergraduate students and pg students.

The above results show the stability in the personality trait; that is; narcissism. Selfie taking is a learnt behavior so that is why there is a significant difference in the mean of selfie taking behaviour of the participants. From the SAIS it was identified that 13.86% click selfies very often and 34.36% clicks selfies rarely. 4.8% of the samples click more than 50 selfies a week whereas 44.36% of the samples click selfies less than 10 a week. 51.6% of the sample click selfies by making themselves presentable without any makeup whereas 27.4% people use minimum quantity of beautifying products. In a gender based comparison on how the participant feels if they get very low likes for a selfie 20.40% of females feel sad about it and 36.73% are ok with it. In males, 12.06% feels sad if they get low likes for a selfie they posted and 43.1% are ok with it. 42.8% of females responded that they feel happy if they get a lot of likes and 55.17% males responded for the same.

CONCLUSION
Even though selfies have become a popular trend in the present era, the

danger hidden behind it could be exposed through testing personality traits of narcissism. Since Narcissism is positively correlated to selfie taking behaviour, as per the above study and other studies conducted, exposure to the levels of narcissism and the degree to which the participants are addicted to selfies could be understood.

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CLASSIFICATION OF IMAGES USING ARTIFICIAL NEURAL NETWORKS

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Abstract: Artificial Neural Networks are information processing systems with remarkable ability to derive meaning from complicated data. It can be used to extract patterns which cannot be detected by other techniques. In this paper, dimensionality reduction is applied to features extracted from images and then neural network back propagation algorithm is implemented for the purpose of automatic classification. The main advantage of using neural network methods in this project is that we can train such imaging systems with thousands of images until the system learns to recognize various classes.
Key words: Artificial Neural Network, Back Propagation, Digital image processing,Precision , Recall

1. INTRODUCTION

Statistical pattern recognition techniques have obtained extensive use in Digital image processing. Initially, pattern recognition problems were often solved by linear and quadratic discriminants or the k-nearest neighbour classifier [1]. Later the back-propagation learning algorithm for neural networks was introduced. A neural network is an information processing device whose design closely resembles the design and functioning of animal brains. The neural networks have the ability to learn by examples, which are suited for real time systems. They have the advantage of adaptive learning, self organization, real time operation and fault tolerance [2]. Artificial Neural Network consists of large number of highly interconnected processing elements called neurons which operate in parallel. These neurons are connected to each other by links which is associated with weights which contains information about input signal. By adjusting these values in a systematic way, the network is eventually able to approximate the desired function [3].

In this paper, the classification of images is implemented using artificial neural

networks. The rest of this paper is organized as follows. Section 2 deals with Literature Review, Section 3 explains Proposed Methodology. Conclusions are given in Section 4.

2. LITERATURE REVIEW

In the paper, "Learning New Facts from Knowledge Bases with Neural Tensor Networks and Semantic Word Vectors", Andrew Ng's Stanford research group focused on using neural networks to extract data from unannotated text [4]. It focuses on lexical databases which store information about English words, specifically definition and usage, and also provide information about the relationship between different English words. They are commonly used in aritificial intelligence and text processing research. According to Aravind Nagathan, Animozhi and Jithendra Mungara [5], the use of feed-forward neural network has considerably improved the recall rate and also retrieval time, due to its highly efficient and accurate classification capability. In the paper, 'A genetic optimized neural network for image retrieval in telemedicine', Mohandass Divya, Jude Janet and Ramadass Suguna [6] stated that the proposed method efficiently extracts features and retrieves relevant images from compressed images. Shamla Mantri ,Nikhil S. Tarale and Sudip C Mahajan in their paper, ' Dimensionality Reduction technique using Neural Networks – A Survey' [7] , different dimensionality reduction techniques such as Principal component analysis , Independent component analysis and Self-Organizing Map are selected and applied in order to reduce the loss of classification performance.

The objective of this work is to use Neural Network back propagation algorithm for the classification of input images into different categories. Here neural network can trained using the reduced feature set obtained from dimensionality reduction techniques like PCA in order to obtain better results.

3. PROPOSED METHODOLOGY

3.1 Prepare input data

In this paper, a general image database consisting of 500 images is used for training the neural network. Neural network is used to classify images into various classes by taking as input, reduced features extracted by PCA. Back-propagation technique, which is a supervised method for learning is used for training the neural network about the reduced feature set of images in the database.

3.2 Neural Network Classification

The architecture of neural network consists of a large number of nodes and interconnection of nodes. The individual inputs P1, P2…., PR are weighted by corresponding elements $W_{1,1}$,$W_{1,2}$,…,$W_{1,R}$ of the weight matrix W [3].
The neuron also has a bias 'b', which is summed with the weighted inputs to form the net input 'n'.

$$n = W_{1,1} . P1 + W_{1,2}.. P2 + … W_{1,R.} PR + b$$

In matrix form, this can be rewritten as

$$n = W. P + b$$

Now, the neuron output is given as,

$$a = f(W.P + b)$$

The transfer function used above is a log-sigmoid transfer function. This transfer function takes the input (which may have any value between plus and minus infinity) and squashes the output in between 0 to 1 range, according to the expression

$$y = 1 / (1+e^{-n})$$

The nodes at a particular stage constitute a layer. The first layer is called input layer and last layer is called output layer. The layers in between output and input layer are called hidden layers. As the number of hidden layers in the network increases, the performance of network increases. Each node in a network serves the purpose of summation of all its inputs. The output of a node is further applied to the next node.

In this paper, Levenberg-Marquardt backpropagation algorithm (trainlm) is used for classification. Trainlm is a network training function that updates weight and bias values according to Levenberg-Marquardt optimization. Trainlm is often the fastest back propagation algorithm in the matlab toolbox, and is highly recommended as a first-choice supervised algorithm. The training process include creation, configuring a three-layered neural network and making it learn about the extracted features of training set images. Here we use the reduced feature set obtained from PCA for the training of images. The learning process is carried out using backpropagation algorithm. The training makes the network store the learnt knowledge in its knowledge base. This knowledge base is used in later phase in comparison and decision making tasks by network.

3.3 Performance Evaluation

The performance of retrieval of the system can be measured in terms of its Recall and Precision. Recall measures the ability of the system to retrieve all the models that are relevant, while Precision measures the ability of the system to retrieve only the models that are relevant.

$$Precision = \frac{(Number\ of\ relevant\ images\ retrieved)}{(Total\ Number\ of\ images\ retrieved)}$$

$$Recall = \frac{(Number\ of\ relevant\ images\ retrieved)}{(Total\ no\ of\ relevant\ images)}$$

The number of relevant items retrieved is the number of the returned images that are similar to the query image in this case. The total number of images retrieved is the total number of images that are returned by the retrieval system. In precision and recall, crossover is the point on the graph where the both precision and recall curves meet. The higher the number of crossover points better will be the performance of the system.

3.4 Implementing the Backpropagation algorithm

The proposed method has been implemented using Matlab 13 and tested on

a general-purpose database containing 500 images, in JPG format of size 256X384 resized to 286x340. The database includes 500 color images categorized into five classes and each class includes 100 images as follows: African people, Beach, Building, Bus, Dinosaurs. In neural network classifier based PCA, We used Levenberg-Marquardt backpropagation algorithm (trainlm) with 3 hidden layers for classification. Here the network is trained about the reduced feature set of all the images from the training dataset. A given query image is feature extracted and searched for similar images. For each query image, relevant images are considered to be those which belong to the same category as the query image. The performance of the training process can be analysed using the Precision Recall plot.The quality of the image retrieval, with different feature extraction schemes has been evaluated by randomly selecting query images, of each category, from test image database. Each query returns the top 6 images from database. To measure retrieval effectiveness for the image retrieval system, Precision and Recall values are used. From the Table 1 of Precision and Recall, it is found that the rates are higher for Neural network based PCA when compared to ordinary techniques.

Table 1. Table of Precision Recall Rates

Class	PCA		Neural Network Based PCA	
	Precision	Recall	Precision	Recall
Tribal	0.667	0.47	0.90	0.85
Beach	0.778	0.37	0.89	0.79
Towers	0.667	0.37	0.95	0.80
Bus	0.667	0.31	0.88	0.90
Dinosaur	1	0.97	1	1

4. CONCLUSION

In Neural Network based classification, the network is trained about the reduced feature set using PCA of all the images from the training dataset. The training algorithm used in this paper is Levenberg-Marquardt backpropagation algorithm (trainlm) with 3 hidden layers. The neural network based classifier improved the precision recall rate, thereby increasing the quality of the classification.

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