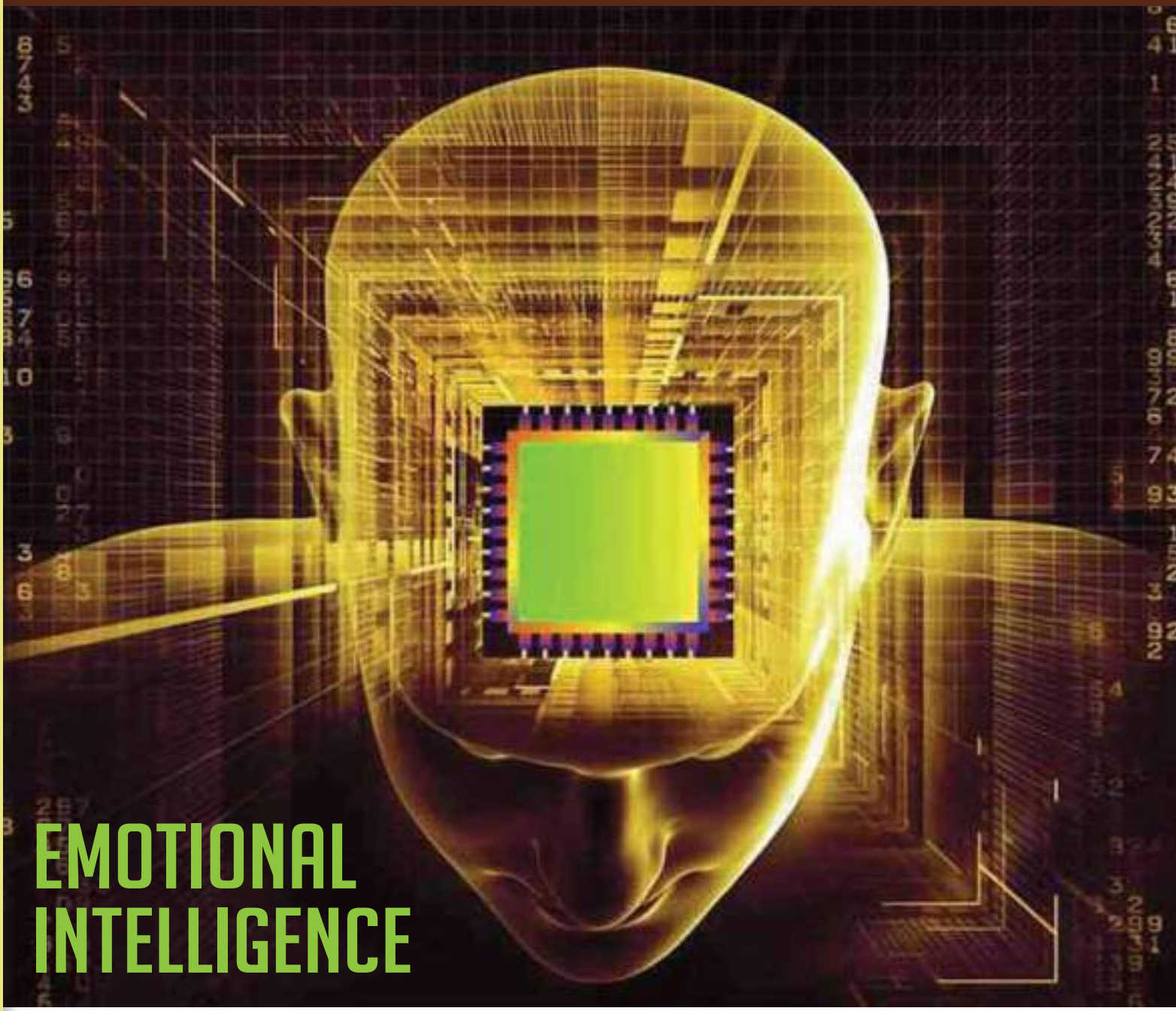
52 pages including cover

CSI Communications

Knowledge Digest for IT Community

VOLUME NO. 43 | ISSUE NO. 3 | JUNE 2019

₹ 50/-



EMOTIONAL INTELLIGENCE

ISSN 0970-647X

www.csi-india.org

From the Desk of Chairman, Publication Committee

Dear Fellow Members,

The Executive Committee of CSI under the leadership of Prof. A. K. Nayak has constituted the publication Committee with eminent persons in field of Computers as Chief Editors/Editors with a view to strength the quality of intended journals: Communications (CSIC), Journal of Computing (JOC) and Adyayan. Proceedings of the various conferences of CSI need to be properly channeled. It is no hyperbole to say that Prof. Nayak and Shri. Sanjayji have put in a lot effort in maintaining the periodicity and quality of CSIC.

Over the last two years CSIC has emerged well under the leadership of Prof. S S Agarawal. Various issues of CSIC with emphasis on latest topics have emerged with the support of Guest Editors. With all this, there is still scope for improvement and we would work in this direction. If the standards go up, JOC and CSIC will be citation listed. This is possible with the cooperation of all of us.

Journal of Computing (JOC) was there earlier and it has to be reactivated. Dr. Deshmukh, who is a Sr. Professor and Chief Editor, and his team are working in this direction. The contents of Journal of Computing (JOC) include: Theory of Computer Science, Data Bases, Software Engg., Software Project Management, Fog Computing, Artificial iIntelligence, Data Science etc. The list is indicative and not limited to these topics only. The periodicity of this journal is quarterly.

Adyayan is basically for students and research scholars to encourage them. It was also there earlier. Dr. Vimal Jain is seriously working towards this and seems to have very good articles for publication.

The present team is a dynamic one and of course there may be some teething problems in the beginning. Our thanks to Prof. A. K. Nayak, President, CSI and. Shri Sanjayji, IPP, for constant encouragement and support.

With best compliments,

Dr. D. D. Sarma

Chief Scientist (R), CSIR-NGRI, CSIR-NGRI, Hyderabad.

Editorial

Prof. (Dr.) S. S. Agrawal
Chief Editor

Dr. Ritika Wason
Editor

Dear Readers

Emotional Intelligence or its generic shorthand EQ, is ubiquitous in the present scenario when anything and everything of our daily life as well as the business ecosystem is somehow utilizing the IoT. After familiarizing ourselves with Data Science and Analytics in May-2019 issue, we have dedicated this issue to Emotional Intelligence and its applications in varied domains. This issue showcases articles related to this domain.

The transformation of Artificial Intelligence into Emotional Intelligence has been effectively traced by Deeepak Sharma and Priti Sharma in the first cover story entitled "Rise of Emotional Intelligence in Artificial Intelligence." They track how the popularity of Aritificial Intelligence in the late 90's has presently transformed itself into EQ-enabled smart machines that can smartly interact with the mankind. The next story entitled, "Emotional Intelligence" by A.R. Revathi further clarifies the fundamentals of Emotional Intelligence while highlighting some of its notable applications. The varied applications of Emotional Intelligence have further been elaborated in "Emotional intelligence: Introduction and Applications" by Mamta Santosh and Avinash Sharma. One should also note that emotions play an imperative part in intelligent machine behaviour resulting into human-like judgement making capability. The next cover story entitled, "Symbiotic Transformational Technology on the Rise: Artificial Intelligence in Emotional Intelligence by S. Balakrishnan, J.Janet and S. Sheeba Rani delves into the same. The cover story, "Use of Emotional Intelligence for Smarter AI" by Shalu Jindal, Mamoon Rashid, Vishal Goyal, Neeraj Mogla and Surinder Pal investigates the integrities of Emotional Intelligence which ultimately lead to human success. They evaluate how the integration of EQ with Artificial Intelligence has enabled human-robot interaction and co-existence a reality. The final cover story entitled, "The concept of Emotional Intelligence and its augmentation with AI through Artificial Emotional Intelligence" by Soumadip Sen and Sourav Samanta introduces Artificial Emotional Intelligence and its evolving trends.

The technical trends section showcases how Emotional Intelligence has transformed working across boundaries. The first article "Emotional Intelligence: Features and its Importance in our life" by Anju Khandelwal delves into the specifics of emotional Intelligence. The next article, "Emotional Intelligence: The Secret Key of Successful Career" by Sunil Gupta, Goldie Gabrani and Arushi G. Bakshi discuss how emotional intelligence can be a key player in defining a successful career for an individual. The research front showcases how cognitive computing that aims to mimic the human brain is eventually leading the present era. The article, "A First Step towards Cognitive Computation by M. Mallikarjuna and Aditya Kumar Sarda discusses how Cognitive Computing techniques are blooming themselves into the Cognitive Computing era.

The last article in this issue, "Data Analytics in Machine Learning: Role and Future Perspectives" by Tarika Verma, Amit Sagu and Nasib S. Gill highlights the importance of Data Analytics in knowledge discovery leading to effective decision making.

The issue also reports different CSI student branch activities carried out all across the nation.

We are extremely thankful to all our contributors as well as readers. Original, plagiarism-free, unpublished articles are solicited throughout the year from CSI members as well as non-members. Our sincere gratitude to the CSI publication committee members, editorial board members, authors and reviewers for their great contribution and support in realising this issue.

Our special thanks to Prof. A. K. Nayak, President, CSI for his constant encouragement, support and guidance in publication of June, 2019 issue.

We look forward to receive constructive feedback and suggestions from our esteemed members and readers at csic@csi-india.org

With kind regards,

Prof. (Dr.) S. S. Agrawal, Chief Editor
Director General KIIT & Emeritus Scientist (CSIR)
Dr. Ritika Wason , Editor
Associate Professor, BVICAM, New Delhi

President's Desk

From : President, Computer Society of India
Date : 01 June, 2019
Email : president@csi-india.org / Cell : (91) 82106 93239

In the recent days, lot of research works are being done in the areas of Emotional Intelligence by utilizing the power of many advanced and hybrid computing techniques. The available range of techniques includes; artificial intelligence, soft computing, machine learning, simulation and modeling, pattern recognition, robotics, machine vision, signal and image processing, biomedical computing, bioinformatics, green computing, cryptography with the advanced form of those techniques hybridized with genetic algorithm, evolutionary algorithm, nature inspired computing, neuro-fuzzy approach for solving the real life problems with the help of intelligence and smart science. The purpose of this special issue is to seek high quality popular & research papers that contribute to the advancement of knowledge in Emotional Intelligence.

CSI Annual Convention at Udaipur

I have the pleasure to inform you that the CSI Annual Convention shall be organised at Udaipur, Rajasthan by CSI Udaipur Chapter for which the dedicated & devoted Members of the Chapter are making their best efforts to make the convention excellent & scale of height. I congratulate Dr. Amit Joshi, Convention Chairman, Col. Prof. S. S. Rangdevot, Chairman, Advisory Committee, Dr. Y. C. Bhatt, Programme Chairman, Dr. Bharat Singh Deora, Chairman, Finance Committee, DR Azimuddin Khan, Chairman Industry Committee, & Mr. Gaurav Kumawat Convenor for their pioneer effort to bring this great event in to action. I request all the concerned for their kind presence for enhancing the strength, efficiency, visibility, productivity & effectivity of CSI.

Inauguration of New Student Branches

Expansion of CSI continues all over the country by establishing more & more Chapters & Student Branches. The inauguration & establishment of new Student Branches at Jawaharlal Nehru National College of Engineering at Shivamugga, Karnatakae & at NIE Institute of Technology, Mysore has set the milestone for the clear indication that more & more academic Institutions & students are extending their faith & confidence in CSI by enrolling themselves under CSI Domain. The society achieved the substantial growth in Student Membership enrolment in the current year comparison to the previous year. I take this opportunity to congratulate the Management & Student Members of respective student branches for their great efforts..

Chapter & Student Branch activities

As per the usual practice in every month, many of our Chapters & Student Branches with their dynamic & vibrant efforts have conducted quality activities. Faculty Development Programme at Bharati Vidyapeeth Institute of Computer Applications & Management (BVICAM) New Delhi in technical collaboration with CSI Delhi Chapter was successfully conducted at BVICAM for which the Management Committee & Members of the Chapter are deserving to be congratulated. I extend my special thanks to Dr. M. N. Hoda & his team members for the success of the programme. A Presentation Session was conducted by CSI Chennai Chapter at CSI Education Directorate which was well attended & very useful for the participants. Activities conducted by CSI Coimbatore Chapter, Tamil Nadu, CSI Lakshmangarh Chapter at Modi Nagar, Rajasthan, Surat Chapter of Gujarat were of very good quality & beneficial to the members in particular & to the Society in general. I congratulate all the Organisors & Members of respective Chapters for their tireless effort & significant contribution. This Issue also covers the photographs of activities conducted by large number of student branches. We apologize for not covering the detail news because of the space constraint. But CSI is proud for it's student activities of such large scale in every month. I congratulate & express my thanks to the management of the respective Institutes/Colleges, Student Branch Coordinators, Students Members of the respective organisations for their pioneer efforts & leadership to organize the various events successfully & effectively in excellent manner.

CSI National Student Convention

In the month of March, 2019 the CSI National Student Convention was held at Jeppiar Engineering College, Chennai which was well attended by the Student Delegates, Academicians, Researchers & industry Experts. Wide varieties of activities were conducted which made the event grand success. I congratulate the Authorities of the college along with Faculties & Student Branch Coordinator for their great efforts to make this mega event most effective & productive.

Summer Discount in Membership fees

CSI has taken initiative to make the exponential growth in its life membership enrolment for which 15% discount in life membership fees has been announced. The life membership enrolment form is also given in this issue for availing the opportunity of membership discount. I request all the hon'ble members of the CSI to make wide publicity of this summer discount scheme among their relations & known circle which is for the time period from 15th May to 15th July 2019.

I take this opportunity to seek the active & kind support of the Members to make CSI more Dynamic, Vibrant, Productive & Sustainable to achieve the height of excellence.

Let us come forward to make Clean CSI & Green CSI with transparent activities & visions to make it Swachh, Pardarshi & Hara Vara.

With warm regards,

AkNayak

Prof. Akshaya Nayak
President, CSI

CSI COMMUNICATIONS

VOLUME NO. 43 • ISSUE NO. 3 • JUNE 2019

Design, Print and Dispatch by
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Printed and Published by Akshaya Kumar Nayak on behalf of Computer Society of India, Printed GP Offset Pvt. Ltd. 269, 2nd Floor, A-2, Shah & Nahar Indl. Estate, Sitaram Jadhav Marg, Lower Parel, Mumbai 400 013 and Published from Samruddhi Venture Park, Unit No. 3, 4th Floor, Marol Industrial Area, Andheri (East), Mumbai 400 093. • Email : **hq@csi-india.org**
Chief Editor: S. S. Agrawal

Rise of Emotional Intelligence in AI

Deepak Sharma and Dr. Priti Sharma
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On April 26th, 2019, Marvel Studio released one of the most awaited science fiction movies of this year "Avengers: End game". Here, the lead converted his supercomputer into a Robot machine which could do both complex computations (Logical Intelligence) and also feel the love chemistry between the hero and heroine of the movie (Emotional Intelligence). It is not going to be difficult for anyone to imagine that by the end of the 21st century our lives will be surrounded by these emotionally intelligent robots.

In general, intelligence can be categorized into two classes. One is Logical Intelligence and other is emotional intelligence. These are measured by Intelligent Quotient (IQ) and Emotional Quotient (EQ) respectively. We, Humans are blessed with the possession of both, but logical Intelligence has been our favorite child since ages. In the late 90's, the term artificial intelligence (First coined in 1956 by John McCarthy) gained huge popularity among the researchers and many successful efforts were made to synthesize the logical intelligence.

Many researchers have advocated that emotions play an important role in critical thinking, learning, memory functions, decision making, and many others. The term Emotional Intelligence was first used in an article by Keith Beasley in 1987 in the British Mensa magazine. Although in science fiction movies such as The Terminator (1984), Transformers (2007) and much other emotional intelligence in the machine has often been portrayed as a dangerous thing for mankind.

Over the years, researchers realize this fact that teaching machines "how to feel" is equally important as teaching them "how to think". Emotional intelligence helps the machine to grow in a new dimension which was not explored before.

The idea of developing an emotionally intelligent machine seems strange and unfamiliar at first but these types of machines have significant advantages. With the ability to process millions of data and ability to perform large complex computations within seconds, they still can't have the ability to see or understand the feeling of the user and to adapt their functions accordingly. User sometimes feels very frustrated and anxious when an unexpected error message is encountered and feel like venting out the anger on the machine but the machine, on the other hand, have no idea what he is going through and lack the ability to respond in a constructive way. However, a machine with some extent of emotional intelligence can respond back to the user with some productive solutions and ultimately decrease the frustration of the user by some extent.

Artificial Emotional intelligence is growing at a fast speed. Now we have android apps on a mobile phone which could observe the very small change in your facial expressions by using the camera of your phone and can tell whether the emotion you are showing is real or fake. In addition to that, the machine can tell about your mood just simply listening to your voice. The natural language processing (NLP)

For almost 50 years, Computer Scientists and researchers are doing their best to build machines that can interact with us smartly. The biggest success achieved on this path is "SOPHIA-THE ROBOT". Sophia is the first social humanoid interactive smart robot seriously one of its kind developed by Hong Kong based company Hanson Robotics. Sophia came into this world on February 14, 2016.

algorithms are matured enough that they can even tell whether a person is saying something sarcastically or not.

Emotional intelligence skills of a machine in some manner even surpasses the normal human ability but still machines sometimes unable to find complex emotions such as attraction, affection, jealousy, etc. In the future, we surely will have software which can tell whether a person is speaking the truth or a lie. This might end the political career of some politicians but are we ready to accept a machine telling us all the stuff that's the question.

"Future is uncertain and that's the beauty of it." Science is all about believing in something and proving it right by putting lots of efforts into it. Many visionary people are there in this world who are constantly working towards a better future.

Are you amongst them?

■

About the Authors

Dr. Priti Sharma MCA, Ph.D.(Computer Science) is working as an Assistant Professor in the Department of Computer Science & Applications, M.D. University, Rohtak. She has published more than 50 publications in various journals/ magazines of national and international repute. She is guiding 3 Ph.D. research scholars from various research areas. She is engaged in teaching and research from last 12 years. Her area of research includes Data mining, Big data, Software Engineering, Machine Learning.

Mr. Deepak Sharma has completed his M.tech from C-DAC: Centre for Development of Advanced Computing, Ministry of Communications and Information Technology, Government of India affiliated from Guru Gobind Singh Indraprastha University, Delhi. He is currently pursuing Ph.D. in Computer Science at M. D. University, Rohtak. His main research areas include Data mining, Mobile adhoc network (MANET), wireless sensor network (WSN) and Internet of things (IoT).

Emotional Intelligence

A. R. Revathi
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"Anyone can become angry- that is easy. But to be angry with the right person, to the right degree, at the right time, for the right purpose, and in the right way- that is not easy".

-Aristotle, "The Nichomachean Ethics" Aristotle's challenge, p.xix

Introduction

Among the most important research topics, Emotional Intelligence or Emotional Quotient going to prove to be of great hope among business leaders and professional managers. Emotional Intelligence has a huge impact on management studies that illustrates how one can manage their emotions and act accordingly. Emotional intelligence is the most covered psychological topic since last decade.

Recent decades view emotions as a unorganized interruptions in one's mental activity. According to Publilius Syrus "Rule your feelings, lest your feelings rule you" [1] Nowadays, in psychology, Young stated emotions as "acute disturbance[s] of the individual as a whole" [2] and bypassing with modern introduction which defines emotion as "8 disorganized response, largely visceral, resulting from the lack of an effective adjustment" [3] Keeping this in mind, pure emotion is viewed as a reason for "complete loss of cerebral control and containing no trace of conscious purpose" [4].

As people concern the term "Emotional Intelligence" is an oxymoron which is all about rational thinking without any reaction to someone's action and this field touches many areas of research in Management, Psychology, Robotics and so on. In this paper, we attempt to look for easy understanding of EI in its various dimension and domains and its role or impact on business and technological success.

What is emotion?

A state of a human being arrogant, jovial, anger, sadness, happiness, excitement and so on, which makes them to enter into a psychological subsystem that can be shown to themselves or to others.

People state emotion as an organized response to something that mentally and physically transform a person or to interact socially into enriching experience. Intelligence: Intelligence is the capacity of an individual to predict a statement, whether it is true or not? or to find the truth in the false statement.

SOCIAL INTELLIGENCE

In order to understand emotional intelligence one should have to know what is social intelligence?

Social intelligence is the capability to understand and act as the way to people and to oneself (Personal Intelligence).

How can we use intelligence with emotion?

Emotional Intelligence involves psychological action that can be done to themselves or to others or to use the emotions to solve a problem, to make logical decisions, and to come up with new ideas based on human action and thinking. It is a subset of social intelligence and personal intelligence. Emotion and intelligence can vary from one person to another. In order to distinguish them interpersonal and intrapersonal knowledge and intelligence is used.

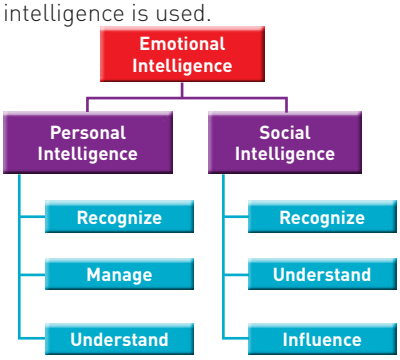

Fig.1: Illustrates types of Emotional Intelligence

Both used to distinguish the pleasure from one of pain and to detect a set of feelings. Interpersonal intelligence also involves the cubic measure to check others mood and to convert the obtained knowledge into service to predict their future behavior to certain things.

Components of emotional intelligence

(i) Self-awareness

- Emotional Awareness
- Accurate self-assessment
- Self confidence

When people know about themselves, people know their ability and disability as well as how they react to one situation and behavior of others.

(ii) Self -regulation

- Self management
- Trustworthiness
- Conscientiousness
- Adaptability
- Innovation

Emotionally intelligent people can keep in check about their own emotions when something is happening.

Fig. 2: Illustrates components of Emotional Intelligence

(iii) Motivation

People with high intellectual skills can motivate others which makes them more optimistic (confident about future) and resilient (able to recover quickly from different situations).

(iv) Empathy

People with the ability to understand others feelings and feeling pity for others misfortune are good at collaborating well with people.

(v) Social skills

The social skills of people with high Emotional Quotient can respect people well by showing care and mingle with them more easily.

Emotional Intelligence Models

The three dominated models are going to be explained below. The three models are

a. Mayor-Salovey-Caruso ability model
b. Goleman's model
c. Mixed model.

a. Mayor-Salovey-Caruso ability model

This model was proposed by the psychologist Mr. Peter Salovey and Mr. John Mayer. They only identified the term "Emotional Intelligence" in the year 1990. Their concept is Ability-Based Emotional Model. In 1997 they refined it and proposed four branches. These branches are Emotional Perception, Assimilation, Understanding, Management.

b. Goleman's model

Mr. Daniel Goleman popularizes the concept of EI in 1995 and he wrote a book on this topic. He describes that emotional intelligence as the ability to motivate oneself and survive in the face of expressing distress. This model proposes self-awareness, self-anagement, social awareness, relationship management.

c. Mixed model

This model was proposed by Bar-On in 1998. His model was viewed as an mixed intelligence. He defined EQ as "an array of non cognitive capabilities, competencies and skills that influence one's ability to succeed in copying with environmental demands and pressures". This surrounds the area like self awareness, contemplate, empathy, happiness and optimistic

Need of emotional intelligence

IQ measurement should contain tests demonstrating not being afraid, angry, grieved, or inquisitive over things that arouse the emotions of younger children [5] which is recommended by Woodworth. The next tradition views emotion as an arranging response in order as because it mainly focuses cognitive activities and successive action [6,7]. Instead of characterizing emotion as complete confusion, unsystematic, and something to outgrow, Leeper suggested that emotions are initially motivating actions; they are "processes which arouse, sustain, and direct activity" [6].

Emotional Intelligence is needed in all the fields like education, work, family etc. one of the major thing is emotional intelligence is essential for building an balanced life

- Physical health
- Mental well-being Relationships
- Conflict resolution
- Success

Fig. 3: Goleman's Model

Why do we need emotional intelligence at workplace?

"If you want to go far, you have to go together"

- Anonymous

Truly speaking, people come up with collaboration of ideas when they work together instead of isolation if and only if they can able to tackle well with others emotions.

Need of emotional intelligence in technology

Right now, at repetitive tasks machines work better than humans but it requires lots of processing power and pattern recognition.

We may say instead we use Artificial Intelligence?

AI fails to replicate tasks, it is a field that makes machine to think and act rationally like humans.

"Machines will not replace humans until they are emotionally strong".

AI needs Emotional Intelligences to facilitate machine-human interaction according to their moods.

Reasons why AI need EI?

- **To assist us**

Bots(autonomous program on network, which can interact with the system or users) are mindless minions. If people make bots to pick up kids from school it does so but it doesn't think how the kids react. So people need EI.

- **To understand us**

If people are going to empower systems, algorithms, software code to perform like humans, people have to imbue them with certain restrictions and empathy that they usually have.

- **To make us better human beings**

Just because a machine can do certain things as human doesn't mean they can do so. But people can say emotionally intelligent technology can make us better human beings.

Fields were emotional intelligence is in a sense

The rise of Automation and increase in the use of digital platforms in our day to day job is the evidence that we rely on technology to make things work smoothly innovative and creative. But technology should not dominate us instead all can use technology to enhance our unique creativity and innovative talents in uncertain times.

By upgrading to machine learning one can able to gather data and to process results as well as with the emotional intelligence of humans, a symbolic relationship can be accomplished where all can improve quality, efficiency of results and performance of the system.

The field of Robotics is increasing day by day. Researchers are currently working on Artificial Intelligence so that machines can mimic and understand

human thoughts. Eg. Pepper a white, semi-humanoid robot as size of six year old children working in banks and hotels.

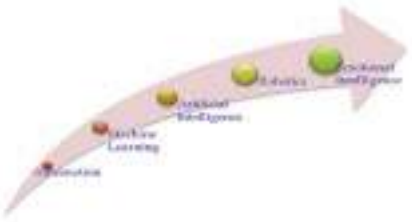

Fig. 4: Illustrates various domains in which EI used.

Now pepper and other robots are getting ready with human emotions. Pepper uses sensor and a camera to capture facial expression. They capture basic six emotions anger, joy, sadness, excitement, disgust and fear assuming these are common across the universe.

PROS

- Increased team performance and social personal effectiveness
- Decreased occupational stress and destructive behavior
- Improves decision making capabilities
- Reduced staff turnover
- Increased personal well being
- Increased leadership ability
- Reduce bulling

CONS

- Manipulates people - If EI become a skill, then people can make use of it by making them to do what you want?
- Prevents people to use their
- Critical thinking capability
- Can be used for personal gain
- Privacy among people will get destructive
- Takes more time to develop this skill
- Reduces manpower

Conclusion

Overall, the actions and reactions that people take in their day to day life are mostly based on emotions which we called as EI. People make use of sense when an individual has greater understanding and communication skills which leads to take proper decision and solve problems in time.

"Experiencing yourself in a conscious manner that is gaining self knowledge and observing social knowledge is an integral part of learning"

So using our emotions in technology can expect accurate results, proper handling of peoples, reduces depression and stress and adaptable decisions.

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About the Author

Dr. A. R. Revathi [I1502200] is currently working as Associate Professor in Department of Information Technology at SRM Valliammai Engineering College. She has completed Ph.D in Anna University, MIT campus, Chennai. Her research interests are mainly focused on motion detection, human detection, vision and IoT.

Emotional Intelligence : Introduction and Applications

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1. Introduction

Emotions are the fundamental parts of the Humans. Emotional aspect broadly impacts on social intelligence like communication; decision making and even helps to understand the behavior of an individual. It plays essential role throughout communication. **Emotional Intelligence** is the ability to recognize, interpret, understand the emotions and behave in an effective way, make decisions. With great advancement in the field of Artificial Intelligence; Machines playing the roles of humans, doing household jobs, assisting people are near future of field. It is crucial to understand the human emotions for these machines so it leads to effective communication of Human and Machine and to make the machines become part of human daily life. Emotional Intelligence have 5 key components: Self Awareness, Empathy, Motivation, Self regulation and Social Skills.

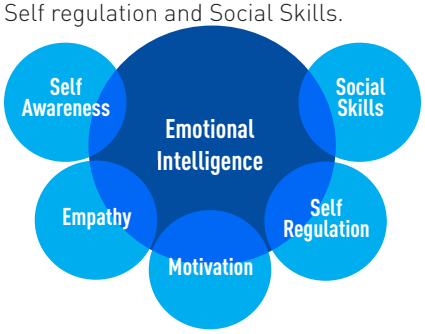

Fig. 1 : Components of Emotional Intelligence

There are several ways of recognizing emotions such as through face expressions, verbal understanding, physical and neurological response monitoring.

As per Mehrabian [3] 55% of the information is conveyed by facial expressions, 38% is conveyed by tone and late 7% is conveyed by spoken words. There are six basic emotions: Happy, Sad, Anger, Disgust, Surprise and Fear. The combination of these expression leads to various other emotions which extend upto 27 emotions.

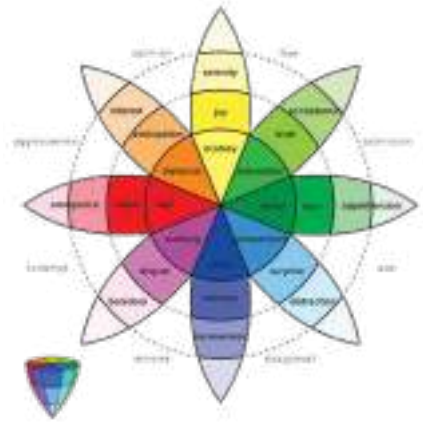

Fig. 2 : Plutchik's wheel of emotions.

2. Techniques

There are several methods to identify the emotions in real time. They work differently in different environments. Most commonly used techniques are Facial Expressions, Speech Recognition and Physical-Neurological Monitoring.

2.1 Facial Expressions

The most effective and most widely used method is through Facial expressions. Expressions exceed cultural diversities and quality. Humans conveys most information through the face expressions. These expressions can be : Posed (acted) or Spontaneous (Real). The emotion recognition is done through combination of movement of facial muscles. Emotion Recognition through facial expressions gives the freedom to analyze the emotions of the person without wearing sensor devices. A good facial expression recognition system should be able to recognize the emotions with low intensity, lightening or tilted face, posed or spontaneous expressions.

Fig. 3 : Facial Expression Recognition

2.2 Vocal Communication

To recognize the emotion of the person through speech, the machine should be able to understand verbal and non-verbal data. Spoken words constitutes verbal data whereas tone of the voice constitutes non-verbal data. The ideal intelligent machine should be able to accurately recognize the emotion in the speech based on the pitch, tone, frequency, energy, loudness, clarity and give the results in real-time. Based on the speech input, the features are extracted and classified in different emotions [6].

2.3 Physical – Neurological monitoring

Another way of recognizing emotions is through high-quality sensors which can find in-depth state of the person. With the EEG, EMG, and GSR sensors it becomes possible to measure the physical and neurological aspects of the human being. It's most effective for patient monitoring so

the track for their health can be kept and we can get updates if there is any sudden change. The wearable sensors also detect the change in emotion of a person to great extent.

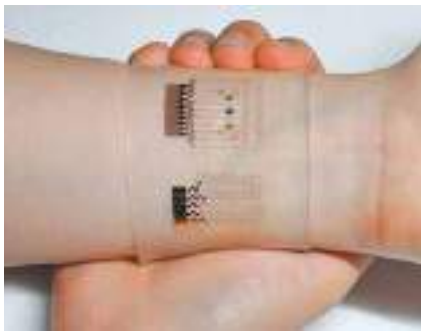

Fig. 4 : Wearable Sensors

3. Applications

3.1 Remote Health Monitoring

With tremendous advancement in technology, we are now able to detect the health issues to some extent by using smart sensors. Even the person doesn't need to be present at the place. It can be done remotely just by gathering and analyzing the facial statistical data and sensors analytics. We can also track the changes in health by involving the person in particular technological environment like, putting some sensors and detect the effect of medicines by monitoring the changes in facial expression and sending the real time data to health professionals. It can be most useful for patient with chronic diseases.

Fig. 5 : Remote patient Monitoring

3.2 E-learning :

The new phase of learning is introduced by combining the knowledge with technology. Performance, output and utilization of information and knowledge is very important. We can now improve the way people learn things and can get rid of the glitches in the learning system, which are not easy to be identified. To detect the concentration of the student we can capture head movement, face expressions and detect how a person is feeling while studying something. We can create the surroundings to detect the mood or feeling of a person. We can change the study or learning technique to make the person feel more comfortable in order to get maximum output.

3.3 Safer Travelling

We look for a safe side when it comes to travelling. How about the vehicle alerts you when you fall asleep or gets diverted from the road. Facial expressions and sensors can detect the facial features in order to detect certain condition, like if the driver is in alert position or if he is feeling distracted or sleepy. Based on the analysis by some sensors and cameras, the car decides to give corresponding response. Either, ring an alarm or just slow down the vehicle based on the data collected and analyzed.

3.4 Gaming

Entertainment is a very important part of life. With the help of virtual reality and Emotion Intelligence, the games are becoming more real. We use webcams, headset, gloves, data suits and sensors to detect player's emotions and behavior. The data is sent to emotion recognition app. Based on the statistics, the game changes its environment accordingly, provide personalized environment and making the player more excited.

Fig. 6 : Gaming with Virtual Reality

3.5 Productive Interviews

If the recruiter knows what the candidate is feeling it can ease the selection process. If the participant is fit for the job or lying in order to get shortlisted can help the interviewer to take the decision. We can keep track of change in facial features or response, on a particular question or condition, using camera and sensors. This canalso help recruiters to take online interviews as well in order to make the process more achieving.

3.6 High productivity digital advertisements

The E-commerce needs to be customer focused to sell the products effectively. We can now boost the marketing output using the emotion recognition. We can show multiple versions of advertisements and different products and capture viewer's facial expression. And which further can be used to analyze the response for a particular advertisement or product. Based on that we can change the advertisement technique or content and circulate the best product for the locality.

3.7 Security :

Security is becoming very important aspect now a days. We can identify the intention of a person by monitoring the facial expressions, which may help us to take particular action according to the sensor response. An alarm or a message can be sent to the corresponding security personnel with the intension of the person. We can also use night vision cameras to make same possible at night.

4. Acknowledgement

We are thankful to University Grand Commission for providing Senior Research Fellowship supporting writing this article.

5. Conclusion

In this article, we have discussed brief introduction of Emotional Intelligence. Various existing methods have been discussed which are used for the purpose and applications of the field are discussed.

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Symbiotic Transformational Technology on the rise: Artificial Intelligence in Emotional Intelligence

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Emotions and Intelligence are allied spectacles and hence veritable intelligent agents are modelled taking into account the emotional quotient. Research and development in artificial intelligence have imbibed emotional intelligence as an important focus theme to scan across real-life disciplines. Noteworthy key-ins have been incorporated to evolve fresh imminent across the sphere of emotional intelligence and algorithms which deploy intelligent software decisions. Agents who delve into teaching-learning process are very alluring for merging emotional facets in artificial intelligence. It is an incredible fact that Emotions play an imperative component in intelligent behaviour and persuade the human judgment-making process. This research insight article focuses on the synoptic sketch of the state-of-the-art research highlights in emotional intelligence with prominence towards strategic features such as Emotion detection, Emotional agents, Text emotion detection and Modeling the setting of artificial and autonomous task agents.

1. Introduction

With the onset of research in social intelligence by Thorndike, the concept of Emotional Intelligence has evolved in the 19th century [1]. Social intelligence is as the "ability to understand and manage other people, and to engage in adaptive social interactions" [2]; emotional intelligence is defined as the ability of an individual to recognize, comprehend, administer, and articulate emotion contained by oneself and in relating with others [3]. Salovey et. al has formulated five critical realms of EI: emotional awareness, emotional management, self motivation, conceding emotions in others and managing relationships. Emotional Intelligence is evaluated using EQ (emotional intelligence quotient) as a common gauging factor through standard EQ tests.

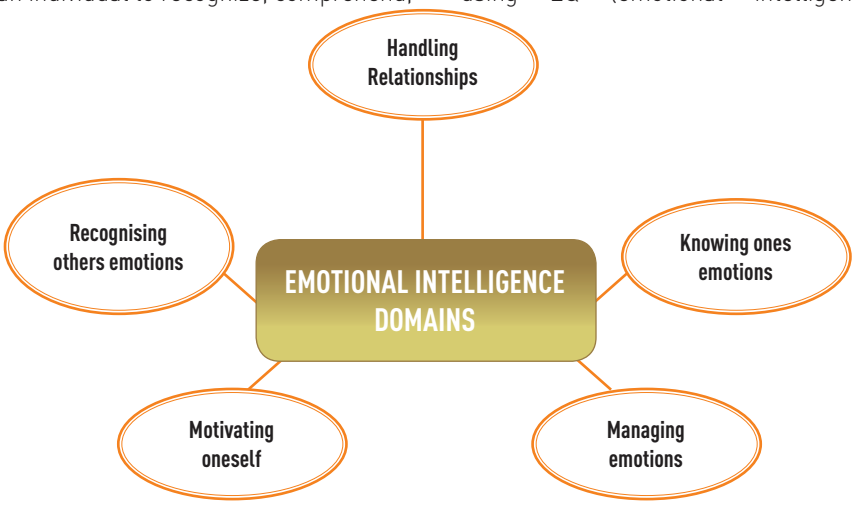

Fig. 1: Facets of Emotional Intelligence

Since the 19th century, research forum in artificial intelligence and human-computer interaction have considered the role and contribution of emotions as a significant factor. Picard shared a contextual outline for designing machines incorporated with emotional intelligence. Consequently, numerous other researchers pertaining to this domain have developed machines that can deduce on emotions with additional capabilities to perceive, manage, comprehend and articulate emotions. Further research progress is currently developing to incorporate emotional entities in the following areas:

- Program the engine to perceive emotions
- Facilitate the engine to articulate emotion
- Exemplify the engine in a virtual or physical manner

An Intelligent Agent (IA) [4] – [7] is considered to be a software entity located in an environment. IA can be

- Autonomous;
- respond to changes in the

environment;
- be proactive in attaining its goals; and also
- Sociable.

For the purpose of attaining the goal, an IA learns by itself and makes use of its internal knowledge base. Thus it is seen as a natural metaphor for human acts. It has elevated performance behaviour in data distribution and control of self-imposed expertise.

There are five categories in the Intelligent Agent-based systems:-
- **Integration:** Integration of information and sharing of knowledge.
- **Coordination:** Collaborative problem-solving and poly-agent structure.
- **Mobility:** Mobile driving forces and object oriented keys.
- **Assistance:** Private assistance, soft-bots and data mining.
- **Believable Agents:** Alife and simulation.

2. Emotion Detection

The mood and perception towards the choice of desired brands or products in the world of digital marketing which reflect the mood of the consumer are gauged by different organisations using Sentiment Analysis. But when the users engage with offline shopping of brands and products in retail outlets, showrooms, etc., the task to gauge consumer mood and user reaction becomes a challenging task to solve. Hence Emotion Detection from facial expressions using AI can be a feasible substitutive option to automatically gauge consumer's rendezvous with their desired choice of substance and trade names.

3. Emotional Agents

An emotional agent is a driving force that networks with its setting based on an evenhanded assessment that the environmental position has on the aim, principles and inclusive point of interests of that agent which is being influenced.

3.1 Different Aspects of considering Emotional Agents:

- Emotional Acuity
- Emotional Interpretation
- Emotional Reminiscence
- Emotional Learning

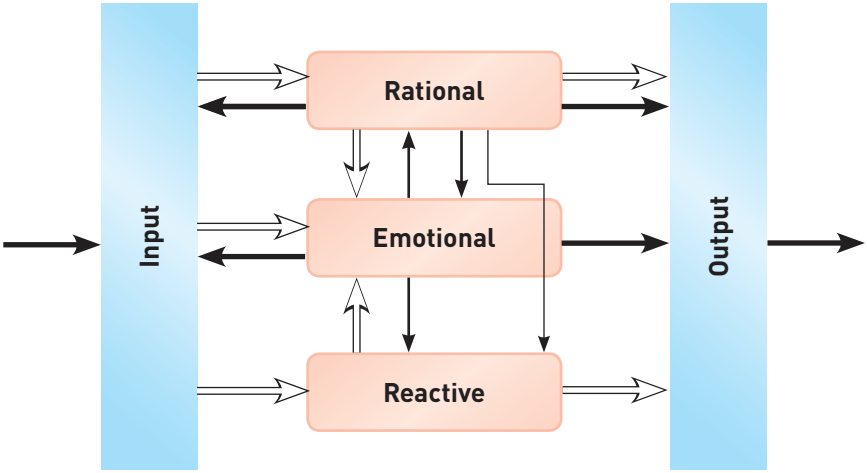

Fig. 2: Configuration of an Emotional Agent

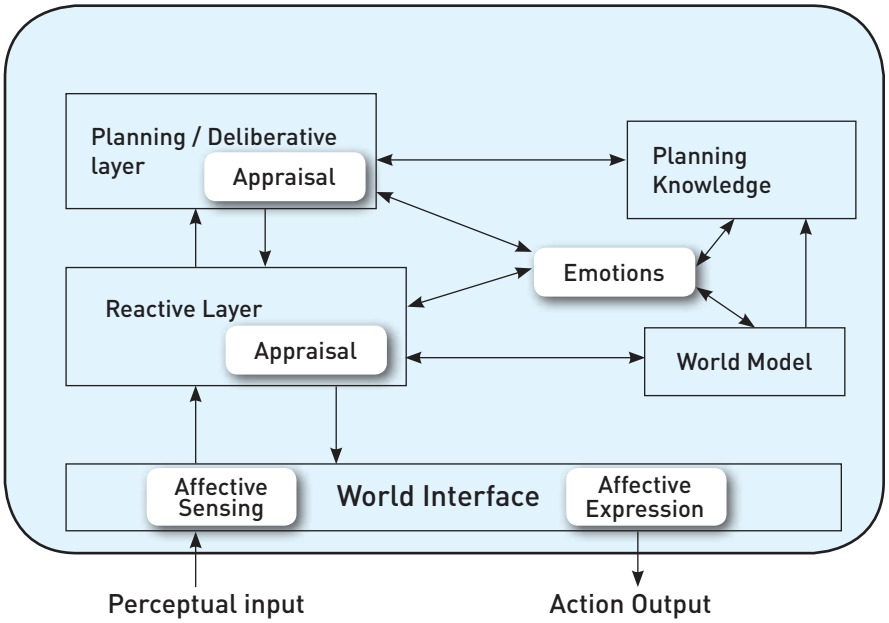

Fig. 3: Emotional Agents as Hybrid Structure

- Emotional Articulation

Emotions will have an effect on the following: Acuity, Viewpoints, Reckoning, Decision Making, Action and Expression.

4. Text Emotion Detection

Emotions play an essential facet in the interface and communication between populace. The barter of emotions all the way through text messages and forwards of private blogs throws up the off the record kind of writing challenge for researches. Mining of emotions from the text will harness for settling on the human-computer interaction that manages communication and many supplementary phenomena. Emotions are also articulated by a person's verbal communication, facial and wordings primarily based emotion respectively. Emotion detection technique at every sentence level plays a fundamental role to outline the emotions or to look out the cues for spawning such emotions. Sentences are the elemental info units of any manuscript. For that reason, the detection technique at the document

level depends on the sensations expressed by the individual sentences of that manuscript that in turn depends on the emotions articulated by the particularized words. The expeditious augmentation of the World Wide Web has facilitated an amplified online communication, blog post and written content over the websites and thus commenced the new-fangled avenues to identify the emotions from that textual information. This has led to the progress of quantified online content affluent in user outlook, emotions, and sentiments [4]. These needs computational methods to successfully investigate this online content, familiarize, and depict constructive conclusions and detection of emotions. The existing schemes apportion with the divergence identification of feelings which tend to be positive or negative.

5. Archetyped Environment f Simulated Agents

AI is about realistic interpretation: reasoning in order to act constructively. A blend of perception, reasoning, and acting encompasses a driving force which acts in an environment and may include other agents. An agent collectively with its environment is entitled as 'world'.

Nowadays, AI is progressively more reliant on cloud computing with its tenacity to build up the dynamics of the human based emotions. Diverse info graphic database, frameworks, annals, applications, toolkits, and datasets in the AI and machine learning world are into existence. The human generation "plugs into" higher intelligence by conceiving an unswerving neural intersection across the internet. The five components of AI with emotional intelligence are as follows: big data compilation, deep learning, self-awareness, security and ethics and external responsiveness (shown in Fig. 5). The human intelligence comprises of Emotions as an indispensable constituent and AI remains a curtailed phenomenon sans emotional intelligence.

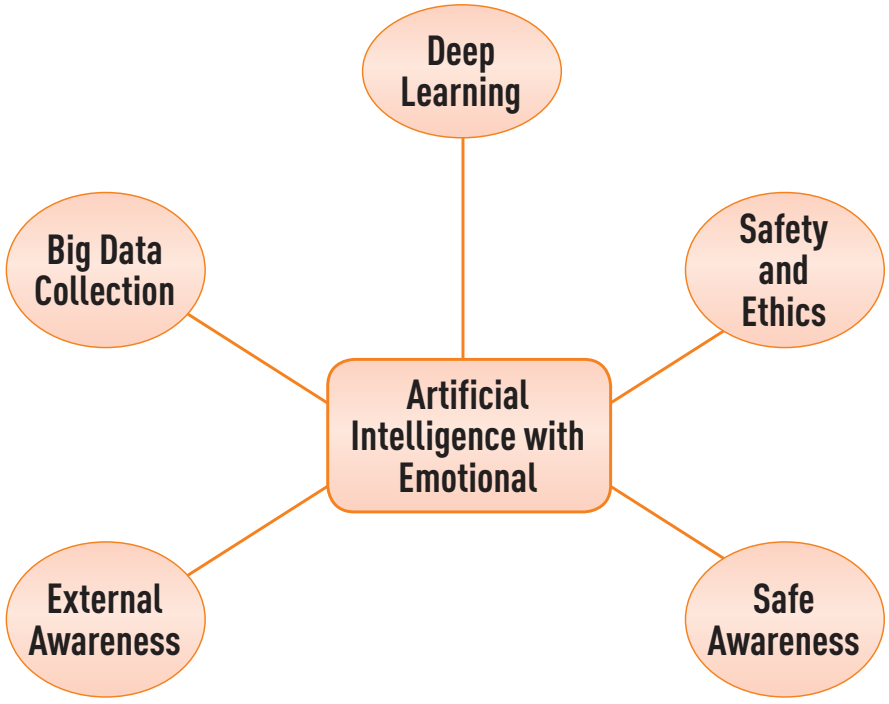

Fig. 5: Artificial Intelligence with Emotional Intelligence Models

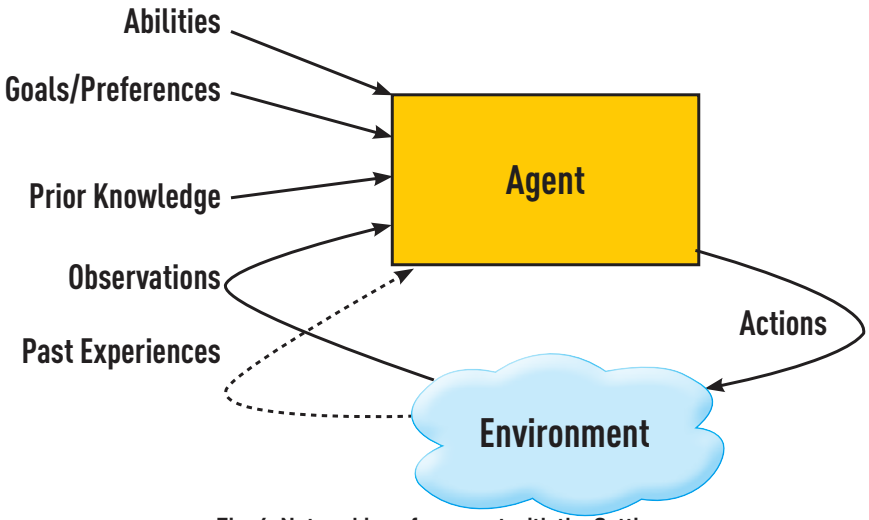

Fig. 4: Networking of an agent with the Setting

6. Conclusion

Design and Development of technology tools endowed with emotional intelligence are the trending research focus booming up in artificial intelligence domain. The global outlook is that AI imbibed into automation/ robotics is going to revolutionize the markets and workforces. The recent statistics suggest that Autonomous cars will coerce over three thousand manual drivers to seek new diverse employment opportunities, and robotic production lines like Tesla's will binge on manufacturing jobs, which are currently at 12 million and falling. This marks the onset of Disruptive technology. Improvisation in AI which is escalating to leaps and bounds will give rise to smarter "thinking" jobs than monotonous "doing" jobs.

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Use of Emotional Intelligence for Smarter AI

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1. Introduction

It has been seen that a lot of people in this world are incredibly bright and intelligent but cannot successfully manage their life. A brilliant student who graduated from the top school in the country may not make similar progress in the company. Ensuring success is not just about intelligence but also about handling emotions which are inherent in the one's trait and personality and this gives rise to Emotional Intelligence. The discipline of Emotional Intelligence helps one to control and manage emotions and makes one to understand them as well. The buzzword of success is closely related to emotional intelligence and research outlines that emotional intelligence is having higher importance than that of IQ. Moreover research suggests that emotional intelligence is connected in all areas where decision making is to be required [1]. Emotional Intelligence is the discipline where aspects of control and recognition of human emotions is taken care of. Emotional Intelligence deals with the domains of handling relationships, managing emotions, knowing self and other's emotions, and motivation [2]. The domains involving emotional intelligence are shown in Fig.1.

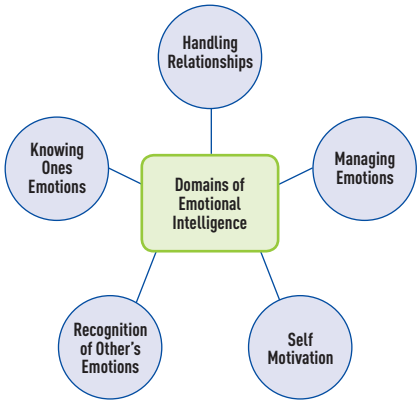

Fig. 1: Various Emotional Intelligence Domains.

2. Components of the Emotional Intelligence

Emotional Intelligence is usually talked in terms of five components of Self-Awareness, Self-Regulation, Motivation, Empathy and Social Skills [3].

Self-Awareness – Recognition and understanding of own emotions come under self-awareness. It is one of the important measuring components of emotional intelligence. Self- awareness is taking care of effect of various actions to be performed in daily life, effect of mood and dealing with emotions of other people. Relationships among various things in terms of their behavior and the way to perceive also come under self- awareness emotions. Recognition of own limitations and strengths for various actions is also found in self- awareness individuals. Research suggests that self-awareness individuals are always accepting new challenges and experiences for various kinds of information. Self- awareness individuals are having high potential of learning from interactions which they undergo with other people.

Self-Regulation- Self Regulation in emotional intelligence gives emphasis on controlling and managing emotions which individuals carry while performing various activities. The crux behind self-regulation based emotional intelligence is not to put constraints and lock any individual from expressing actual feelings but to express emotions at the right time under favoring conditions. Self-regulation gives a proper way to express emotions in appropriate manner. Individuals who follow self-regulation turn to be enough flexible and adapt to changing conditions in proper manner. Self-regulatory individuals are good enough in resolving conflicts and handling situations where difficulty arises.

Motivation - Motivation is the key **factor** in emotional intelligence and it makes people emotionally intelligent without looking for monetary rewards and any kind of recognition. Motivation brings passion and zeal in individuals which in turn helps them to achieve goals and targets. Motivated emotionally intelligent people always go for new experiences for performing activities without caring for results in terms of rewards in turn. Usually motivation in emotional intelligence brings competency in individuals to turn action oriented. Such individuals assign goals and targets for themselves and are ambitious for achieving their goals. They remain committed and always take right initiatives to plan for getting work done whenever any task is put in front of them.

Empathy – Empathy is related to recognition of emotional states in other individuals or the ability to understand the feelings of others. Empathy in emotional intelligence does not mean to have sympathy for others or to accept the behavior of individuals from their perspectives. Instead empathy allows people to understand the meaning and dynamics of relationships which are social in nature. Skillful empathic individuals sense the power in people who are strong in managing social

relationships and their understanding in terms of behaviors.

Social Skills – Social skills in individuals in terms of managing relationships, building connects and interacting with each other is another prime component of emotional intelligence. Good social skills helps individuals to understand own emotions and also feelings of others in proper context. It helps to apply these skills to add them in daily based interactions. In professional environments, social skills help managers to build strong connect with employees. On the other side, it helps employees in building trust as well and develops proper channel between them and their leaders. Listening actively, communication in terms of verbal and non-verbal forms and leadership are some of the important social skills in emotional intelligence. An emotional intelligent human have all of this and more. He can think and feel. He is capable of complex cognitive and intellectual feats and of high levels of motivation and self-awareness which are the quintessential factors that makes a Homeo sapiens, human. But in a world of artificial intelligence (AI), what is the future of emotional intelligence?

3. Introduction to Artificial Intelligence:

Artificial Intelligence is a technology which is used to assist humans for performing their tasks in a better way. However this technology still lacks a power of certain cognitive quotient [4]. In coming future, Artificial Intelligence will surely raise to standards especially with its connected to emotional intelligence. A lot of research has been conducted in the last few years which showed that standard cognitive intelligence by itself is insufficient to guarantee success. There is another type of intellectual skillet which is made up of combination of different level of human competencies. This skill set allows a person to be aware of, to understand and manages his own emotions and at the same time understand and recognize the emotions of others and use this knowledge to foster success for him and others. This skill set, also called Emotional Intelligence, makes cognitive process adaptive and help individuals think rationally about emotions. Next decade of Artificial Intelligence will further minimize the gap in human works and thus humans cannot afford to distance themselves from technology of AI. Many researchers predict and fear that AI revolution will reach those heights where it will take human decisions and thus seek to destroy us. As Artificial intelligence becomes more a part of everyday life and everyday experiences online, it's going to improve user experience for customers and help companies provide the best service they can.

4. Integration of Emotional Intelligence with Artificial Intelligence:

Emotionally intelligent AI agents fill the space and are quite advancing now the places humans are struggling to understand each other. Today almost 52% customers around the world use AI powered technology. Gartner projects that by 2020, you are more likely to have a conversation with chatbot than your spouse [5]. AI has already disrupted a lot of industries such as manufacturing, gaming, media and entertainment. Integrating emotional intelligence with AI is a complicated task but a lot of big companies have already achieved some breakthrough success in it. From Artificial Intelligence perspective, emotional intelligence is related to Artificial Intelligence in terms of collection of big data, self and external awareness, deep learning, safety and ethics. The integration of emotional intelligence with Artificial Intelligence components is shown in Fig. 2.

Fig. 2: Integration of Emotional Intelligence Models with AI

Google and Apple photo curates "great memories" videos and it knows that a video of a baby taking first steps will bring more joy than the photo of a cereal box taken for a shopping list. YouTube knows how we will smile and laugh at a cat video and recoil in horror at child abuse. Facebook is a giant social and emotional learning engine. It has many of our emotional memories such as photos and videos. It also knows our friends and relatives who we interact and finally our taste, what we like and not like. It brings these three things together at an incredible scale to decide what goes into our feeds to engage us both socially and emotionally. Personalized movie of 2018 memories you received last week, is just one such example.

Microsoft built Xiaolce, the most popular social chatbot in the world. Xiaolce considers both IQ and EQ while making decisions. It has a personality of 18 year-old-girl Chinese girl who is reliable, sympathetic, affectionate, and has a great sense of humor.

Few people would argue that a person could outperform an advanced technology system at ingesting and analyzing data and so in areas such as this, AI is proving an invaluable tool which in no way threatens human employees, rather it enhances their work.

5. Working of Emotional Artificial Intelligent Agents:

AI brings a world in which machines interpret the emotion state of humans and adapt their behavior to give appropriate responses to those emotions. Machines can look at our faces to recognize even private qualities such as our sexual orientation, political learning etc.

Affectiva, a Boston based company, which was established a decade ago, uses a webcam to track her smirks, smiles, frowns, and furrows, which measure her levels of surprise, amusement, or confusion. It also uses a webcam to measure her heart rate without wearing a sensor by tracking color changes in her face, which pulses each time the heart beats.

But Affectiva just doesn't stop at micro expressions. It utilizes a multi-modal technology which means it looks

at more than just the face. Affectiva can also analyze the way people talk such as tempo, tone and volume, as opposed to the literal meaning of spoken words.

For training models in deep learning, Affectiva has used sample space of 7.8 million faces covering 87 countries. The model developed based on this training data has allowed deep learning developers to observe some of the key differences related to emotions in different regions around the globe. Another startup under the name of Real eyes makes use of computer vision to observe emotional responses among people the time they watch videos of short durations. Then predictive analytics is used to check the effectiveness of person for watching this video. 15 million frames of natural emotions have been labeled till now with up to seven human assessments for each frame. While a lot of Realeyes focus is marketing, they have also started looking at other sectors like health care, for detecting depressions and education on finding ways to engage students in digital learning.

6. Conclusion:

The spaces where humans continued to struggle in terms of understanding for each other, emotionally AI agents advanced rapidly to contribute in managing and understanding of emotions to greater extent. Unlike humans, AI tracks each and every history in our online records and come with information which is almost impossible for humans to predict. As per Annette Zimmermann, vice president of research at Gartner, by 2020 one's personal device will know more about one's emotion state than one's own family.

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The concept of Emotional Intelligence and its augmentation with AI through Artificial Emotional Intelligence

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Introduction

Why it happens that, most of the backbenchers of a class generally become more successful in life? Why every graduate passing from the top colleges or universities are not equally successful in life? Why high intelligence does not always guarantee success in life?

After going through these questions, we can definitely assume that there must be certain other traits which exist in individuals and have nothing to do with the conventional concept of intelligence or Intelligence Quotient (IQ). Over a long time, researchers, psychologist, scientists, educationist, and people dealing with human resource management have begun to analyse why standard intelligence alone is not enough to anticipate the performance of an individual. They have realized that there is another type of intelligence that exists but is not related to the standard cognitive intelligence and termed them as "Emotional Intelligence".

What is Emotional Intelligence (EI)?

Research is constantly proving that academic qualification and the traditional concept of intelligence or IQ are not the only determining factor for success. There are many different types of intelligence and grades only measure a few. Today we are much focused on marks, grades, percentages, percentiles, points etc. In our day-to-day life, it has become our habit that, whenever we judge a person (a student or any other individuals) we mainly focus on their academics, degree and compare their marks or grades. 99.9% is very common today. But, have we ever thought whether these marks, grades, percentages, percentiles or points measure a person's emotional stability? Do they measure their leadership ability? Do they measure the person's ability to think out-of-the-box? Do they measure their problem solving capabilities? They do nothing to evaluate a person's ability to predict the needs of others. They tell nothing about the ability of an individual to work with others and find optimal solutions for diverse situations. All of these things are highly important for an individual's work performance and career success, but almost none of them are measured by grades. Standardized test scores and grades are just numbers which show the position of individuals with respect to others in a particular field or subject over a particular time frame.

There is a thin but prominent line of demarcation between Intelligence or Intelligence Quotient (IQ) and Emotional Intelligence (EI), which is also called Emotional Quotient (EQ). Without using complicated terms, in simple language, the difference is as follows. EQ can be defined as a person's ability towards identifying, controlling, evaluating, analyzing, and expressing emotions. Individual's with a high level of EQ usually becomes good leaders and efficient team players since they have a strong ability to understand and connect with the people around them. On the other hand, IQ can be looked upon as a score that is derived from standardized tests intended to assess an individual's intelligence. IQ mostly determines academic abilities and identifies individuals with typical intelligence and mental capabilities.

In 1983, Dr. Howard Gardner at Harvard University published a pioneering work entitled, *"Frames of Mind: The Theory of Multiple Intelligences"* where he suggested that intelligence can be of different kinds which are equally cognitive in nature but the traditional standard model of intelligence, based on IQ is very limited to quantify them. Gardner proposed different kinds of intelligence with the scope for inclusion of other additional intelligence. Some of them are as follows:

- Visual-Spatial Intelligence
- Linguistic-Verbal Intelligence
- Logical-Mathematical Intelligence
- Bodily-Kinesthetic Intelligence

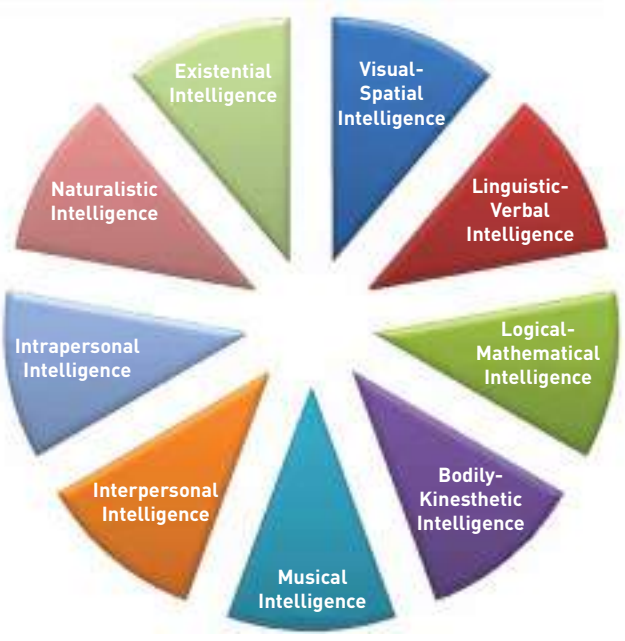

Fig. 1: Gardner's Multiple Intelligence model

- Musical Intelligence
- Interpersonal Intelligence
- Intrapersonal Intelligence
- Naturalistic Intelligence
- Existential Intelligence

Out of this, each one has its own strengths and characteristics. But here we would like to explore more on Intrapersonal and Interpersonal Intelligence.

Individuals with strong intrapersonal intelligence are more aware of their own emotional states, feelings, motivations and fears. They introspect themselves through constant self-reflection, monitoring, analysis, and assessing their personal strengths and weaknesses.

On the other hand, individuals who are strong in interpersonal intelligence are good at interacting with other people, establishing a relationship with others and understanding other's emotions. They have the capacity to understand the intentions, desires and motivations of other people.

Since then, the field has obtained a typical research momentum where different eminent researches and renowned professors have contributed and laid the foundation of this concept. In 1995, the most widely recognized model and concept was put forward by Dr. Daniel Goleman. In his famous book *"Emotional Intelligence: Why It Can Matter More Than IQ"*, he writes "At best, IQ contributes about 20 percent to the factors that determine life success, which leaves 80 percent to other forces. As one observer notes, "The vast majority of one's ultimate niche in society is determined by non-IQ factors, ranging from social class to luck.". Goleman's framework is a four quadrant framework Figure 2. On longitudinal bisection, we will get two quadrants, both on the left and right. Each of these two quadrants can be put under two different heads representing personal competence and social competence.

If we notice properly, we can easily connect Golemsn's idea of Personal and Social competence with that of Gardner's idea of Intrapersonal and Interpersonal Intelligence.

Case study – understanding EI

Consider a situation in a corporate office. The best employee of the team is very upset because his grandpa is very ill and his condition is becoming critical day by day. Therefore he needs to go to his ancestral home as soon as possible. The employee is much worried because there are many tasks left and hence there is lots of pressure. He then talks to his Manager about this problem. Now the Manager has to decide, whether he is going to grant leave to the employee (which will definitely create a problem and can incur losses) or tell him directly that he will not be able to grant the leave at this point of time. So the Manager's decision can be broadly classified under four heads:

Fig. 2: Goleman's Framework of Emotional Competencies.

- **Sympathy:** After hearing from the employee, the Manager becomes emotional, and immediately grants leave to him without considering the impact on the business.
- **Antipathy:** After hearing from the employee, the Manager, straight away, told the employee that, he will not grant the leave at this point of time.
- **Apathy:** After hearing from the employee, the Manager is least bothered about the employee's personal problem, and he doesn't care about him.
- **Empathy:** After hearing from the employee, the Manager immediately sanctioned his leave. At the same time, he gave the employee, his own office laptop and asked him to carry the necessary documents so that he can complete the work from home, when he will be free.

Now let us analyze the situation, once again. If we notice carefully, in the first three heads, there is a potential loss (both in money as well as relationship). That is, a sympathetic decision will eventually have a negative impact on the business and can be a reason for the company's loss. A decision taken in antipathy will definitely trigger a bitter relationship between the employee and his manager. Moreover, due to the critical mental condition, the employee will not be able to focus on his work, which will indirectly affect the business. Being apathetic will not give any fruitful solution to the problem but will definitely create a distance between them. It will give a negative message to the entire team that their Manager is least concerned about their problems, which will directly affect the team bonding. Next one is Empathy, which seems the best solution to the problem. This will not only create a good impression but also tighten the team bonding and team spirit without hampering the business. Both of them will be happy, and there will be a "win-win" situation.

Importance of EI

Now we can understand why emotions are such important in our life. Our mental states and emotions greatly influence every aspect of our lives, from communicating with others, learning new things, understanding circumstances, analysing situations, making decisions and many more. They also have an impact on our health and well-being. This Emotional intelligence which is totally driven by our emotions involve a typical combination of competencies that allows an individual to understand, control and be aware of their own emotions, as well as recognize, understand and interpret the emotions of others thereby using this knowledge to get the best possible outcome leading towards mutual success (of self and others). According to various psychological and neuro-

science findings, emotion plays a crucial role in intelligent behaviour by combining cognitive, perceptive, intuitive, and other bodily processes,

The concept of EI has rapidly created a strong impact on a huge number of domains, including the business industry. Current reports say that many companies have now made emotional intelligence training (EI) training and EQ tests as mandatory part of the recruitment and hiring process. It has been found through research that individuals possessing strong leadership potential tend to be more emotionally intelligent, signifying that EQ is a crucial and significant quality for manager and business leaders to have.

The trend towards Artificial Emotional Intelligence (AEI)

With the advent of Artificial Intelligence (AI), humans want to impart "human-like" capabilities to machines, thereby stimulating intelligent human behaviour in them. Now, we all are aware of the fact that humans have different emotional parameters which are highly important for our survival, interaction with others and environment, decision-making and leading life in the best possible way. Marvin Minsky, a renowned scientist and researcher in the field of cognitive science and artificial intelligence was once questioned about machine emotions, he said: "The question is not whether intelligent machines can have any emotions, but whether machines can be intelligent without any emotions". So, to impart "human-like" capabilities and qualities to a machine, it is equally necessary to augment "emotions" in them. The simulation or augmentation of emotions in machines might be another challenging aspect of AI, and this concept opens the door to Artificial Emotional Intelligence.

Till now, AI has successfully implemented the concepts of knowledge representation, learning, planning, reasoning, and problem solving. Incorporation of computer perception and natural language processing to intelligent machines is already in progress. Now to enhance the creative rationality and mimic the essential components of human characteristics addition of emotional intelligence to machines has been a major area of research.

EI has started as a concept, but with the passage of time, it has rapidly expanded its spans. Today the foundation of EI is supported by different pillars ranging from Psychology, Sociology, Physiology, Neuro Science, Mathematics, and many more. In addition to all these, the implementation of EI in machines or what we call as AEI is working in close connection with Artificial Intelligence, Machine Learning, Cognitive Science, Artificial Neural Networks, Deep Learning and such other related advanced computing paradigms.

Conclusion

There are various concepts or theories about the creation of the earth, different concepts about the origin of life on earth, how the human race has evolved over time and how they became one of the complex living organisms on this planet having intellect, feelings, emotions, creativity and lot more. It seems that over the last few decades, humans have actively taken a challenge, the challenge – to create a new race - the machine race. With our intelligence and creative knowledge, we want to mimic human abilities in the machine. Extensive exploration and groundbreaking researches on Artificial Intelligence, Cognitive Science, Computational Intelligence, Machine Learning show that the day is not far away when it would be really difficult for us to understand whether the person standing in front of us is a human being or a machine. That day, it will really be a great success for us, but many researchers are equally worried about its real impact on us – what if, the machines become a threat for the human race? If that happens, then there would probably be another 'struggle for existence'. Although these questions may seem to be unrealistic and hypothetical yet they can't be ignored. However, with great advantages there are always some associated disadvantages. But by efficiently tackling those bottlenecks, we can focus on the positive side of these inventions, which will definitely help enhance human performance and drastically change our lifestyle in the near future.

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Emotional Intelligence: Features and its Importance in our life

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What is Emotional Intelligence

Emotional intelligence shows the capacity to distinguish, manage and control a person's own emotions. In addition, emotional intelligence also has the capacity to comprehend and control the sentiments of others. In other words, that person also affects the feelings of other people.

Emotional intelligence is defined by Peter Salovi and John Mayer as "Emotional Intelligence is, to take care of the feelings of a person's own and others, to differentiate between different emotions and to display them properly , and the ability to use emotional information to guide your thinking and understanding. "

In other words, emotional intelligence is also helpful in removing stress, communicating effectively and sympathizing with others. Challenges in life can easily be overcome through emotional intelligence. It also helps in identifying, using, understanding, and managing positive ways to prevent conflict in life.

Enthusiastic insight impacts various parts of everyday life, for example, the manner in which you carry on with others and the manner in which you connect with others. On the off chance that you have high passionate knowledge, at that point you can perceive your own enthusiastic status and the enthusiastic status of others, and associate with individuals so that they draw you.You can use this understanding of emotions to build a better relationship with other people. A few people normally acquire high enthusiastic insight, but it is a virtue that anybody can develop more through practice.

For what reason is Emotional Intelligence so Important?

We know that to be prosperous in life, having intellectual intelligence is not enough, but also a special contribution to emotional intelligence. In life, we see many places where the person is not the smartest person with a successful person or all the amenities. In society, we also find many examples where a particular person is talented from education however is socially uncouth and fizzles at work or in his own relationships. For example, we can say that intellectual intelligence can help you succeed in a written test, but emotional intelligence here is important that helps you control your emotions and stress in facing the final group discussion.

Characteristic of Emotional Intelligence:

Goleman's (1998) popular book, *"Working with Emotional Intelligence"*, suggests that enthusiastic knowledge represents 67% of the capacities should have been a fruitful pioneer and is twice as significant as specialized capability or IQ. Daniel Goleman verified that there are five basic qualities of Emotional Intelligence, each with their very own advantages:

1. Self-Awareness
2. Self-Regulation
3. Motivation
4. Empathy
5. Social Skill

1. Self-Awareness

What is self-awareness?

We recognize our feelings. If we know about ourselves what we are doing then we will better understand the others and the people around us. It also means that we are aware of our characteristics as well as shortcomings. When we experience anger, remember that moment and think what is the reason for our anger. If we know these reasons then this is self-awareness. Mindfulness is your capacity to perceive: feelings, decision ability, self-analysis, work and understanding how they affect others around you.

2. Self-Regulation

What is self-regulation?

Self-regulation is the next step of emotional intelligence in which you think about its effect before speaking anything. This is an important part where you can adapt yourself to changing situations. Self-guideline enables you to control your feelings and driving forces admirably. It will affect others in a positive way rather than negatively. If you make a mistake by yourself, in every situation, keep yourself accountable and not anyone else.

3. Motivation

What is inspiration?

When you are motivated to fulfil a series of tasks, you are in a better position to influence others. Being self-motivated enjoys doing continuous work towards achieving goals because it is not motivated by money or position. You should continue to be preoccupied with achieving your goal. This will work as inspiration and leadership for your colleagues in your work area. Even if you are facing a challenge, then it will continue to inspire the opponent.

4. Empathy

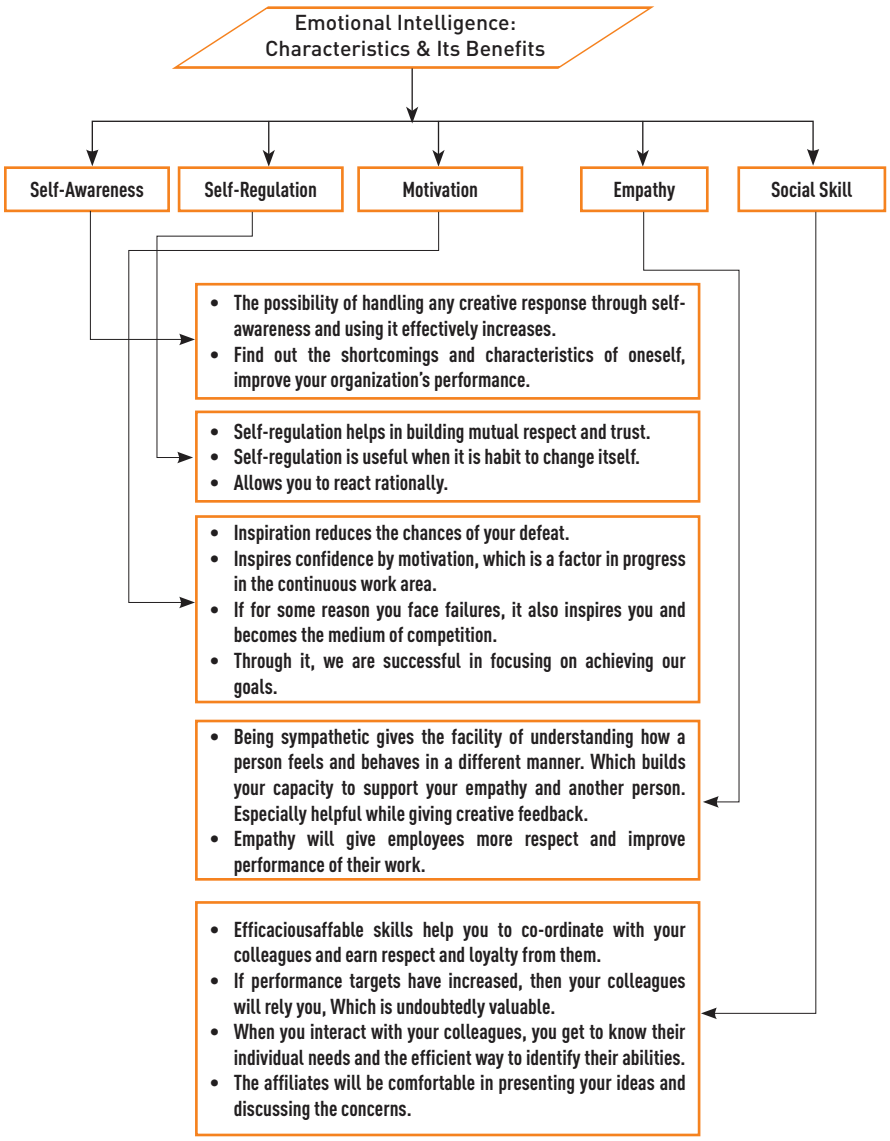
What is empathy?

Being sympathetic means that you are capable of recognizing and understanding the feelings of others. On the other hand, assuming the position of someone else in a special situation, sympathy is only to imagine. Socially every successful person should know how to sympathize with others. By doing so, the successful person will always earn respect from others. Empathy in the work area shows your team that you care about it. Doing this increases the efficiency of the workforce.

5. Social Skill

What are social skills?

The last step in emotional intelligence is social skills and it is one of the important steps. Social skills are for everyone to tell their point of view. Here there is the ability to build a relationship with others that makes the relationship more comfortable. Effective social skills, in a way, manage relationships that benefit the



Flow Chart: Emotional Intelligence Characteristics and Benefits

organization. You can understand the feelings, needs and concerns of other people, pick up on emotional signs, socially feel comfortable, and recognize the mobility of power in a group or organization.

How to Develop Emotional Intelligence

Here are different ways to develop your emotional intelligence.

- Manage your negative feelings. When you are able to manage and reduce your negative emotions, you are less likely to get overwhelmed.
- Be conscious of your vocabulary.
- Practice sympathy.
- Learn your tensions.
- Retreat from fury.

Area of the Real Life where Emotional Intelligence affects

Emotional intelligence has a significant effect on every part of your life. The main areas here that can affect it.

- **Your Performance at Work**

Emotional intelligence can help you to navigate the social complexities of the workplace, to lead and motivate others and to excel in your career. In fact, when it comes to job-taking candidates, many companies now see emotional intelligence as being important in the form of technical capability and require an EQ test to be leased.

- **Your physical health**

If you are unable to manage your stress level, then it can cause serious health problems. Uncontrolled stress can increase blood pressure, suppress the immune system, increase the risk of heart attack and stroke, contribute to infertility, and speed up the aging process. The first step to improve emotional intelligence is to learn how to overcome stress.

- **Your mental health**

Uncontrolled stress can also affect your mental health, so that you can get into the grip of anxiety and depression. If you are unable to understand and manage your emotions, then you will also be open to mood, while inability to make strong relationships can make you feel lonely and different.

- **Your relationships**

To understand and control your emotions, you are better able to express how you feel and how you feel to others. This allows you to communicate more effectively and build more grounded relationships, at work and in your own life.

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Presentation on What does the New Smart Information Age Hold for Us?

Seminar Hall, CSI Educational Directorate, Taramani, Chennai
In association with IEEE Computer Society, Madras Chapter

Computer Society of India-Chennai Chapter organized a presentation on What does the New Smart Information Age Hold for Us? on Friday 3rd May 2019 at 6.00 pm in the Seminar Hall, CSI Educational Directorate, Taramani, Chennai in association with IEEE Computer Society-Madras Chapter.

The presentation started with an introduction note by Hon. Secretary Mr. J. Jerald Inico, welcome address by Mr. Praveen Kumar, MC Member, Chennai Chapter and was followed by an introduction to Resource Person Prof. Dr. San Murugesan, Western Sydney University & BRITE Professional Services, Australia.

Dr San Murugesan started the presentation with an introduction to emerging trends in the day to day life of Information Technology. A comparative study on internet age and digital age was discussed. The disadvantages of Users relying on one personal app were conferred. Our day to day life that becomes smart by Smart information age techniques were clearly explained by the resource person. The various technologies that should be on our Radar were briefly explained. The emerging transformative technologies were well elucidated. The rise of open source software and its future prospective were clarified. The industrial revolution with the facial recognition software "Rekognition" and "watching the watcher" a spy app on smart speaker was an eye opener to the listeners. Participants gained a sound knowledge on chatbots, blockchain, 3d printing, robots, quantum computing and chiplets. WIot techniques were well illustrated and Trackers the emerging technology was demonstrated. The presentation ended with an interactive session and feedback from the participlants.

The event was witnessed by many senior members with Dr. E. Iniya Nehru, Chairman, Prof. P. V. Subramanian, Vice-chairman, Prof. J. Jerald Inico, Secretary and Mr. Ananda Padmanaban, Treasurer and was the great day for everyone present for the meeting. Certificates were distributed to the participants. A lucky draw was organized to encourage punctuality and the gifts were distributed. Dr. A. Prema Kirubakaran, MC member, CSI-Chennai chapter proposed vote of thanks followed by a group photo session and dinner.

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Further published books/papers will be send for indexing and inclusion in SCOPUS,Web of Science (WOS) and Google scholar.

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	Early Bird Submission	Regular Submission
Paper Submission Opens	1st May 2019	1st July 2019
Paper Due	30th June 2019	30th July 2019
Acceptance Notification	10th July 2019	10th August 2019
Registration Due	17th July 2019	17th August 2019
Camera Ready Submission	17th July 2019	17th August 2019
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Emotional Intelligence: The Secret Key of Successful Career

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Emotional Intelligence is modern admission buzzword used by universities to identify good students. This article shows how emotional intelligence of the students is used by various universities during admissions, to analyse their academic achievement and finally their success. In the present scenario, if a student is applying to say for engineering or business school, he needs to demonstrate his accurate and fast number-crunching abilities either through various scores he gets by writing various exams like JEE, GRE, GMAT or by his previous work experience or some other metrics.

Nowadays, students are very much concerned about the various aspects of different professions, salary packages they get after the completion of their course, less respect for their teachers and are emotionally immature if we compare them to the previous generations of students. Irrespective of the ethology of the changing student's profile, most universities are much stressed to admit the good qualified applicants. Universities are finding a tough time to enrol students who are emotionally mature enough to take the required grill of higher education. Universities may admit students who (i) are not fully prepared, (ii) do not completely understand the role of an engineer or manager and (iii) are not aware of their entire responsibilities in industry. But universities are well aware of these apparent changes in the student's profile. These changes are a result of multiple reasons, including economic, cultural, societal, spiritual that produce a different type of student. So while admitting students, conventional tools used during admissions process may foresee successful performance in academic. But these tools are not capable enough to capture many imperceptible parameters (like maturity, empathy, self-awareness, emotional intelligence etc.) and various behavioural patterns which may ultimately be more critical for a student to lead a life of a successful engineer or a manger. These parameters and patterns together form the essential components in a student's life required for leading a successful life.

Introduction: What is the Impact of Emotional Intelligence in Individual Career?

Intelligence is individual's overall capacity of an individual for adaptation through their cognitive levels, effective reasoning and processing of information. In simpler terms, it is the group of skills individuals used to understand, read and react effectively to various signs given by others and one's own self. The set of skills include problem-solving,empathy, self-awareness, and emotional expression. These skills permit people to react, reflect, and know various environmental situations. Whereas Emotional intelligence (EI) is the ability of persons to identify their own emotions and also of others, differentiate between diverse feelings and tag them suitably. EI is then used to guide their thinking and behaviour patterns, and amend their emotions to adapt to environments to achieve their targets. The term EI first appeared in a research by Michael Beldoch in the year 1964, but it became popular only in 1995, when a book on EI by Daniel Goleman was released in 1995. In the book he defines Emotional Intelligence, EI as the ability to understand, recognize, and manage our own emotions as and have an ability to recognize, understand and influence the other emotions. However the book at that time was criticized within the scientific community in spite of having detailed reports of its usefulness and applications [1].

Another term which is very important and is associated with EI is empathy. Empathy typically permits a person to connect his individual experiences with those of others. Many models exist in the literature that is able to measure levels of empathy. As already mentioned the emotional intelligence is the capability to distinguish and identify the various feelings and their senses and find the relationships between them. It includes one's ability to receive emotions, and synchronize them to understand the information related to them. In today's situation the main objective of universities involved in higher education is to prepare students for their employments in their specific professions. Emotional intelligence can be used as a powerful tool to predict the person's behaviour and to be successful in one's life. Studying and analysing EI of students can help solving many problems the current generation of students is facing [2]. Hence, EI can be used as a suitable predictor in different areas of student's life viz. his admission process, his academic performance, his relationship with peers and teachers, his behaviour at job etc.

There is some sort of overlap that exists between personality traits and emotional intelligence models. Hence, a cautious investigation is vital to find out EI level of an individual. Either self-reporting mechanisms or various tools and instruments are available to both measure and assess EI of individuals. Example include Bar-On EQ-I. These

levels can be further classified into high and low levels. Figure-1 shows the comparisons between Low and high emotional intelligence.

Fig. 1: Low and High Emotional Intelligence

How will one know about his Emotional Intelligence (EI)?

In order to understand this, Emotional Intelligence is divided into four major quadrants viz. (a) Self-awareness, (b)Self-management, (c) Social-awareness and (d) Relationship-management [3].

a. Self-awareness: when one identifies one's own emotions and understands their effect on one's thought and behaviour. It aids to analyse one's own strengths and weaknesses and in turn have self-confidence.
b. Self-management: when one is able to control his unwary feelings and impulsive behaviours. It helps manage one's emotions in a much structured manner and helps him to adapt to varying circumstances.
c. Social-awareness: when one understands emotions and anxieties of others, interact with others comfortably
d. Relationship-management: when one works towards developing harmonious relationships, continue with good relationships, is good at team work, handles conflicts amicably, communicate to resolve issues, and motivates others.

Recent research shows that 90% of top performers, in any profession, have a high EQ. Skinner and Spurgeon, 2005 have shown that these people have much greater probability of accomplishment in motivating their team members, similar was the observation made by Chapman in 2011. Thus it is very clear that Emotional Intelligence (EI) clearly affects all the aspects of our life, our performance as students, our physical stamina, mental health and our relationships with our peers and teachers. All these will influence decision making in our universities to take decisions to improve student intake? Is it possible to be so effective in our relationships with all the university's stake holders: parents, companies, alumni? Is a student strongly empathic and is able to control his impulses and so on?

The different types of EI traits is shown in the figure 2, emotional intelligence has five important traits.

a. Self-Awareness – It is ability to understand emotions, strengths, weaknesses, and goals to identify their impact on others.
b. Motivation – Ability to involve others to work together for the achievement of goals
c. Self-Regulation: Ability to control self feelings and emotions.
d. Empathy: Capability of considering other people's feelings especially while making decisions.
e. Social skills: Ability to manage relationships to guide people in the desired direction.

Can we develop our Emotional Intelligence quotient?

Answer is yes. Human brain is elastic and with practice one can develop and improve his EI. Developing Emotional Intelligence requires learning of following five skills.

a. Ability to rapidly decrease stress.
b. Capability to identify and manage self-emotions
c. Capability to interact with others through using non-verbal techniques.
d. Capability to use humour and deal courageously with all challenge.
e. Ability to resolve all conflicts and have positive confidence.

Steven Stein in his book on Emotional Intelligence for Dummies in 2009 says any person can learn and develop his EI quotient. He suggested the following ways to improve one's Emotional Intelligence quotient:

a. Self-Aware

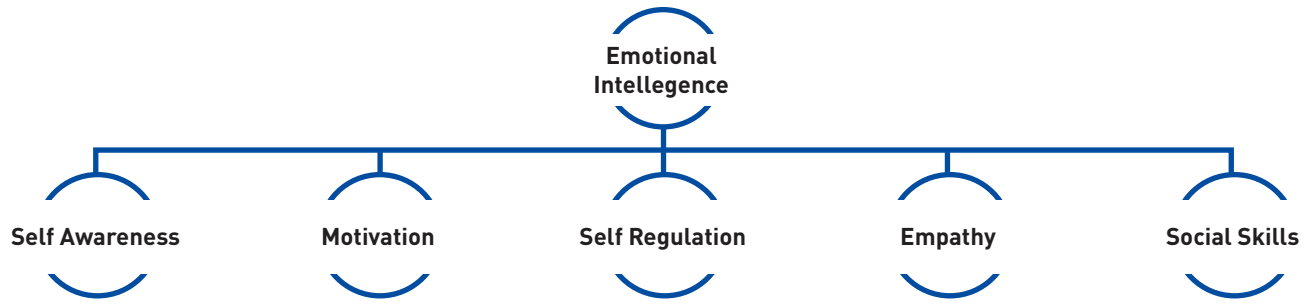

Fig. 2: Emotional Intelligence Traits

b. Express one's thoughts, and feelings
c. Discover one's inner passions
d. Walk in the other person's shoes
e. Be socially interactive and responsible
f. Manage one's own impulses
g. Be more flexible
h. Be happy
i. Manage other person's emotions
j. Know one's strengths and weaknesses

To summarize, all of us can be emotionally intelligent and can work towards our own personal competence in addition to social competence. If one is emotionally intelligent, as admissions personnel in a university, we will surely be able to understand and analyse the requirements of our students, their siblings and parents. By understanding their EI quotients universities can play an important role in providing an effective transition into their new universities. Universities can direct them in the right path and help produce the right expectations not only of university per se but the whole society at large [4][5].

What is Role of Emotional Intelligence quotient in Student Admission?

The Wall Street Journal describes how various universities have started using EI through conducting Emotional IQ (Intelligence Quotient) tests to estimate applicants and further giving admissions to them in their programs. This method of evaluation is similar to that has been in used past decade of recruiting engineers and managers during the interview selection process.

In order to select their students, therefore these universities are now deploying same tools and techniques that differentcompanies are doing same thing from long duration. The universities understand that some students may have got poor academic grades or have limited or irrelevant experience. But these scholars may be otherwise highly needed students for their program. On the other side these candidates may have wide experience but may not have the necessary behavioural constructs to easily adapt and succeed in their educational program. So admission people have taken a cue from the company's hiring process by deploying the Emotional IQ test. Emotional IQ tests help the admission people to gain more information about a candidate's additional attributes required for admission to an academic program where the candidates may have not so great grades. As individuals with higher emotional intelligence scores tend to be more effective in life as compared to those with a less emotional intelligence; Emotional IQ test helps to select the better candidate adapt for the academic program so as they can adapt to the rigour of the program easily [6][7].

The objective of admissions is not only admitting students in their program and also making sure the accurate data is stored in student records. Between the time a student comes to the university to the students starts attending the program beginning classes, a good admissions official works effectively with each person involved in this process. These can be parents, students, guardians, international embassy officials, admissions personnel of other universities, academic professionals, deans, chancellor, top management, marketing team, advancement, IT Team, Finance, faculty etc.. Admission official is the face of the school, and most often the first point of contact to the applicants. Hence this role is a very rewarding role and also very arduous emotionally. Connecting effectively with so many varied stakeholders requires admissions people themselves to be emotionally intelligent [8].

What is Role of Emotional Intelligence in Success of a Student?

Conventional approach of university education was focuses on logical thinking and its intelligence and not giving importance to other types of intelligence. Now the universities are more focused on emotional intelligence of its students as well in order to enhance the academic success. EI comes out be an effective factor for improving the academic performance of students. The research says that students with a higher EI quotient are more matured in understanding and managing the emotion not only of their own selves but also of others. The students who have balanced level of EI quotients demonstrate a high level of academic success.

Conclusions

This article shows the positive character of emotional intelligence in admission and academic achievements of the students. The article is based on researcher suggestion based on their research outcome and analysis. It has been observed that the student with high EI gives good academic outcomes and emotional positive features. The student with low EI has poor chance of academic success and they need to improve the interpersonal and intrapersonal skills. The number of educationalist researchers says that skills like emotional intelligence and interpersonal and intrapersonal play a vital role for student academic achievements. The research shows that there is very positive relation between EI and student academic performance. Some of the researchers also said to put the EI as a part of course curriculum at least at graduate level to improve the performance of the students. The research says that it also increase the soft skill and employability of students.

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■

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A first step towards Cognitive Computation

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Keywords: Cognitive Computation, Neural Computation, Brain-like Computing, Machine Learning, AI, Robots, Emotional Intelligence, Affective Intelligence

1. Introduction

The advancements in Society, Science and Technology have lead to evolution of Computation ranging from Tabulating System Era, Programmable System Era and in short interval of time moving towards Cognitive System Era.

Cognitive Computing has undergone different technological evolutions ranging from Knowledge Discovery to Cognitive Science leading to Big Data and eventually evolving into Cognitive Computation [Fig 2]. We are moving in time that will reach a point where everything from farming to education will be automated- machine-driven, which is leading to a need for faster advancement of technologies, which can provide us insights of useful information from the data being generated.

From the blooming technologies such as Artificial Intelligence, Machine Learning, IOT etc Cognitive computing is one. It is an amalgamation of many fields i.e. Linguistics, Psychology, Neural Science, Philosophy, Computer Science and Data Science. [Fig 1]

Cognitive Computing deals with development of computer system that mimics human brain.

It aims to develop coherent, unified, universal mechanism inspired by minds functionalities. The working of complex Human brain has intrigued the humankind for a long time now. The understanding of the intricacies of the brain will lead to a better understanding of one's existence but here it will lead to build better machines that can replicate its working to support human and its ways.

A human brain consists of humongous number of processes and services running and interacting with each other in order to fulfil a specific task.

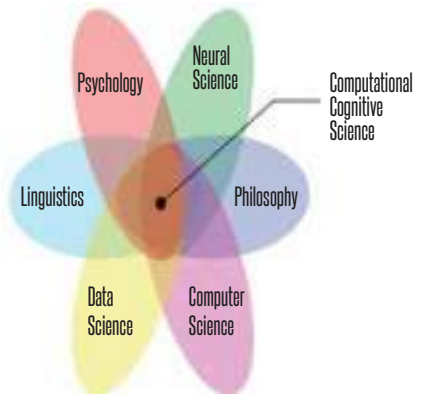

Fig. 1: Multi-disciplinary branches involved in cognitive computing.

Source: http://nyuccl.org/cogsci/

2. Data literacy

Cognitive Computing is a software approach to imitate the action-reaction of human brain i.e., human-brain like computation.

The cognitive process is a two step process i.e., first, the person becomes aware of one's environment and surroundings using the senses such as eyes, ears, nose etc. In the next step, these inputs are sent to a human brain for processing and understanding them through complex computations. The outputs generated are then sent to other parts of the body for appropriate reaction to the stimulus.

According to the Cognitive Computing Consortium, the salient features of Cognitive computing are:

- **Adaptivity**
  The Cognitive System must be adaptable to the dynamic flow of data and changes in the goals.
- **Interactive**
  The Cognitive System must be able to interact with its user to understand his/her query and accordingly respond with a suitable answer.
- **Iterative and Stateful**
  The system must be able to pose a

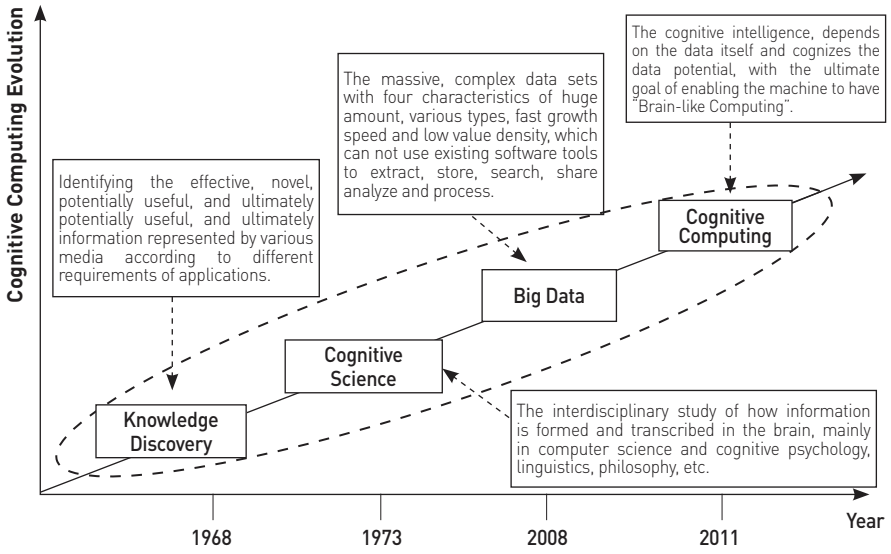

Fig. 2: Evolution of Cognitive Computation [2].

question if the query asked by the user is not clear. Additionally, keep a record of the previous asked information to answer the present question.

- **Contextual**

The Cognitive system must be able to draw a picture of the context from the data provided by the user such as the topic, timeframe, position, people mentioned and many more.

Cognition in a living being gradually advances through experiences and continuous learning. This makes Cognitive Science and its Computations very complex to understand at least by the present existing approaches and its related technologies. Moreover to understand it, in a better way, inter-disciplinary domains and different varieties of tools are taken into account such as linguistics, psychology, AI, neuroscience and many other fields.

The Brain-like computing approach aims to enable the computers to understand and cognize the real world objects from the perspective of human thinking. In order to understand the need of human beings, it is critical to strengthen the cognition of machines through cognitive computing [5]. Thus, the intelligence and decision-making ability of machine needs to be improved. [2]

Many Mathematicians, Scientists and Innovators have contributed to this field such as Alan Turing. In his paper [8], he tries to talk about the question "Can machine think?", if it can, how helpful can it get.

According to Norbert Weiner [7], Cybernetics is defined as "The scientific study of control and communication in the animal and the machine."

It takes human a very small amount of data to learn and generalize it, such as, if a single picture of cricket bat and baseball bat is shown and then asked to identify a different picture of either of it, we will be able to identify it in no time. This is the advancement, evolvement of the human brain but we do not understand how does our brain do this. Scientist and engineers are trying to mirror human cognition structure into Cognitive architecture, trying to analyze the context of the query asked like the WH-questions about the same.

In contrast to human brain, implementation of Cognition requires large amount of data (Big Data) to train the model so as to give an expected output.

3. Different layers of Cognitive Computation

The important layers or the blend of layers that make Cognitive computing are:

- **Sensory Perception:**

In this layer computers are enabled to simulate human senses such as smell, feel, visual and auditory. However, only visual and auditory senses are most advanced in terms of computer simulation.

- **Data Mining and Processing:**

Here huge amount of data is mined and processed, to provide an assistance to take the decisions. Hyper Scale computing, knowledge representation, intensive searching techniques are used to achieve the above.

- **Deduction Reason Learning:**

In this layer, computers are made to simulate human thinking to help the users in taking right decisions.

To build and simulate the complex human thinking and try to replicate brain's potential, different technologies of AI like machine learning, deep learning, reinforcement learning are being used extensively.[Fig 3]

Machine learning (ML):

ML is a branch of Artificial intelligence, which helps in finding relations, anomalies, cluster, classify humongous amount of data and even predict values too. This field of ML is very closely related to computational statistics and mathematical models.

According to Tom M. Mitchell, Machine Learning can be defined formally as "A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, improves with experience E".[6]

Neural Network and Deep Learning:

The artificial neural network is a mathematical and statistical model of neuron, which estimates approximately functions that depend on large amount of values and variables.

The ANN is connected via numerical values that can be adjusted according to the experience gained or the training data per se, which is termed as *weights*.

Deep Learning is another wider branch of Machine Learning. This branch consists of multiple layers of non-linear processing units, inspired by neurons or nerve cells from the brains of living beings.

Reinforcement learning:

This is another branch of ML in which models learn to take actions based on reward or punishment given on previous actions. In this mode of learning, agent interacts with its surroundings or universe in discrete time intervals.

Natural Language Processing:

This technique provides machine an ability to understand the unstructured data such as human languages and speeches and extract required information out of the data provided.

The efficient and right usage of cognitive computing depends on enormous amount of data, their representation and how effectively they are searched and retrieved on queried.

Computer Vision:

Computer Vision is an ability to analyze visual inputs such as pictures and video files. It uses image processing algorithms and models to provide useful information from the visual inputs given.

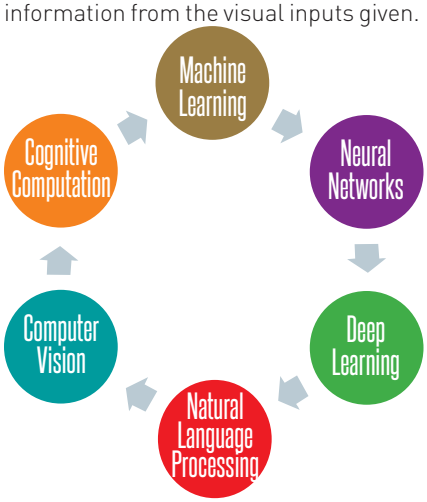

Fig. 3: Technologies part of AI.

4. Differences from AI

- Cognitive Computation tries to simulate human thinking where as AI tries to find patterns in big

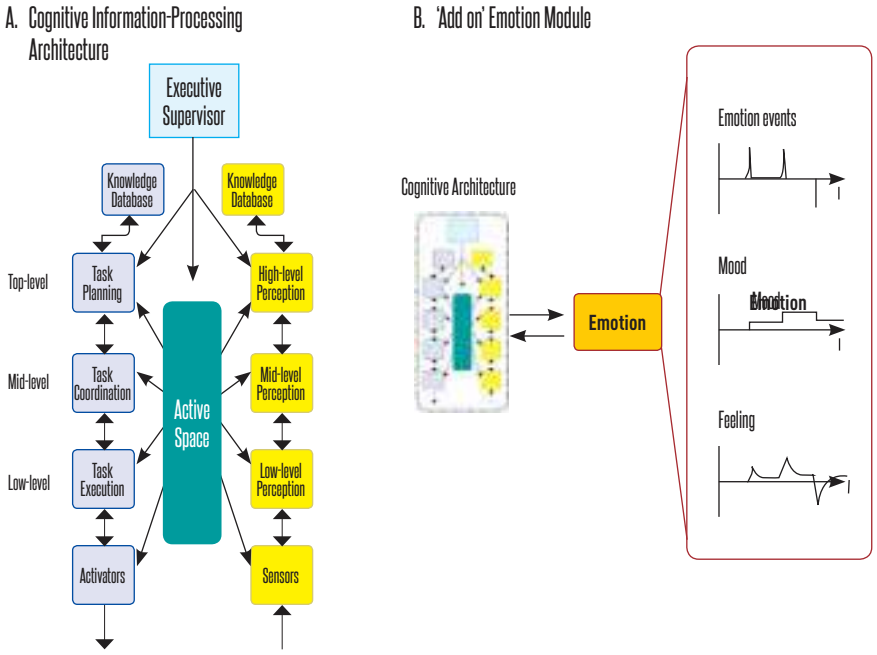

Fig 4(a): Cognition information processing architecture
Fig. 4(b): "Add on" emotion module [10].

data, hidden information to solve complex problem.

- Cognitive Computation provides services to humans in making decisions easier but AI makes the decisions.
- AI serves the purpose of automating processes but Cognitive Computation works to elevate human capabilities. [9]

5. Cognitive-Emotional Intelligence

Emotions play a significant role in attributing the characteristics of a human being.

Emotional Intelligence (also known as Affective Intelligence) is the study and development of machines that can recognize, analyze and mimic human emotions.

Artificial Emotional Intelligence and Cognitive Computation go hand in hand.

The extension of Cognitive Computing to explain and exploit the impact of emotions is in its budding stage.

Integration of Emotional Intelligence into Cognitive Computing is a key in designing autonomous agents like robots, to make them more human like. Emotion is not bestowed on robots as "add on" with "feelings" but emotions enable to enhance percept/actions to be part of robotic functionalities.

The general Cognitive Information Processing architecture for intelligent, autonomous robots is modular in nature, comprising of low-level modules for action and perception, middle-level modules for task coordination and mid-level perception and higher-level for task planning and visual cognition.

Mostly, the top level is connected to knowledge database. To coordinate the activities of the modules, a Centralized Mentor or Supervisor is deployed [Fig 4a].

Emotions can be treated as external modules that interact with the modules of the architecture, so as to determine "Feeling", "Mood" and "Emotional event" [Fig 4b].

6. Limitations of Cognitive Computing

As Cognitive Computing is new and blooming field at present, there are few limitations faced, such as:

- It needs human intervention for complete analysis; it overlooks the missing factors in an unstructured data.
- Implementation of Cognitive Computation is very time consuming, meticulous task and expensive too. This becomes one of the barriers resulting in a gradual evolvement of this field.

7. Applications

Usage of Cognitive computation is gradually rising in every field or sphere, starting from personal help like movies, new threads recommendation to industrial level such as pharmaceuticals, astronomy and many more.

Industries such as educational institutes are making a great use of it in tracking student's performance, generating courses according to student's capabilities to grasp. Pharmaceutical industries are using it to assess the benefit and the risks of drugs produced so as to take proactive measures before releasing it out in public use, to automate repetitive tasks and to test the quality of the products [3].

Banking sectors can use it to avoid, detect and predict frauds, make user services easier by employing automation and faster and efficient loan sanctions. For small scale and large scale industries it could provide an insight of the upcoming demands and requirements of the goods by looking into their past sales and transactions.

Moreover, increase in research and development in this field will help us understand one of the intricacies of the nature that is brain, its working and the methods to enhance it, so that it reaches its highest potential.

8. Companies working in this field

Companies that provide products and services in the field of Cognitive Computation are:

- IBM – Watson
- Google – DeepMind
- Microsoft – Microsoft cognitive services
- SparkCognition

9. Conclusion

Much of the excitement and hype created about Cognitive Computation is by its great potential in learning, but only the surface has been scratched yet. The overall goal here is to formulate and design computational frameworks to help us learn better by exploiting data about our learning processes and activities. [1]

A well-designed and programmed

Cognitive Computing System enables the user with contextual insights based on the query posed. The solution generated by Cognitive Computation System to the end users provide useful insights into decision making process, from the data given which is not easily understandable manually [4].

The predominant feature of this field is that it assists a person, it recommends one according to their own requirements, making the task simpler and allowing them to focus on more intelligent and attention driven tasks.

We believe, now it's time for the industries to take a step ahead and embrace technology to match the requirements of the Society and make most of it.

10. Resources

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- https://www.marutitech.com/cognitive-computing-features-scope-limitations/
- https://www.ibm.com/developerworks/community/blogs/jfp/entry/Cognitive_Computing_vs_Analytics?lang=en

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Mr. Aditya Kumar Sarda is pursuing his III year of B-Tech in Computer Science and Engineering from the school of Computing and Information technology, REVA University, Bangalore. He has shown a keen interest in Machine Learning, Cognitive Computing and Data Science. He looks forward to do research in the same.

Note: The Life Membership application Form for Summer Offer is available on page no. 32

Data Analytics in Machine Learning: Role and Future Perspectives

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Introduction

Over the past many decades, data mining and analytics are playing a crucial part in knowledge unearthing and further in taking decision /support. Machine learning acts as elementary tool for knowledge extraction, pattern searching and making predictions. [1] Thus Machine learning (ML) is a computational engine for the data mining without explicit programming. ML enables software applications to predict outcomes precisely after proper training using the test data. It basically transforms gathered input and then statistically analyzes it for a relevant outcome. This output is updated immediately when new data is made available. [2]

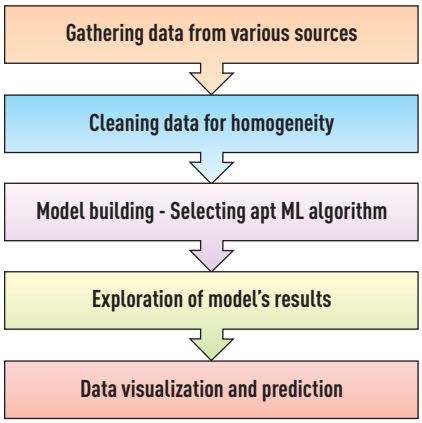

Fig. 1: Machine Learning Process [7]

With growing awareness to extract useful information after analysis for decision based system and predictive systems, the technical development of database and data analysis has geared up. Basically this process is to adjust program actions to find a new style of interest or relationship among variables and the productive information can be unsheathed which further can be used to develop various statistical models. This finds applications in daily life such as personalized online advertisements, spam filtering, threat detection, mode clustering, fraud detection, soft sensing, process monitoring etc. and building news feed.

Fig. 2: Machine Learning as a subfield of Artificial Intelligence [6]

How data analysis is done

In nutshell, the Machine learning evolved from the computer science's pattern recognition domain and in more generalized way in artificial intelligence. In today's ML probability and statistics have also became important as the data explorations and predictions are being extensively used in recent algorithms for exploratory purposes.

To effectively carry out data mining and analytics, machine learning algorithms have always played an important role.

There are many machine learning algorithms [3], as follows:

1. **Unsupervised Learning-**

It is basically for the data without label and the key point is to find the hidden structure within the data and this does not require any kind of pre-training for a particular type of outcome. Instead, **deep learning process** is used iteratively to review the data and deducting conclusions. These algorithms can also be used for complex tasks like NLP, image

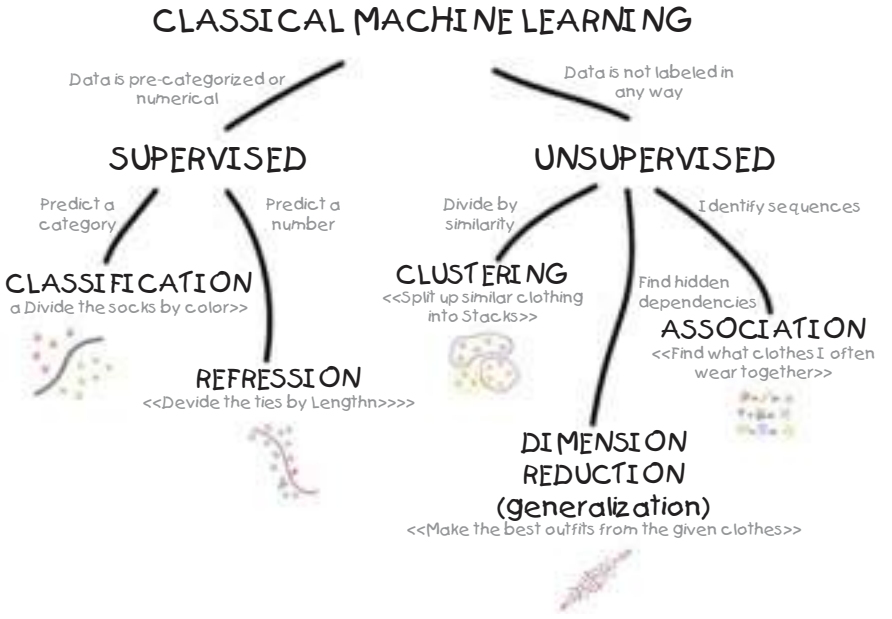

Fig 3: Major classification of machine learning [8]

processing, conversion of speech to text and many such tasks in a fast manner, particularly they function like neural networks to find the co relation among the variables using millions of examples during training. After being trained, the algorithm can use its association banks for interpreting new data. Massive amounts of training data is required for training these algorithms and this is made practically feasible by using huge amount of data generated in this era of big data.

These algorithms include:

- Principal Component Analysis,
- Independent Component Analysis,
- **K-means Clustering** (in it data sample is divided into k groups in which each data sample belongs to the group with the nearest mean),
- **Self-Organizing Map** (a high-dimensional data space is mapped to a low-dimensional data space),
- **Support Vector Data Description** (outliers or novel data found out based on boundary of a dataset)

2. Supervised Learning-

It works on both data samples, discrete or continuous; just they need to be labeled before applying the algorithm.

When the data label is discrete, this learning can be used for data classification, e.g. operating mode classification or fault classification.

Else, when the data is continuous, regression models can be formed for estimation and prediction.

Main applications include process monitoring, fault classification and identification, online operating mode localization, soft sensor modeling and online applications, quality prediction and online estimation, key performance index prediction and diagnosis, etc. [5]

During the training period a data scientist or data analyst, who acquaints the machine learning skills, needs to provide the following: input, desired output and feedback for more accurate predictions. The features or the variables to be used in the training period are also determined by the data scientists. After the completion of the training, the unknown and new data may be worked upon and processed using the already learnt data sets.

It includes **Support Vector Machine, Nearest Neighbors, Multivariate Linear Regression** (generalized form of linear regression), **Artificial Neural Networks, Decision Tree** (optimal path is found to arrive at the desired outcome) and **Random Forest.**

3. Reinforcement Learning-

It includes deep learning areas in which models use iterations to complete a given process.

If a favorable outcome is there then that step is rewarded and the unfavorable outcome steps are penalized. This process is iterated till the optimal outcome for the given process is learnt by the algorithm.

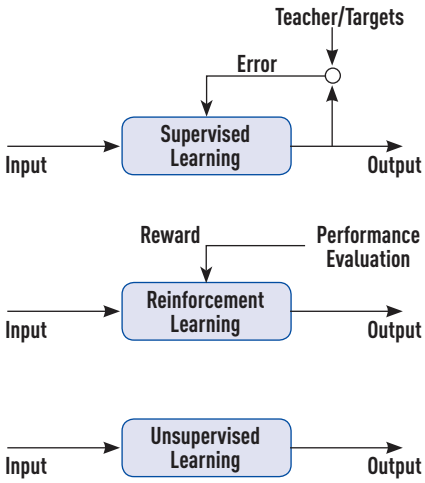

Fig 4: Various types of Machine learning (Supervised, Reinforcement and Unsupervised Learning respectively) [9]

The application area of the reinforcement learning includes gaming, robotics and navigation areas.

Rest types of machine learning find major usage in areas of data mining and analytics.

Examples of machine learning

- Personalized news feed - predictive analytics
- Customer relationship management (CRM) systems - for effective responses.
- Business intelligence (BI) - auto identification of potentially crucial data points.
- Human Resource (HR) – these find the best applicants for some desired open positions.
- Self-driving cars- identify objects in the path or inside the car and then determine optimal responses.
- Virtual assistant- interpret user's speech, processes it and decides to respond as per the user's personalized requirements

Future Research Perspectives

Machine learning is becoming better and advanced day by day. With the increment in the power of machines and specially the computation power the machine learning algorithms are evolving in a parallel manner. This further helps in better data analytics and better predictions. Such as neural network concept is being used for long for the data analysis purpose. However work is still going on to handle big data problems by reducing the computational burden using the parallel processing or by increasing the number of layers for making the processing faster. This big data is of great use for training the machines to obtain desired outcomes.

Further automatic training can be used by optimal utilization of resources. This can be made feasible using deep neural networks and by using each layer for enabling fast processing. [4]

Fig. 5: Companies using Machine Learning extensively [10]

Big data problem has also become major problem to be handled by machine learning algorithms. This is important to be handled to evolve the training mechanisms for the better machine learning and making it more personalized. For e.g. Google self driving car needs to be trained for taking better decisions and actions for the given stimulus, online advertisement offers like from Flipkart and Amazon,

etc. [1]

The future researches related to ML and Data Analytics may include following:

A. Machine Learning driven by Big Data
B. Sustainability related Data Mining and Analytics
C. Data Cleaning and Quality Evaluation
D. Sensor Network Design and many more.

Conclusions and Remarks

Undoubtedly machine learning plays a key role in data mining and analytics. Further, data mining along with machine learning will unveil more unearthed prospects in the data sets. This is advancing furthermore with the use of deep neural networks which distribute the processing of data in various layers which work together to provide the desired outcomes in a fast manner. This also enables optimal use of high powered computational resources.

However, it should be kept in mind that data analytics and machine learning are quite multi-disciplinary research area, which would further require expertise in multiple fields like machine learning, pattern identification, process control statistics, etc. For efficient usage of these disciplines all their barriers need to be eliminated and new strategies have to be designed for their perfect utilization at both institutional and industrial level as well as at the cooperation level between them. Thus researchers of different cultures have to work with each other and coordinating with each other.

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About the Author

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Faculty Development Programme at BVICAM

in Technical collaboration with CSI Delhi Chapter

Bharati Vidyapeeth's Institute of Computer Applications and Management (BVICAM), New Delhi organized a two weeks FDP on "Emerging Trends in Computer Science & IT from 13th to 24th May 2019, in collaboration with IEEE Computer Society (Delhi Section), IIPC (AICTE), CSI Delhi Chapter and ISTE Delhi Section. The objective of this FDP was to promote awareness on emerging research trends in the domain of IT to enhance the level of technical caliber and research aptitude of the young research scholars and faculty members doing research. The FDP also covered a two days workshop on Accreditation Process through NBA and NAAC with the objective to promote awareness of Outcome Based Education and introducing audience with the process of Accreditation and its benefits to Institution and its stakeholders.

The two weeks FDP programme spanned across 20 interesting and knowledge imparting sessions encompassing novel frontiers of Computer Science and Information technology. The two-week span covered varied technical sessions like "Research Methodology" by Dr. Nimit Gupta of FIIB, New Delhi, "Nature Inspired Optimization" by Dr. Ankur Chaudhary and Mr. A. P. Agrawal, Amity University, Noida, "Rough Set Theory & Data Mining" by Dr. Rajni Jain, ICAR-NIAP, N. Delhi, "Multi Criteria Decision Making by Fuzzy TOPSIS" **by Dr.** Rekha Gupta, LBSIM, New Delhi, "Optical and Wireless Communication" by Dr. Richa Bhatia, AIACT&R, New Delhi, "Campus to Corporate" by Mr. Rajeev Jain, Corporate Trainer, "Machine Learning using R Tool", "Art of Writing Quality Research Papers, Technical Proposals, PhD Synopsis using Latex" by Dr. P. S. Rana, Thapar University, Patiala, "Ad-hoc Networks using FANET" by Dr. Umang Singh, ITS, Ghaziabad, "Medical Image Processing" by Dr. Arun Balodi, NIT, Delhi, "Reference Management Tool – Mendeley" by Dr. Ritika Wason, BVICAM, New Delhi, "Hands-on NS2" by Mr. Manish Kumar, BVICAM and "Optimized Solution to Solve NPC problems" by Dr. Anupam Baliyan, BVICAM.

Besides these knowledgeable sessions 16th-17th May, 2019 witnessed dedicated sessions on Outcome Based Education and Accreditation process. First day of the workshop i.e. 16th May 2019 witnessed sessions on Outcome Based Education and Transforming traditional course to OBE format from Dr. P. S. Grover, University of Delhi and Dr. Prerna Gaur, NSIT, New Delhi. On the same day, a session based on Accreditation Process was delivered by Dr. Anuradha Jain, VIPS, New Delhi where she introduced the audience with both the challenges and benefits of Accreditation. Second day of the workshop i.e. 17th May 2019 witnessed sessions on NAAC Accreditation and Assessment Framework by Dr. Peeyush Pahade, H. V. Desai Senior College, Pune.

The two-week programme witnessed participants from premier Institutes across the nation like Delhi Technological University, New Delhi, St. Stephen's College, New Delhi, Ambedkar Institute of Advanced Communication Technology and Research, New Delhi, JSS Academy of Technical Education, Noida, Gurukul Kangri Vishwavidyalya, Haridwar, VJTI, Mumbai, Govt. Polytechnic, Ujjain and many other institutes.

The FDP was concluded with a Valedictory Session in the august presence of Prof. Yudhi Ahuja, California State University, U.S.A., Prof. P. K. Gupta, Secretary General, NAFEN, New Delhi and Prof. M. N. Hoda, Director BVICAM. Session begin with welcome address by Prof. M .N. Hoda in which he addressed the changing roles of teachers in this era of technology where students have different expectations than earlier. Prof. Yudhi enlightened the audience with the role of such FDPs in teaching learning process. Prof P. K. Gupta also gave his views on R&D projects through his presentation entitled "Developing indicators for measuring success of R&D projects". He discussed types of scientific researches such as Applied and Basic research. After the enlightening talks certificates were distributed to all the participants. Dr. Vishal Jain, Associate Professor, BVICAM, co-ordinated the entire FDP program.

National Student Convention 2018

Organised by

CSI Student Branch of Jeppiaar Engineering College, Chennai

at Department of CSE & IT

21st & 22nd March, 2019

The National Level CSI Student Convention was organized by CSI Student Branch - Jeppiaar Engineering College, Chennai in collaboration with CSI Chennai Chapter on the theme "Nature Inspired Computing for Digitized World" during 21st & 22nd March 2019.T hrough this National Convention the participants illustrated their talents by involving various events in wide arena. Convention was inaugurated by Dr. J Venu Gopala Krishnan, Principal, Jeppiaar Engineering College. Mr K Bhaskaran, Past Chairman, CSI Chennai Chapter was the Key Note speaker. The guest speaker addressed about the current trends and prospectus in IT industry. He also added his views on entrepreneurship strategies to start a independent company. Followed by Other Events such as Paper Presentation, LOL Code, Pro Coding, Google It, Design and Market, Project Expo, Fix The Code, DB Mania, Workshop. Around 250 students from various institutions actively participated in the event.

This was followed by "PAPYRUS" The planet is all yours, so they came up with a spark of innovation to improve the lives around them. The stage set to listen their words, fulfil the expectation in the form of paper presentation. Papers and abstracts presented were from the domains, Augmented reality, 5G wireless communication, Big data, Network Security, Digital jewellery, Embedded systems, Data mining, IOT, Artificial Intelligence, Cloud computing, Image processing etc. The session was chaired by Mrs. Beulah David and Mrs. Sumathy.

This was followed by "PRO-CODING" CODING event which promises to be a skilful team experience of all times. It was a 2 MEMBER TEAM EVENT with 2 rounds. Round 1:(Prelims) A pen and paper round. Round 2:(Finals) OFFLINE COMPILERS ARE AVAILABLE. This was followed by "GOOGLE IT" The name is self explanatory and yes, this event was introduced with the notion of testing the surfing knowledge and ability of the students. It was a team event which allows 2 members.

This was followed by "DESIGN AND MARKET" Do you want the fame of a designer? Participants need to design a attractive and catchy poster for a specific product given within a specific time. Then, Participants need to market the poster thereby driving about the demand and usage of the product. This was followed by "LOL CODE" LOLCODE is an esoteric programming language inspired by lolspeak, the language expressed in examples of the lolcat internet meme. This was followed by "FIX THE CODE" This event was recommended for a good dynamic debugger. This was followed by "DB MANIA" DB MANIA was an event based on database SQL queries. if you are a database maniac, you are in the right place. Participate in this event and experience the thrill of SQL queries. Hence the high standard of this quiz will make it a toughest fight between the brightest students of other states.

This was followed by "PROJECT EXPO" Project Expo organized presentation and display of models/working projects competition. The idea of sharing knowledge and also an endeavour to foster and enhance the culture of scientific inquiry and its relevance in real world applications and underline the strong connection among student community. This Project Expo motivated the students to a whole new level as they demonstrate their projects to other students, representatives from Institutes etc. getting their views, reviews & appreciations. Various projects exhibited were from the following domains, Artificial Intelligence, IOT, Natural Language processing, Augmented reality, Cloud Computing, Image processing, Data Analytics. The session was chaired by Mr SubashChandar and Mrs Godfrin.

Finally the convention was concluded with prize distribution function. Dr J Venu Gopala Krishnan, Principal and Dr J Arokia Renjit, HOD-CSE, distributed the prizes to the winners.

STUDENT BRANCHES INAUGURATION

REPORTS

JAWAHARLAL NEHRU NATIONAL COLLEGE OF ENGINEERING, NAVULE, SHIVAMOGGA (REGION-V)

CSI Student Branch at Jawaharlal Nehru National College of Engineering, Shivamogga was inaugurated by Prof. Veerendra Kumar, Chairmen, CSI Mysore Chapter on 29th April 2019. During his inaugural speech, he motivated the students to involve in self-learning using the resource of the college and internet. He has also mentioned the advantages of having professional bodies and how to make use of them. Dr Mahadevaswamy, Principal JNNCE addressed the gathering and insisted on becoming Entrepreneurs instead of seeking job. In his presidential address he highlighted the funding opportunities from various agencies. After the inauguration, two days workshop on IoT was organised on 29th & 30th April 2019 in association with CSI. Dr. Jyothi, Prof. and HOD, ISE Dept, Dr. Nirmala Shivananda, Prof. and HOD CSE Dept, Girish Mantha, Asst Prof, ISE Dept, Sri Vishwanatha, President NES, Shimoga & Prof. Santhosh, Director MCA Dept were also present.

NIE INSTITUTE OF TECHNOLOGY, MYSORE (REGION-V)

On 8th April 2019 marked the beginning of a new venture for NIE Institute of Technology, Mysuru as it was the inauguration of CSI student branch. The CSI Student branch was inaugurated by Prof Chidananda Gowda, Former Vice Chancellor Kuvempu University and it was accompanied by Prof Archana, Principal , NIEIT, Sri Veerendra Kumar, Chairman, CSI Mysuru Chapter, Smt Aruna Devi, Vice Chairperson, CSI Mysuru Chapter and Smt Anitha Venkatesh Past Chairperson, CSI Mysuru chapter along with Smt Usha, HOD-CSE, and Sri Sudeep, HOD-ISE. Before lighting the lamp, invocation song was rendered by Pushpalatha, student of ISE. Ms Trisha, student of ISE, welcomed dignitaries. Sri Veerendra Kumar stressed on the need for students to associate themselves with organizations like Computer Society of India and about the different activities of CSI. He stressed to organise different tutorials, seminars, conferences and projects from which the student & faculty community will be benefited. Prof Archana delivered a presidential address and advised the students to write project proposals and apply for project grants. Dr Chidananda Gowda, Chief Guest delivered a keynote address on three Types of Intelligence and future opportunity for Artificial intelligence. The inaugural function concluded with a vote of thanks by Ms Shreya. The event was coordinated by Smt Lovee Jain, Asst Prof, CSE, Smt Rajeshwari, Asst. Prof, ISE and Mr Karthik, Asst. Prof, CSE. More than 100 students were participated in the programme which was inspired the students.

COIMBATORE CHAPTER

Chapter conducted the AGM on 23-4-2019. Mr. N Valliappan, Past Chairman opened the meeting and welcomed all members for participation and then he handed the proceedings over to Mr. N Duraiswamy, Chapter Treasurer for presenting the financial statements for the year 2016-17. Mr. N Valliappan, Past Chairman, updated the participants on Chapter's income and expenditure details and explained the total assets and liabilities position. Members enquired details about establishment expenses and the process. He briefed the current process and explained the on account adjustment with HO. After detailed review and discussion, the financial statements as presented was proposed for adoption by Prof. A Sivabalan and seconded by Mr. V Sivaramaswamy. Subsequent to financial statements review, Dr. G Radhamani, Past Secretary of the Chapter thanked all the members present. With no other matters in the agenda, the meeting then concluded.

LAKSHMANGARH CHAPTER

One day National seminar on Recent Trends in Energy Systems was held during 19 April 2019, and organized by Department of Energy Engineering, School of Engineering and Technology (SET), Mody University of Science and Technology Lakshmangarh, Sikar. The seminar was conducted with association and sponsorship of the Institution of Engineering and Technology (IET), UK and CSI Lakshmangarh Chapter. The Seminar was inaugurated by Prof. S L Soni, Director, NIT, Uttarakhad. During the inauguration, Prof. V K Jain, Dean, SET, welcomed the Chief Guest, Prof. S L Soni with bouquet facilitation. The inauguration was also attended by special guest, Prof. K S Sangwan, Professor, BITS Pilani, Prof. Manoj Soni, Associate Professor, BITS Pilani and Prof. Rohit Bhakar, Associate Professor, MNIT Jaipur. While addressing, Prof. V K Jain provided brief information about SET, Mody University and informed that such kind of seminars would be helpful for students and faculties to know about the trends in recent technologies. During the seminar, Prof. S L Soni presented an expert talk on energy conversion and its management. He discussed the ways to utilize energy for I C engine in productive manner. He also provided an insight on utilizing waste energy from the engines for different applications. The second talk of the seminar was given by Prof. Manoj Soni, in which he discussed recent trends, issues and challenges of renewable energy. He explained the recent advancement and challenges in renewable energy by giving an example of normal PV plant and concentrators. The brief discussion on design and installation of solar energy system was highly appreciated by the students. The third expert talk was delivered by Prof. K S Sangwan in which he provided information about sustainability development from different resources. He informed that how sustainable development would be carried out in day to day resources. Further he gave an example of energy and time saving using Lathe machine, Drill Machine, Shaper Machine, etc. The last expert talk was delivered by Prof. Rohit Bhakar in which he presented power system operations with uncertainty management in smart grids. He discussed transmission losses occurring in the power grids and how to save them. During the end of presentation he provided a brief insight on uncertainty management within the smart grid systems. In the end, the seminar was concluded by Dr Sanjeev Jakhar (Coordinator) and Mr. Atul Kumar (Co- Coordinator) by giving vote of thanks to the invitee experts and participants. The seminar was attended by a total of 180 participants including students and faculty who appreciated the expert talk on different areas of energy.

SURAT CHAPTER

CSI Surat chapter hosted a seminar on Careers in the field of Information Technology on 22nd May 2019. The seminar provided guidance to the students who have appeared 10th and 12th standard of any stream and their parents. It was a very interesting and interactive session. A career decision is one of the most important decisions in life. To choose the best career one has to consider demanding IT skills in the market and then to select the skills based on interest. The guest on the dias were Mr Sanjay Panchbhaya, Vice Chairman CSI Surat Chapter, Mr Tejesh Patel Chairman CSI Surat Chapter, Mr Kirtibhai Shethna Chairman IEI, Mr Nitin Oza Former chairman IEI, Dr Niteen Patel CSI member and coordinator of the event. The program started with welcoming by Dr Papri Ghosh member, CSI Surat Chapter. Mr Kirtibhai Shethna, Chairman Institution of Engineers Surat Chapter gave his opening remarks. Mr Tejesh Patel discussed about CSI Surat and then Dr Niteen Patel briefed about the event. Honorable Tejesh Patel Chair CSI Surat Chapter discussed on the topic "Industry Perspective and Expectation". Dr Keyur Rana discussed on the topic on Opportunities in engineering degree programs. Dr Kamalendu Pandey talked on opportunities in UG Programs. Dr S V Patel talked on opportunities in PG Programs. Dr Alpesh Sankaliya talked on Opportunities at diploma level courses". Mr Sanjay Buch gave the summary of all the opportunities and careers related to computers. After the experts talk there was a QA round and many questions of the aspiring candidates were addressed by the experts. The vote of Thanks was given by Er Nitin Oza, Former Chairman Institution of Engineers Surat Chapter.

Student branches are requested to send their report to sb-activities@csi-india.org

Chapters are requested to send their activity report to chapter-activities@csi-india.org

Kindly send **High Resolution Photograph** with the report.

FROM CSI STUDENT BRANCHES

REGION-II

Supreme Knowledge Foundation Group of Institutions, Hooghly

27-4-2019 - Seminar on Recent Trends and Advances in Internet of Things (IoT) and Biochip

REGION-III

Pandit Deendayal Petroleum University, Gandhinagar

6-4-2019 - Workshop on Hi-Tech Cyber Crime Investigation

REGION-III

Devang Patel Inst. of Advance Technology & Research, Anand

25-3-2019 to 29-3-2019 - Workshop on Data Analytics using Python and R-Programming

REGION-V

Aditya Engineering College, Surampalem

29-3-2019 & 30-3-2019 - Project Expo

REGION-V

Vasavi College of Engineering, Hyderabad

2-3-2019 - Technical Quiz

4-4-2019 – Winners receiving Awards in the Coding Contest

Maharaja Institute of Technology, Mandya

3-5-2019 - Workshop on React J S

AMC Engineering College, Bangalore

3-5-2019 & 4-5-2019 - International Conference on Information and Computing Systems (ICICS-2019) Research

FROM CSI STUDENT BRANCHES

REGION-V

New Horizon College of Engineering, Bangalore

24-4-2019 - National Conference on Advancements in Computer Science and Engineering

2-5-2019 - Mini Project Competition

St. Joseph Engineering College, Mangaluru

12-3-2019 - Industrial visit to Infosys at Mudipu, Mangaluru

13-4-2019 - Workshop on Neural Network and its Applications

Alva's Institute of Engineering and Technology, Mangaluru

14-3-2019 & 15-3-2019 – Event on Technofia (Inter-Collegiate Technical Fest)

12-3-2019 to 19-3-2019 - Workshop on Hadoop for Big Data Analytics

REGION-V

NIE Institute of Technology, Mysore

18-5-2019 - Motivational talk on Career Opportunities in Data & Analytics

REGION-VI

Sipna College of Engineering and Technology, Amravati

19-3-2019 - Workshop on Python Programming

FROM CSI STUDENT BRANCHES

REGION-VI

Universal College of Engineering, Vasai

15-3-2019 - Seminar on Prolog

15-3-2019 - Seminar on Responsive Website Designing

REGION-VII

Rajalakshmi Engineering College, Chennai

8-3-2019 - INNOVISION 19 - An Exhibition Venture and Creative Idea Presentation

Kongunadu College of Engg. & Technology, Tholurpatti

23-3-2019 - International Conference on Innovations in Electrical, Information and Communication Engg. (ICIEICE'19)

Sri Venkateswara College of Engineering, Sriperumbudur

28-3-2019 - Big Idea Contest (Project Display Competition)

8-4-2019 – Event on QUIZZUP (Programming & Technical Contest)

Mount Zion College of Engg. & Tech., Pudukkottai

8-3-2019 - TECHQUEST '19 - Technical Symposium

Viswajyothi College of Engg. and Techn., Vazhakulam

20-3-2019 & 21-3-2019 - Inter College Technical Symposium (Bodhi 2K19)

Registered with Registrar of News Papers for India - RNI 31668/1978
Regd. No. MCN/316/2019-2021
Posting Date: 10 & 11 every month. Posted at Patrika Channel Mumbai-I
Date of Publication: 10th of every month

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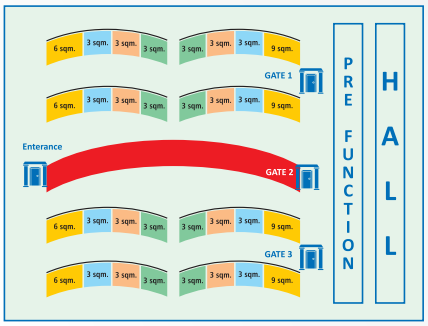

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