



**J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY  
(UGC AUTONOMOUS)**

**DEPARTMENT OF  
COMPUTER SCIENCE & ENGINEERING**

# **COMPUTING INTELLIGENCE**



**TECHNICAL MAGAZINE  
JUNE 2020**

## About JBIET



As one of the top ten most preferred institutions in Telangana, JBIET continues to strive to impart technical (engineering) and professional education of very high standards.

The aim of JBIET is to mould young learners into globally competitive professionals who are professionally deft, intellectually adept and socially responsible.

The expert faculty at JBIET inculcate the best values and principles, ascribing to a modern curriculum; while the students imbibe pragmatic perception and a pro-active nature, which spurs them towards exploration and advanced inquiry, resulting in valuable insights.

The Placement record of JBIET over the years is proof of our right efforts in enabling the best in class engineering, technical and professional education to aspirants.

## Vision of the College

To be a centre of excellence in engineering and management education, research and application of knowledge; to benefit society by blending ethical values with globally relevant learning.

## Mission of the College

- ▶ To provide world class engineering education, encourage research and development.
- ▶ To evolve innovative applications of technology and develop entrepreneurship.
- ▶ To mould the students into socially responsible and capable leaders.

## **About the Department**

- ▶ Established in 1998 with B.Tech CSE with intake 60
- ▶ M.Tech CSE Started in 2005 with intake of 18
- ▶ Present intake B.Tech CSE 120 M.Tech CSE 18
- ▶ Total Faculty 24 Non-Teaching :8
- ▶ No of labs :10
- ▶ Dept Library
- ▶ No of MOU'S with industry :6
- ▶ Good Placement Record& Higher Education
- ▶ R&D and Project Labs
- ▶ Professional Chapters
- ▶ Good Teaching and Learning process
- ▶ Good Student Supporting System

## **Vision of the Department**

To meet the emerging trends in computer Science and Engineering, strive for self-reliance enabled through high end research by adapting a futuristic approach.

## **Mission of the Department**

To impart qualitative education, prepare students refurbish their latent talents and aspire for a pragmatic career in Computer Science and Engineering

To provide an ambience to develop strategic areas of advance study with perception to foster industry centric education in computer science and Engineering.

To inculcate self-learning among students to make them self-reliant and socially responsible.

## Program Educational Objectives (PEOs)

Program outcomes are narrower statements that describe what students are expected to know and be able

To do upon the graduation. They are formed in line with the graduate attributes of NAAC. These relate to the Skills, knowledge, attitudes, values and behavior outcomes that students acquire through the program.

<b>PEO1</b>	To emphasize analytical, computational and programming based tools and methods of computer science and engineering to solve real world problems.
<b>PEO2</b>	To mold the student's career by steering their confidence levels for better understanding, strengthening technical outlook for innovation and better communication at the job place where they are employed.
<b>PEO3</b>	To hone the technical skills for creating and productivity in computer science and engineering beyond classroom learning.
<b>PEO4</b>	To promote multi-disciplinary awareness through exposure to areas of project development and industrial training for sustainable competition in Research and Development.





## Lasting Legacy of Late Shri. J. Bhaskar Rao

B.Com; L.L.B.,  
Founder Chairman of JB Group

### Chairman's Message

In my position as the Chairman of all the J.B. Group of Educational Societies and all the J.B.Group of Educational Institutions, I convey my best wishes to all our relentlessly advancing institutions nestled in a sprawling woody campus of about 106 acres of land, on the main road at Yenkapally, Moinabad Mandal, and R.R.District. The efficacy of the group can be witnessed from the establishment of three Engineering Colleges; J.B.Institute of Engineering & Technology.Joginpally.B.R.Engineering College; and Bhaskar Engineering College, besides the manifestation of Bhaskar Medical College and Bhaskar General Hospital. My lifetime ambition and objective being the provision of education, from KG to PG, to the underprivileged students of rural background, we have been providing free education, up to High School level in English Medium, to the poverty-stricken destitutes of our countryside. We established J.B. Institute of Computer Technology during 1996-97 with PG Courses in MCA and MBA, in the vicinity of Lord Balaji's abode, Tirupathi, as well. The management started two new Womens Engineering Colleges at Hyderabad and Tirupathi from the academic year 2008-09. The management encourages the youth of this state to find their careers in the noble profession of medical practitioner, by imparting quality medical education, and help our people lead healthy lives.

The World since recent times had been moving amazingly fast and fiercely competitive in all spheres of human activity. The said situation called for massive expansion of career focused education, particularly in Engineering, Management and such other professional areas. As a result, there had been mushroom growth of Institutions at a phenomenal level in the private sector. However; it is unfortunate to observe that the quality of education started eroding. The urgent need of the times was to lay emphasis on quality education and to strive vigorously for global excellence and acceptability. It is exactly at this critical juncture of time i.e. in the year 1993, J.B.Educational Society was established to serve the cause of the spread of general, Professional and Engineering education by a team of enlightened persons, under my Chairmanship.

The J.B. Group of Educational Societies has been maintaining an excellent academic track record for more than a decade. The J. B.Institute of Engineering & Technology (1998),Bhaskar Engineering College and Bhaskar Pharmacy College (2007) were established by J.B.EducationalSociety.Joginpally B.R. Engineering College (2002), Bhaskar

Medical College (2005) and Joginpally B.R. Pharmacy College (2007), were established under the banner of Joginpally B.R. Educational Society.

J.B.I.E.T. has well developed infrastructural facilities, such as adequate built up area, well equipped laboratories, libraries and information centers with digitalization and automation and on line transaction facilities in the campus. All facilities such as Medical, Transport, Canteen and Games & Sports, are available besides Seminar Halls, Conference Halls, Indoor Auditorium, Open-Air Theatre, Post Office and Banking.

We have encompassed Jawaharlal Knowledge Centre at J.B.I.E.T and J.B.R.E.C. to empower students to acquire Interactive Communication skills, Technical and employable skills to compete in the Global job market. The policy of this Management is to impart quality education and train the students and for the accomplishment of the same, we have recruited resourceful faculty that are dynamic dedicated and committed to the goal oriented efficient teaching with effective methodology. We have recruited seven Professors with Ph.D Degrees to hold the posts of HODs of the respective seven branches, apart from the principal with vast experience in the field.

J.B.I.E.T., being an NBA accredited institution and the winner of the status of JNTUs Permanent Affiliation, is one of the best 10 Engineering Colleges of the state, and also is the most preferred institution for aspiring students and their parents. The enrollment of students in JBIET has crossed the 3000 mark and went even higher in the academic year 2008-09.

The institute has launched a host of Faculty and Staff Development Programs, R&D, and Industry and other external project consultancy activities. We have taken up faculty, staff and students' Welfare and other HRD measures.

I have great pleasure in conveying the tiding that we have submitted proposals to the U.G.C. authorities for grant of Deemed to be University Status, for which the Government of Telangana and JNTU were pleased to issue No Objection Certificates. We are expecting that the said grant will be accorded in 2009.

National Seminars and Conferences are being organized frequently at our M.N. Rao Auditorium (air conditioned). Experts from Academia and Industry are invited to address and interact with the students. The Management has been sponsoring the deserving students and faculty to present technical papers and participate in the International Conferences in India and abroad. The Management has taken all possible measures for the career development and placement of all the qualified students domestically and globally.

NBA team of experts have visited and inspected J.B.R.E.C. on 20th & 21st February, 2009 to consider for the grant of Accreditation of four U.G. programs offered at the College.

We are fortunate to have the three renowned Academic Administrators, eminent scholars and the former illustrious Vice Chancellors of Osmania University and JNTU on the panel of Governing Bodies and the Advisory Bodies of J.B.Group of Educational Institutions, who extend their precious advice, and expert guidance, from time to time to formulate strategies in the cause of holistic development of the students.

On the eve of the Annual Day celebrations of JBIET, Bhaskar Engineering College, Bhaskar Pharmacy College, JoginpallyB.R.Engineering College, JoginpallyB.R.Pharmacy College, this year, we organized Spoorti-2009 (A Techno Cultural Fete) in the most befitting manner.

I have immense pleasure to welcome and congratulate all the Principals, Faculty, Staff and Students of all the colleges housed in the Campus for their laudable efforts in organizing Infoquest-2009 and Inxs-2009, studded with several student centric activities, spanning over three consecutive days i.e. on 26th, 27th and 28th February, 2009 and also for bringing out a souvenir 'Spoorti-2009' to commemorate the events.



**J.V. KRISHNA RAO**  
MBA HR - USA

## **Secretary Message**

*“Education is the passport to the future, for tomorrow belongs to those who prepare for it today”.*

JB Institute of Engineering & Technology was established in the year 1997 under the umbrella of JB Group of Educational Institutions, Hyderabad. At present JBIET is a UGC Autonomous Institution and permanently affiliated to JNTU Hyderabad.

The Speedy development in the field of Information & Technology has accelerated the demand for the value based education in the stream of Engineering, Technology and Management which is qualitative, progressive and multidimensional in competitive global environment. We provide quality education beyond the four walls of classroom to cope up with the corporate world.

The aim of JBIET is not only to produce mere degree holders, but the bright, talented men and women equipped with all round development of personality. Our vision of the institute is to impart quality education with Life Skills in all core disciplines of knowledge by developing global leaders who are passionate, committed and confident to take initiative in the nation building and create a peaceful environment for WORK, WORKER AND WORKPLACE.





**Major General Prof Dr S S Dasaka, SM, VSM (Retd)**  
CEO – JB Group of Educational Institutions, Hyd.

## **CEO Message**

I welcome you all to the portals of J.B. Institute of Engineering and Technology (JBIET) a Great Institution by all standards. Engineering continues to be a lucrative career for the bright minds, as it is only through engineers that the inventions of science can reach the masses, for the overall development and welfare of the society. With numerous development projects being executed and planned within the country and outside, engineers have a bright future. And at JBIET, we ensure that it happens.

JBIET has been one of the best engineering colleges in the two states of Telangana and Andhra Pradesh. It has been striving hard to not only maintain its standards but also to continuously improving them, so as to benefit the students in particular and the society at large. The college boasts of well qualified and self motivated faculty who have rich experience in academics, industry and research. They are backed up by experts from the industry. The curriculum is regularly revised to keep pace with the industry requirements, so that the students pass out as industry-ready graduates. The institute has excellent infrastructure, laboratories and workshops. The calm and quiet environment in the lush green campus, away from the hustle-bustle of the city, provides a tranquil environment, so conducive to quality Teaching -Learning.

In today's age, everyone is aware that besides class room studies, colleges should Concentrate on overall development of students by laying adequate attention on co-curricular and extra-curricular activities. At JBIET, we are very focussed about the same and ensure that all students are put through "Life Skills and Employability Skills Training" right from the first semester itself. The JB Educational Group of Institutions has Architecture, Pharmacy, Law, Medical and Dental Colleges, all co-located within the same campus, along with JBIET. This provides to students the much needed inter-disciplinary teaching-learning environment, which is otherwise not available in many stand-alone colleges.

The college not only inculcates a Creative and Innovation Spirit in the minds of our Students but also actively encourages them through the Group's JB Institute of Inventors Association of India (JBIIAI). This body provides intellectual support, logistics support and financial support, right from ideation to commercialisation. We hand-hold the students right through and ensure that they become Job-providers rather than Job-Seekers.

It will be the sincere endeavour of JBIET to turn you into knowledgeable Graduates / Postgraduates by guiding you and moving along with you

during your studies at the institute. I would like to wish you all a studious, satisfying and enjoyable journey in this institute. Along with your parents/guardians, we at the institute, will be looking forward eagerly and confidently to your bright success; so does the society and the nation. Remember what Swami Vivekananda said “Arise, Awake and Stop not, till the goal is reached”.

Looking forward to moving along with you in your beautiful journey ahead.  
Come, join us!  
Wishing you All the Best!

## **Message from the Desk of Principal**



**Dr.S.Sudhakara Reddy**

**M.Tech, MBA, Ph.D, F.I.E, LMISTE, M.I.S.M.E**

“Change is the end result of all true learning”

Welcome to the vibrant world of JB Institute of Engineering and Technology, Hyderabad, I on behalf of all the faculties and staff, congratulate you for choosing JBIET to reach the life goal. This Institute established in the year 1998 under the aegis of JB Group of Educational Institution's. JBGEI is the brain child of our visionary leader and founder chairman Late Sri. J. Bhaskar Rao Garu. In Consonance with the needs of time and to cope up with the dynamic changes in the era of technology dominant world.

At JBIET we the team are continuously working on to fulfil the local, regional, national and global aspirations of the youth of Telangana and Andhra in particular and India at large for providing the world class technical education to benefit all the sections of the society. In the current context of rapidly changing Socio-Economic Scenario, Demographic Dividend of India playing a major role in performing unexpected results. We go beyond the normal education system at our campus. The overall holistic development of the budding professional / technocrats of JBIETians with value addition education systems with Employability and Life Skills, Techno Sessions, Cultural Fest, Technical Fest, QUIZ, Guest Lectures, Industry Institute Interactions and the most important is the curriculum design in consult with Industry and university is extending full support to empower our institution.

Our Institute is committed to maintain an academically rich and professionally competent environment by encouraging the enterprising skills of our students. Our institute has consistently produced excellent results and its alumni are making their Mark in distinguished organizations in India and overseas. We are constantly making efforts to ensure that our students showcase their academic talent with high moral values and make responsible citizens of the society and humanity.

I am confident that we as an Institute will grow and contribute positively and actively in transforming the society. With warm wishes.

### **Constitution of Editorial Board:**

Editor and Editorial Board, for the publication of Technical Magazines, Newsletters is appointed by the HOD. The student representatives in this publication are also decided by the HOD. Technical Magazine and News Letters covers of following items:

- News about latest Technical inventions and innovations.
- Technical activities and achievements in the Department.
- Articles from Department Faculty and Students related to various areas of interest.
- Details about Seminars, Workshops, Conferences at JBIET.
- Achievements of the students & faculty.

### **Process of Publishing:**

- Editor with the help of the Editorial Board collects the news items related to CSE from various Magazines, Newspapers and Professional Societies and also calls for the articles publications from students and faculty giving a fixed target time.
- These articles are screened by Editorial Committee for publication into Magazines/Newsletter.
- Technical activities and achievements in the Department are collected based on the information available to HOD.
- Sometimes, special issues are planned based on the current topics and new technological trends.
- Details about Seminars, Workshops, and Conferences at JBIET are collected from IQAC.
- After collection, a basic draft is created and submitted to advisory board for proof reading. Later, this content is formatted on publishing software like Microsoft Publisher, Scribus etc.
- Frequency of Publishing Magazine Once in a Year and News Letters is Twice in a Year.

### **Process of Dissemination:**

- E-copy of the Newsletter/Magazines are disseminated through JBIET Website. Printed copies of the same are available in the Department and Central library.

### **Ensuring Students Participations**

- Students are encouraged to write articles and submit news items.
- Students get recognition and appreciation for their articles published by them, among their Cohorts.
- Student's achievements are also published to keep them motivated.
- Student's representation is also made in the editorial board.

## **Board of Editors**

### **Chief Editor:**

Dr. P. SrinivasaRao, Professor, Dept of, HOD CSE

### **Associate Editor: Dr.**

Dr. Niraj Upadhayaya, Professor, Dept of CSE

### **Faculty Coordinators:**

Dr. Gallipoli Apparao Naidu, Professor, Dept of CSE

### **Technical Support:**

Mr.K.Ramakrishna, Asst professor dept of CSE

Mr.K.Srikanth, Asst professor dept of CSE

### **Student Coordinators:**

Mr. Hajari Nandha Kumar, IV yr, Dept CSE

Ms. Aditi. S.D. IV yr, Dept CSE

### **Cover page Design:**

Sohaib Ahmer, IV yr, Dept CSE



# 1. Creative Computing

## Introduction

You might think the term "creative computing" is a contradiction. How can something as precise and logical as electronic computing possibly be creative? We think it can be. Consider the way computers are being used to create special effects in movies-image generation, coloring and computer-driven cameras and props. Or an electronic "sketchpad" for your home computer that adds animation, coloring and shading at your direction. How about a computer simulation of an invasion of killer bees with you trying to find a way of keeping them under control?

## Beyond Our Dreams

Computers are not creative perse. But the way in which they are used can be highly creative and imaginative. Five years ago when Creative Computing magazine first billed itself as "The number 1 magazine of computer applications and software," we had no idea how far that idea would take us. Today, these applications are becoming so broad, so allen compassing that the computer field will soon include virtually everything! In light of this generality, we take "application" to mean whatever can be done with computers, ought to be done with computers or might be done with computers. That is the meat of Creative Computing. Alvin Toffler, author of Future Shock and The Third Wave says, "I read Creative Computing not only for information about how to make the most of my own equipment but to keep an eye on how the whole field is emerging. Creative Computing, the company as well as the magazine, is uniquely lighthearted but also seriously interested in all aspects of computing. Ours is the magazine of software, graphics, games and simulations for beginners and relaxing professionals. We try to present the new and important ideas of the field in a way that a 14-year old or a Cobol programmer can understand them. Things like text editing, social simulations, control of household devices, animation and graphics, and communications networks.

## Understandable Yet Challenging

As the premier magazine for beginners, it is our solemn responsibility to make what we publish comprehensible to the newcomer. That does not mean easy; our readers like to be challenged. It means providing the reader who has no preparation with every possible means to seize the subject matter and make it his own. However, we don't want the experts in our audience to be bored. So we try to publish articles of interest to beginners and experts at the same time. Ideally, we would like every piece to have instructional or informative content-and some deptheven when communicated humorously or playfully. Thus, our favorite kind of piece is acessible to the beginner, theoretically non-trivial, interesting on more than one level, and perhaps even humorous. David Gerrold of Star Trek fame says, "Creative Computing with its unpretentious, down-to-earth lucidity encourages the computer user to have fun. Creative Computing makes it possible for me to learn basic programming skills and use the computer better than any other source.

## Hard-hitting Evaluations

At Creative Computing we obtain new computer systems, peripherals, and software as soon as they are announced. We put them through their paces in our Software Development Center

and also in the environment for which they are intended home, business, laboratory, or school. Our evaluations are unbiased and accurate. We compared word processing printers and found two losers among highly promoted makes. Conversely, we found one computer had far more than its advertised capability. Of 16 educational packages, only seven offered solid learning value. When we say unbiased reviews we mean it. More than once, our honesty has cost us an advertiser-temporarily. But we feel that our first obligation is to our readers and that editorial excellence and integrity are our highest goals. Karl Zinn at the University of Michigan feels we are meeting these goals when he writes. "Creative Computing consistently provides value in articles, product reviews and systems comparisons . . . in a magazine that is fun to read."

Dr. P. Srinivasa Rao *M.Tech., Ph.D(CSE)*  
*Professor & HOD CSE*  
*Dean of P.G Studies*

## 2. Mobile WiMAX

Mobile WiMAX is a broadband wireless solution that enables convergence of mobile and fixed broadband networks through a common wide area broadband radio access technology and flexible network architecture.

The Mobile WiMAX Air Interface adopts Orthogonal Frequency Division Multiple Access (OFDMA) for improved multi-path performance in non-line-of-sight environments. Scalable OFDMA (SOFDMA) is introduced in the IEEE 802.16e Amendment to support scalable channel bandwidths from 1.25 to 20 MHz

The Mobile Technical Group (MTG) in the WiMAX Forum is developing the Mobile WiMAX system profiles that will define the mandatory and optional features of the IEEE standard that are necessary to build a Mobile WiMAX compliant air interface that can be certified by the WiMAX Forum. The Mobile WiMAX System Profile enables mobile systems to be configured based on a common base feature set thus ensuring baseline functionality for terminals and base stations that are fully interoperable. Some elements of the base station profiles are specified as optional to provide additional flexibility for deployment based on specific deployment scenarios that may require different configurations that are either capacity-optimized or coverage-optimized

### **Introduction of Mobile WiMAX:**

Release-1 Mobile WiMAX profiles will cover 5, 7, 8.75, and 10 MHz channel bandwidths for licensed worldwide spectrum allocations in the 2.3 GHz, 2.5 GHz, and 3.5 GHz frequency bands.

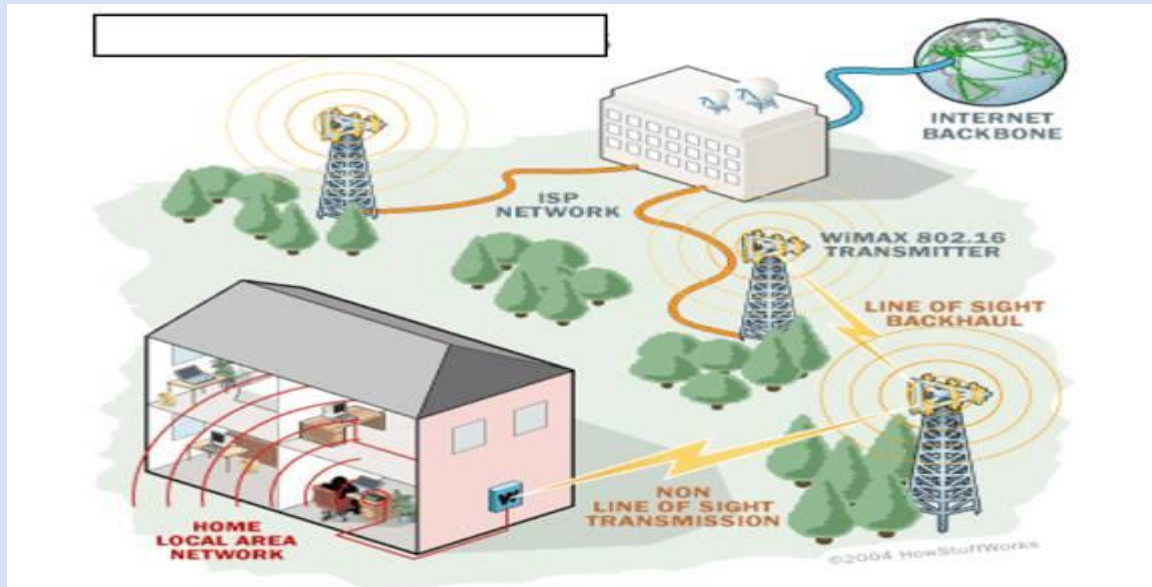
Mobile WiMAX systems offer scalability in both radio access technology and network architecture, thus providing a great deal of flexibility in network deployment options and service offerings. Some of the salient features supported by Mobile WiMAX are:

- **High Data Rates.** The inclusion of MIMO (Multiple Input Multiple Output) antenna techniques along with flexible sub-channelization schemes, Advanced Coding and Modulation all enable the Mobile WiMAX technology to support peak DL data rates up to 63Mbps per sector and peak UL data rates up to 28 Mbps per sector in a 10 MHz channel.
- **Quality of Service (QoS).** The fundamental premise of the IEEE 802.16 MAC architecture is QoS. It defines Service Flows which can map to Diff Serv code points that enable end-to-end IP based QoS. Additionally, sub channelization schemes provide a flexible mechanism for optimal scheduling of space, frequency and time resources over the air interface on a frame by-frame basis.
- **Scalability.** Despite an increasingly globalize economy, spectrum resources for wireless broadband worldwide are still quite disparate in its allocations. Mobile WiMAX technology therefore, is designed to be able to scale to work in different canalizations from 1.25 to 20 MHz to comply with varied worldwide requirements as efforts proceed to achieve spectrum harmonization in the longer term. This also allows diverse economies to realize the multifaceted benefits of the Mobile WiMAX technology for their specific geographic needs such as providing affordable internet access in rural settings versus enhancing the capacity of mobile broadband access in metro and suburban areas.
- **Security.** Support for a diverse set of user credentials exists including; SIM/USIM cards, Smart Cards, Digital Certificates, and Username/Password schemes.

**Mobility.** Mobile WiMAX supports optimized handover schemes with latencies less than 50milliseconds to ensure real-time applications such as VoIP perform without service degradation. Flexible key management schemes assure that security is maintained during handover.

**Physical Layer Description:**

WiMAX must be able to provide a reliable service over long distances to customers using indoor terminals or PC cards (like today's WLAN cards). These requirements, with limited transmit power to comply with health requirements, will limit the link budget. Sub channelling in uplink and smart antennas at the base station has to overcome these constraints. The WiMAX system relies on a new radio physical (PHY) layer and appropriate MAC (Media Access Controller) layer to support all demands driven by the target applications.



The PHY layer modulation is based on OFDMA, in combination with a centralized MAC layer for optimized resource allocation and support of QoS for different types of services (VoIP, real-time and non-real-time services, best effort). The OFDMA PHY layer is well adapted to the NLOS propagation environment in the 2 - 11 GHz frequency range.

It is inherently robust when it comes to handling the significant delay spread caused by the typical NLOS reflections. Together with adaptive modulation, which is applied to each subscriber individually according to the radio channel capability, OFDMA can provide a high spectral efficiency of about 3 - 4 bit/s/Hz. However, in contrast to single carrier modulation, the OFDMA signal has an increased peak: average ratio and increased frequency accuracy requirements. Therefore, selection of appropriate power amplifiers and frequency recovery concepts are crucial. WiMAX provides flexibility in terms of channelization, carrier frequency, and duplex mode (TDD and FDD) to meet a variety of requirements for available spectrum resources and targeted services

K.Ramakrishna  
Assistant Professor, CSE

### 3. Rolling Stone of technology

#### **Abstract:**

Slope rolling stone is one of the engineering geological disasters on the process of the fundamental construction in the mountain area. Combined with the slope rolling stones problem in a certain open pit mine, the influence factors, trajectory of slope rolling stones and interaction between slope and rolling stones were analyzed. The slope rolling stones movement model was built and the trajectory of rolling stones was predicted by the method of the random probability. Based on the space location of the point of fall, the bouncing height and the kinetic energy distribution law of the rolling stones, the protective measures were put forward and the height and the strength of the interception net were designed.

#### **Introduction:**

Wired, which will reach newsstands nationwide the first week of January, is seeking to capture the elusive market formed by the convergence of computing, communications and the media, and characterized by recent events as Apple's Newton personal digital assistant, Kodak's Photo CD and the alliance of IBM with Time-Warner Inc.

In a publishing industry characterized by comparative, qualitative product reviews and promotional photos of computer look-alikes, the San Francisco magazine's format definitely will be unique. But with constraints on corporate advertising budgets, the success of a startup magazine today is anything but assured.

Wire's stories will provide a broad context for new digital technology, a critical look at the impact of this technology on culture and society and a forum for the information elite to share news and views, said Wire's founders Louis Rossetti and Jane Metcalfe.

"If Rolling Stone covered music the way computer magazines cover the information society, it would be full of stories about amps and haw-haw pedals," said Rossetti, Wire's editor and co-publisher.

Rossetti and Metcalfe say their new magazine will appeal to early adopters of technology, the same ones who buy high-tech cars, wide-screen televisions and cellular phones. It won't have any product reviews and only one regular columnist: Nicholas Negroponte, director of MIT's Media Lab and the spiritual leader of the so-called digital revolution.

Negroponte's involvement goes beyond being a regular contributor. He was the magazine's first outside investor. Wire's only other outside investor is Charlie Jackson, founder of Silicon Beach Software, a software company.

#### **Description:**

In 2013 the Rolling Stones celebrated the 50th anniversary of the release of their first record, an unparalleled longevity in rock music—while other aging groups typically reform on rare occasions, the Stones had recorded and toured almost continuously over that period. Given such a lengthy career, the group's history inevitably includes highly contradictory phases, with singer Mick Jagger having mutated from revolutionary into royalty. When Jagger was appointed Knight Bachelor for services to music in 2002—an award he accepted at the urging of then-British Prime Minister Tony Blair, a strong American ally in the Iraq War—the Stones had long since ceased to represent anything like the polarizing public figures they had been in the late 1960s, as the leading musical heroes of the student movement in Europe and the United States, especially for those on the left opposed to the Vietnam War. Jan Bull's article in this special issue sheds a distinctive light on this period in recounting the significance of the Stones behind the Iron Curtain, in Communist Czechoslovakia, where the group was regarded by the authorities as "ideological diversion," and by young people as a "protest band." In the more recent past, in stark contrast, the principal members of the Stones—Jagger, guitarists Keith Richards and Ronnie Wood, and drummer Charlie Watts—have presented the remarkable spectacle of elderly multimillionaires continuing to perform



rock and roll with largely undiminished energy to enthralled fans from all generations, both remnants of the counterculture of the 1960s and their grandchildren. In just over a decade culminating in 2007, the Stones conducted four of the most highly profitable tours in history.

M.Rajkumar,  
Assistant Professor, CSE

## **4. Amazon Relational Database Service (RDS):**

Amazon RDS Features:

Amazon RDS is a managed relational database service that provides you six familiar database engines to choose from, including Amazon Aurora, MySQL, MariaDB, Oracle, Microsoft SQL Server, and PostgreSQL. This means that the code, applications, and tools you already use today with your existing databases can be used with Amazon RDS. Amazon RDS handles routine database tasks such as provisioning, patching, backup, recovery, failure detection, and repair. Amazon RDS makes it easy to use replication to enhance availability and reliability for production workloads. Using the Multi-AZ deployment option, you can run mission-critical workloads with high availability and built-in automated fail-over from your primary database to a synchronously replicated secondary database.

Lower administrative burden

Easy to use

You can use the AWS Management Console, the Amazon RDS Command Line Interface, or simple API calls to access the capabilities of a production-ready relational database in minutes. Amazon RDS database instances are pre-configured with parameters and settings appropriate for the engine and class you have selected. You can launch a database instance and connect your application within minutes. DB Parameter Groups provide granular control and fine-tuning of your database.

Automatic software patching

Amazon RDS will make sure that the relational database software powering your deployment stays up-to-date with the latest patches. You can exert optional control over when and if your database instance is patched.

Best practice recommendations

Amazon RDS provide best practice guidance by analyzing configuration and usage metrics from your database instances. Recommendations cover areas such as database engine versions, storage, instance types, and networking. You can browse the available

recommendations and perform a recommended action immediately, schedule it for their next maintenance window, or dismiss it entirely.

## Performance

**General Purpose (SSD) Storage:** Amazon RDS General Purpose Storage is an SSD-backed storage option delivers a consistent baseline of 3 IOPS per provisioned GB and provides the ability to burst up to 3,000 IOPS above the baseline. This storage type is suitable for a broad range of database workloads.

### Provisioned IOPS (SSD) Storage

Amazon RDS Provisioned IOPS Storage is an SSD-backed storage option designed to deliver fast, predictable, and consistent I/O performance. You specify an IOPS rate when creating a database instance, and Amazon RDS provisions that IOPS rate for the lifetime of the database instance. This storage type is optimized for I/O-intensive transactional (OLTP) database workloads. You can provision up to 40,000 IOPS per database instance, although your actual realized IOPS may vary based on your database workload, instance type, and database engine choice.

### Scalability

**Push-button compute scaling.** You can scale the compute and memory resources powering your deployment up or down, up to a maximum of 32 vCPUs and 244 GiB of RAM. Compute scaling operations typically complete in a few minutes.

**Security . Encryption at rest and in transit.** Amazon RDS allows you to encrypt your databases using keys you manage through AWS Key Management Service (KMS). On a database instance running with Amazon RDS encryption, data stored at rest in the underlying storage is encrypted, as are its automated backups, read replicas, and snapshots. Amazon RDS supports Transparent Data Encryption in SQL Server and Oracle. Transparent Data Encryption in Oracle is integrated with AWS CloudHSM, which allows you to securely generate, store, and manage your cryptographic keys in single-tenant Hardware Security Module (HSM) appliances within the AWS cloud. Amazon RDS supports the use of SSL to secure data in transit.

M.Renuka,  
Assistant Professor

## 5. 50 Years of Data Science

More than 50 years ago, John Tukey called for a reformation of academic statistics. In “The Future of Data Analysis,” he pointed to the existence of an as-yet unrecognized science, whose subject of interest was learning from data, or “data analysis.” Ten to 20 years ago, John Chambers, Jeff Wu, Bill Cleveland, and Leo Breiman independently once again urged academic statistics to expand its boundaries beyond the classical domain of theoretical statistics; Chambers called for more emphasis on data preparation and presentation rather than statistical modeling; and Breiman called for emphasis on prediction rather than inference. Cleveland and Wu even suggested the catchy name “data science” for this envisioned field. A recent and growing phenomenon has been the emergence of “data science” programs at major universities, including UC Berkeley, NYU, MIT, and most prominently, the University of Michigan, which in September 2015 announced a \$100M “Data Science Initiative” that aims to hire 35 new faculty. Teaching in these new programs has significant overlap in curricular subject matter with traditional statistics courses; yet many academic statisticians perceive the new programs as “cultural appropriation.” This article reviews some ingredients of the current “data science moment,” including recent commentary about data science in the popular media, and about how/whether data science is really different from statistics. The now-contemplated field of data science amounts to a superset of the fields of statistics and machine learning, which adds some technology for “scaling up” to “big data.” This chosen superset is motivated by commercial rather than intellectual developments. Choosing in this way is likely to miss out on the really important intellectual event of the next 50 years. Because all of science itself will soon become data that can be mined, the imminent revolution in data science is not about mere “scaling up,” but instead the emergence of scientific studies of data analysis science-wide. In the future, we will be able to predict how a proposal to change data analysis workflows would impact the validity of data analysis across all of science, even predicting the impacts field-by-field. Drawing on work by Tukey, Cleveland, Chambers, and Breiman, I present a vision of data science based on the activities of people who are “learning from data,” and I describe an academic field dedicated to improving that activity in an evidence-based manner. This new field is a better academic enlargement of statistics and machine learning than today’s data science initiatives, while being able to accommodate the same short-term goals.

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## **6. Necessity of Only AI or Iot or ML or Block chain or All Of Them Together?**

Dr.G. Arun Sampaul Thomas M.E., Ph. D

Few thought-provoking articles I had read recently about Machine-Joking. Humans had some achievement in defining what would create humour. Can machines do that by means of AI with the help of ML? Nah, it's not been entirely codified. As even full-time improvised comedians would confess, there is no magic formulation to fabricate the unspoiled joke. Much of what creates us laugh depends on elusive elements such as context or gesture of the comedian himself. Sometimes even we humans don't know why a joke is comical!!! What is comical for one person may not be entertaining for others. The same joke told by two people might generate different responses. A joke is fun, and a jest can be subjective. So, how can we teach AI to make jokes if we ourselves don't grip the reasons why a joke is humorous? AI, which inclines to accentuate on a very slender range of tasks, is poorly furnished to spot the wide range of elements involved in humour, let alone know what they mean. Drought of context is one area that makes it more challenging for algorithms or codification.

Refer the following examples of the machine generated one-liners jokes:

- I enjoy my coffee like I enjoy my war: cold.
- You know what really thrusts my buttons? That guy that's in control of me.
- And like my Alexa at home told me a joke "What is the preferred crisp flavour of the pilot, answer is "Plane"

That in principle describes deficiencies of machine controlled, code-based undertakings. The system learns to deliberate from data. It is based on the trends and patterns from the data that the AI makes assessments. The assessments have to be logical and defined. AI is just basically an efficient assessment based decision-making machine. It is can be taught to think but it cannot generate thought beyond the patterns and trends from the data it receives.

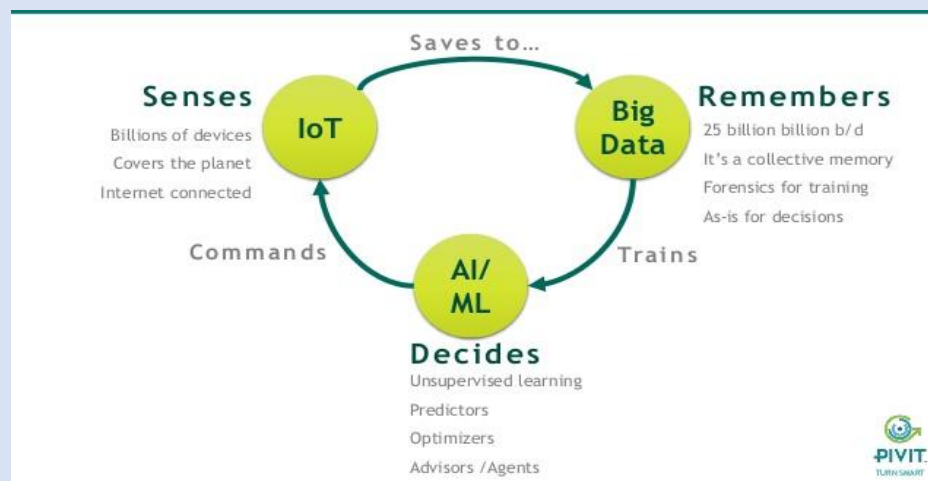
### **Blockchain solutions:**

- Blockchain is redefining how trustworthy transactions ought to be conceded out. The internet is itself highly susceptible and Blockchain is out with the result to discourse it. One problem that Blockchain resolves of AI and IoT is the confidence liability lines. Most IoT devices are associated to each other via public networks and it is

inessential to say how susceptible public networks really are. [10] Blockchain resolves this problem by linear and enduring indexed records which can be crafted. Globally general public can mention them without censorship. They can also smoothen the trade process by providing a payment mechanism as well as communication outlet. The public is the authority and not any centralized entity as is the case with the banks. Any kind of hacking and tampering with the data like captivating control of device and records is intolerable due to the way blocks are stored and guarded in an unambiguous database in the Blockchain scheme. Every IoT device is a point of vulnerability and the hazards are still higher as even AI is involved in making choices for users. Hence Blockchain can be used to provide a safe, scalable and certifiable platform that has supreme security implementations.

#### Block Chain and its Process flow :

- Internet of things (**IoT**) (Sensors to evidence various task statistics, with **Blockchain** elucidations) ==> **BigData** (Capability to store large volume of data, whether from sensors or from systems) ==> Machine Learning (**ML**) / Deep Learning(**DL**) (Decision Options for AI based on design of data and statistics, originated from BigData) ==> Artificial Intelligence (**AI**) (The decision maker, who decided grounded on best-case scenarios) as indicated in the figure 1.



*Figure 1 – Block Chain solutions with Process flow*

#### References:

<http://www.bikashmohanty.com/topics/do-we-need-only-ai-or-iot-or-ml-or-blockchain-or-all-of-them-together.html>



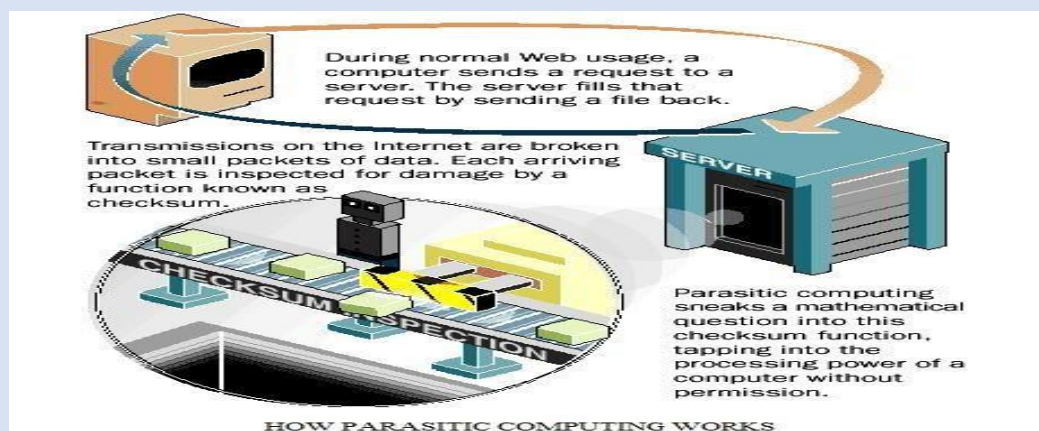
## 7. PARASITIC COMPUTING

Parasitic computing is a concept by which one can use the resources of machines that are connected on the Internet. This technology exploits open Internet protocols to use the resources of remote machines. As the name suggests, the machine that requires the services of others does not need to be authorized by the latter. Any machine, which is connected to the Internet, has to carry out minimum processing of any packet they receive without any authorization. This concept is exploited by parasitic computing in order to make use of computing powers of remote machines and web servers all around the globe. So one cannot really stop their machines from being utilized in this manner.

Parasitic computing can be a very effective technique when it comes to solve NP complete problems such as Circuit SAT, 3 SAT, etc. These problems are currently considered as some of world's most complex and time consuming problems. These problems generally have a set of Solutions Which Itself Is a Subset of a Set of Possible Solutions.

### How Parasitic Computing Works:

Although any possible solution to such problems can be verified quickly, there is no known efficient way to identify a solution in the first place. In fact, the most notable characteristic for such problem is that there is no fast solution. The time required to solve such problem is exponentially proportional to the size of the problem. So, as the size of the problem grows, the time required to find all solutions of the problem grows exponentially. In fact, time required to solve a moderately large NP-Complete problem can easily reach billions if not trillions of years using any kind of modern computing technology we have available today. For this reason, even just determining whether there is a fast solution to such problems or not is one of the principal unsolved problems of computer science.



The parasitic computer starts the process by transmitting specially generated messages to number of targeted web servers consisting of arithmetic and logic unit (ALU) and a network

interface (NIF). The packet carrying one of possible solutions to the problem is inserted into the IP level bypassing the parasitic node's TCP.

The parasitic computer generates a message in such a way that if the solution is not valid, it will fail the TCP checksum on the destination machine and the packet will be dropped. But in the case when the solution is correct, it will be propagated to the HTTP layer via TCP. Since it is a behavior of a web server to respond to any requests coming to an HTTP layer regardless of whether it understands the request or not, the web server will send a response back to the parasitic computer that it has received an HTTP request. Thus the parasitic computer sends out a message for each possible solution it only receives responses back from the server when the possible solution is a one of the actual solutions of the problem.

Parasitic computing is programming technique where a program in normal authorized interactions with another program manages to get the other program to perform computations of a complex nature. It is, in a sense, a security exploit in that the program implementing the parasitic computing has no authority to consume resources made available to the other program. Although as elegant and effective it proves to be, there are some major problems with this approach for computing. Since most of the computers connected to the network will be using TCP/IP, the resources available to the parasitic computer are virtually unlimited and almost all of the computer can be exploited. Furthermore, there is a very high possibility that servers can allocate their valuable CPU cycles to do the processing commanded by the parasitic node thus degrading overall performance of the applications running on the server and access efforts of the normal application.

### **Conclusion:**

Parasitic computing moves computation onto what is logically the communication infrastructure of the Internet, blurring the distinction between computing and communication. The Notre Dame scientists have shown that the current Internet infrastructure permits one computer to instruct other computers to perform computational tasks that are beyond the target's immediate scope. Enabling all computers to swap information and services they are needed could lead to unparalleled emergent behavior, drastically altering the current use of the Internet. The implementation offered above represents only a proof of concept of parasitic computing. As such, the solution merely serves to illustrate the idea behind parasitic computing, and it is not efficient for practical purposes in its current form.

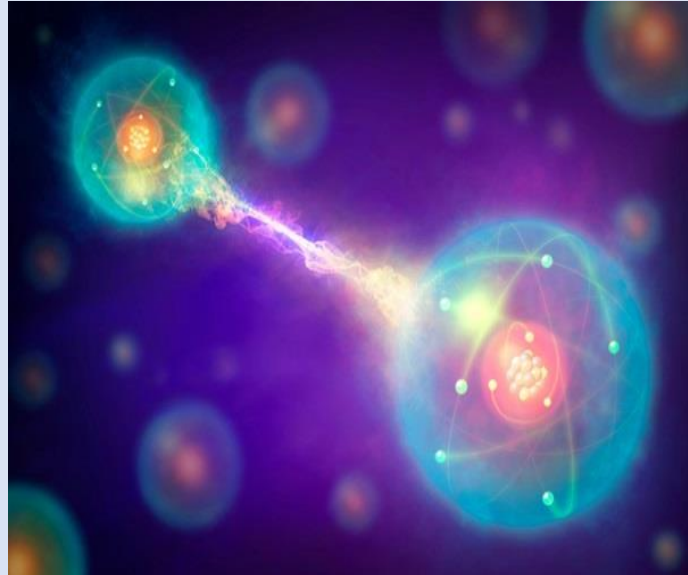
D. Himagiri  
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## 8. Quantum entanglement

Quantum entanglement is a quantum mechanical phenomenon in which the quantum states of two or more objects have to be described with reference to each other, even though the individual objects may be spatially separated.

This leads to correlations between observable physical properties of the systems.

For example, it is possible to prepare two particles in a single quantum state such that when one is observed to be spin-up, the other one will always be observed to be spin-down and vice versa, this despite the fact that it is impossible to predict, according to quantum mechanics, which set of measurements will be observed.



As a result, measurements performed on one system seem to be instantaneously influencing other systems entangled with it.

But quantum entanglement does not enable the transmission of classical information faster than the speed of light.

Quantum entanglement has applications in the emerging technologies of quantum computing and quantum cryptography, and has been used to realize quantum teleportation experimentally.

At the same time, it prompts some of the more philosophically oriented discussions concerning quantum theory.

The correlations predicted by quantum mechanics, and observed in experiment, reject the principle of local realism, which is that information about the state of a system should only be mediated by interactions in its immediate surroundings.

Different views of what is actually occurring in the process of quantum entanglement can be related to different interpretations of quantum mechanics.

There are many ways to create entangled states. One way is to make a measurement of your (composite) system that gives you partial information. We can learn, for example, that the

two systems have conspired to have the same shape, without learning exactly what shape they have. This concept will become important later.

The more distinctive consequences of quantum entanglement, such as the Einstein-Podolsky-Rosen (EPR) and Greenberger-Horne-Zeilinger (GHZ) effects, arise through its interplay with another aspect of quantum theory called “complementarity.” To pave the way for discussion of EPR and GHZ, let me now introduce complementarity.

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Assistant Professor

## 9. Creating Heatmap From Scratch In Python

Heatmap is frequently used to visualize event occurrence or density. There are some Python libraries or GIS software/tool that can be used to create a heatmap like QGIS, ArcGIS, Google Table Fusion, etc. Unfortunately, this post won't discussed how to create a heatmap using those software/tool, but more than that, we will write our own code to create a heatmap in Python 3 from scratch using Python common library. The algorithm which will be used to create a heatmap in Python is Kernel Density Estimation (KDE). Please refer to this post (QGIS Heatmap Using KDE Explained) to get more explanation about KDE and another post (Heatmap Calculation Tutorial) which give an example how to calculate intensity for a point from a reference point using KDE.

### Importing Library

Actually, there are some libraries in Python that can be used to create heatmap like Scikit-learn or Seaborn. But we will use just some libraries such as matplotlib, numpy and math. So we are starting with importing those three libraries.

```
import matplotlib.pyplot as plt
import numpy as np
import math
```

### Heatmap Dataset

To create a heatmap, we need a point dataset that consist of x,y coordinates. Here we create two list for x and y. The plot of dataset can be seen in figure 1.

#### *#POINT DATASET*

```
x=[20,28,15,20,18,25,15,18,18,20,25,30,25,22,30,22,38,40,38,30,22,20,35,33]
y=[20,14,15,20,15,20,32,33,45,50,20,20,20,25,30,38,20,28,33,50,48,40,30,35]
```

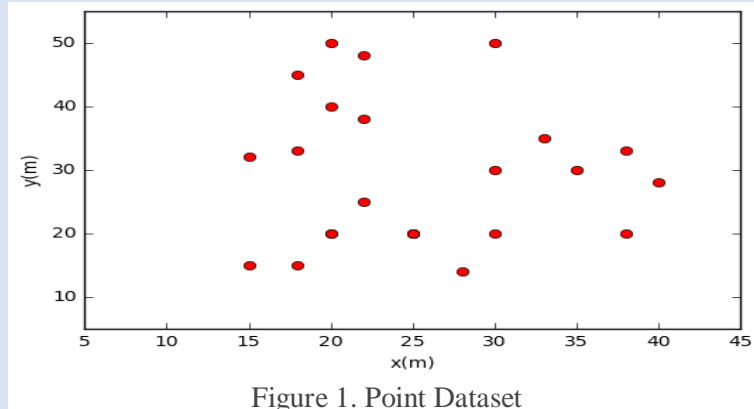


Figure 1. Point Dataset

### Grid Size and Radius

In creating heatmap using KDE we need to specify the bandwidth or radius of the kernel shape and output grid size. For this case, I use radius 10 m and grid size 1 m. Later you can change these parameters to see how they affect the heatmap result.

```
#DEFINE GRID SIZE AND RADIUS(h)
```

```
grid_size=1
```

```
h=10
```

### Getting X,Y Min/Max to Construct Grid

To construct grid we use mesh grid. Therefore we need to find x,y minimum and maximum to generate a sequence number of x and y. These sequence numbers then will be used to construct mesh grid. To include all the dataset coverage with a little bit more space, I subtract x,y minimum with radius and add it up for x,y maximum.

```
#GETTING X,Y MIN AND MAX
```

```
x_min=min(x)
```

```
x_max=max(x)
```

```
y_min=min(y)
```

```
y_max=max(y)
```

```
#CONSTRUCT GRID
```

```
x_grid=np.arange(x_min-h,x_max+h,grid_size)
```

```
y_grid=np.arange(y_min-h,y_max+h,grid_size)
```

```
x_mesh,y_mesh=np.meshgrid(x_grid,y_grid)
```

### Calculate Grid Center Point

After constructing mesh grid. Next we calculate the center point for each grid. This can be done with adding x mesh and y mesh coordinate with half of grid size. The center point will



be used later to calculate the distance of each grid to dataset points.

```
#GRID CENTER POINT
```

```
xc=x_mesh+(grid_size/2)
```

```
yc=y_mesh+(grid_size/2)
```

```
Kernel Density Estimation Function
```

To calculate a point density or intensity we use a function called `kde_quartic`. We are using Quartic kernel shape, that's why it has "quartic" term in the function name. This function has two arguments: point distance(`d`) and kernel radius (`h`).

```
#FUNCTION TO CALCULATE INTENSITY WITH QUARTIC KERNEL
```

```
def kde_quartic(d,h):
```

```
    dn=d/h
```

```
    P=(15/16)*(1-dn**2)**2
```

```
    return P
```

```
Compute Density Value for Each Grid
```

This is the hardest part of this post. Computing the density value for each grid. We are doing this in three looping. First loop is for mesh data list or grid. Second loop for each center point of those grids and third loop to calculate the distance of the center point to each dataset point. Using the distance, then we compute the density value of each grid with `kde_quartic` function which already defined before. It will return a density value for each distance to a data point. Here we only consider the point with a distance within the kernel radius. We do not consider the point outside the kernel radius and set the density value to 0. Then we sum up all density value for a grid to get the total density value for the respective grid. The total density value then is stored in a list which is called `intensity_list`.

```
#PROCESSING
```

```
intensity_list=[]
```

```
for j in range(len(xc)):
```

```
    intensity_row=[]
```

```
    for k in range(len(xc[0])):
```

```
        kde_value_list=[]
```

```
        for i in range(len(x)):
```

```
            #CALCULATE DISTANCE
```

```
            d=math.sqrt((xc[j][k]-x[i])**2+(yc[j][k]-y[i])**2)
```

```
            if d<=h:
```

```
                p=kde_quartic(d,h)
```

```
            else:
```

```
                p=0
```

```
            kde_value_list.append(p)
```

```
        #SUM ALL INTENSITY VALUE
```

```
        p_total=sum(kde_value_list)
```

```
        intensity_row.append(p_total)
```

```
intensity_list.append(intensity_row)
```

### Visualize The Result

The last part we visualize the result using matplotlib color mesh. We also add a color bar to see the intensity value. The heatmap result can be seen in figure 2.

#### *#HEATMAP OUTPUT*

```
intensity=np.array(intensity_list)
plt.pcolormesh(x_mesh,y_mesh,intensity)
plt.plot(x,y,'ro')
plt.colorbar()
plt.show()
```

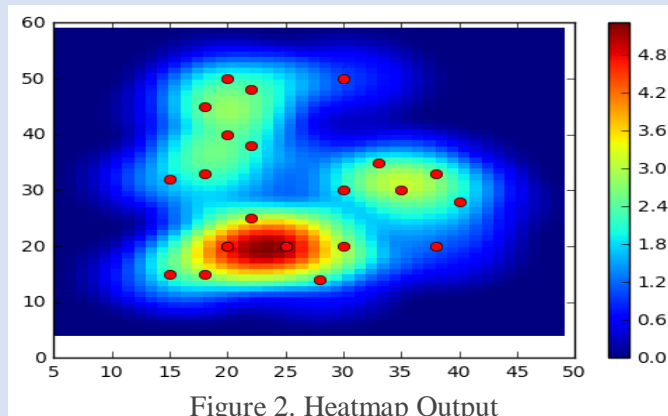


Figure 2. Heatmap Output

The complete code snippet can be found below.

```
import matplotlib.pyplot as plt
import numpy as np
import math
#POINT DATASET
x=[20,28,15,20,18,25,15,18,18,20,25,30,25,22,30,22,38,40,38,30,22,20,35,33,35]
y=[20,14,15,20,15,20,32,33,45,50,20,20,20,25,30,38,20,28,33,50,48,40,30,35,36]
#DEFINE GRID SIZE AND RADIUS(h)
grid_size=1
h=10
#GETTING X,Y MIN AND MAX
x_min=min(x)
x_max=max(x)
y_min=min(y)
y_max=max(y)
#CONSTRUCT GRID
x_grid=np.arange(x_min-h,x_max+h,grid_size)
y_grid=np.arange(y_min-h,y_max+h,grid_size)
x_mesh,y_mesh=np.meshgrid(x_grid,y_grid)
#GRID CENTER POINT
xc=x_mesh+(grid_size/2)
yc=y_mesh+(grid_size/2)
#FUNCTION TO CALCULATE INTENSITY WITH QUARTIC KERNEL
def kde_quartic(d,h):
    dn=d/h
    P=(15/16)*(1-dn**2)**2
    return P
#PROCESSING
intensity_list=[]
for j in range(len(xc)):
```

```

intensity_row=[]
for k in range(len(xc[0])):
    kde_value_list=[]
    for i in range(len(x)):
        #CALCULATE DISTANCE
        d=math.sqrt((xc[j][k]-x[i])**2+(yc[j][k]-y[i])**2)
        if d<=h:
            p=kde_quartic(d,h)
        else:
            p=0
        kde_value_list.append(p)
    #SUM ALL INTENSITY VALUE
    p_total=sum(kde_value_list)
    intensity_row.append(p_total)
intensity_list.append(intensity_row)
#HEATMAP OUTPUT
intensity=np.array(intensity_list)
plt.pcolormesh(x_mesh,y_mesh,intensity)
plt.plot(x,y,'ro')
plt.colorbar()
plt.show()

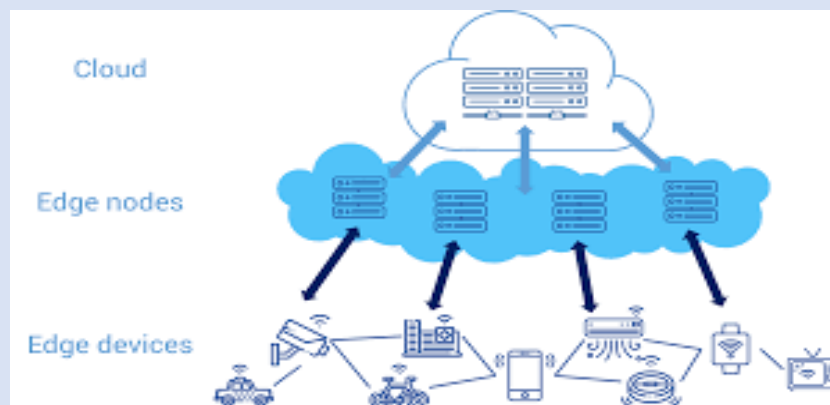
```

That's all how to create heatmap in Python from scratch using KDE. There are other kernel shape available like Gaussian, Triweight, Epanechnikov, Triangular, etc. Please free to add those kernel shape and modify the code. Try to experiment with changing some parameters like radius and grid size and explore the result.

K.Srikanth,  
Assistant Professor

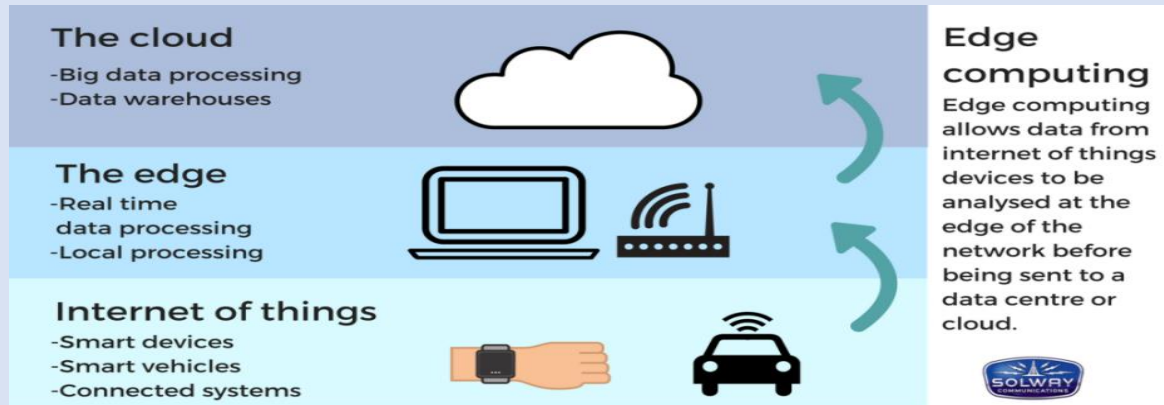
## 10. Edge Computing

In the context of Industrial Internet of Things, 'edge' refers to the computing infrastructure that exists close to the sources of data, for example, industrial machines (e.g. wind turbine, magnetic resonance (MR) scanner, undersea blowout preventers), industrial controllers such as SCADA systems, and time series databases aggregating data from a variety of equipment and sensors. These edge computing devices typically reside away from the centralized computing available in the cloud.



According to Wikipedia Edge computing is defined as “pushing the frontier of computing applications,

data, and services away from centralized nodes to the logical extremes of a network. It enables analytics and data gathering to occur at the source of the data. This approach requires leveraging resources that may not be continuously connected to a network such as laptops, smart phones, tablets and sensors.”



The role of edge computing to date has mostly been used to ingest, store, filter, and send data to cloud systems. We are at a point in time, however, where edge computing systems are packing more compute, storage, and analytic power to consume and act on the data at the machine location. This capability of edge computing will be more than valuable to industrial organizations—it will be indispensable.

Edge computing is currently being implemented due to following advantages it Provides in industrial sector.

- Powers the next industrial revolution, transforming manufacturing and services.
- Optimizes data capture and analysis at the edge to create actionable business intelligence.
- Creates a flexible, scalable, secure, and more automated technology, systems, and core business process environment.
- Promotes an agile business ecosystem that is more efficient, performs faster, saves costs, and is easier to manage and maintain.

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## 11. Asimo Robot

Robots, the suppositious concept that has been demonstrated a million times in movies, comes to life with the brilliant exertion of Honda. ASIMO or Advanced Step in Innovative Mobility is a state-of the-art humanoid robot created by Honda in the year 2000. Aimed to be a multi-functional portable assistant, ASIMO is intended to function in real-world environments. The creation of ASIMO was envisioned to help people who are bed ridden or disabled. ASIMO beats humans in tasks which can be devastatingly dangerous for them for instance, going in hazardous areas, scrapping fires or defusing a bomb. The composition of ASIMO has been kept purely welcoming and friendly. T h e era of robot's existence has been a topic of continuous debates and has invited numerous advantages and disadvantages of the actuality of robots but, Honda with its very first creation has proved that robots can operate efficiently. Honda, with the joint efforts of its eccentric robotic research and development team, successfully launched ASIMO after 20 years of consecutive hard work. Following this ASIMO team continues to excel and refine their wonderful creation. Below are ASIMO's configurations:

### **Height:**

The brainy master piece stands tall with the height of 4 ft. 3 in. and weighs around 48 kg further making it a welcoming robot. The average height of ASIMO brands it a participant of comfortable conversations with the elderly and people with less mobility. Its companionable height makes it a perfect size for assisting household tasks and people confined to bed or wheel chairs.

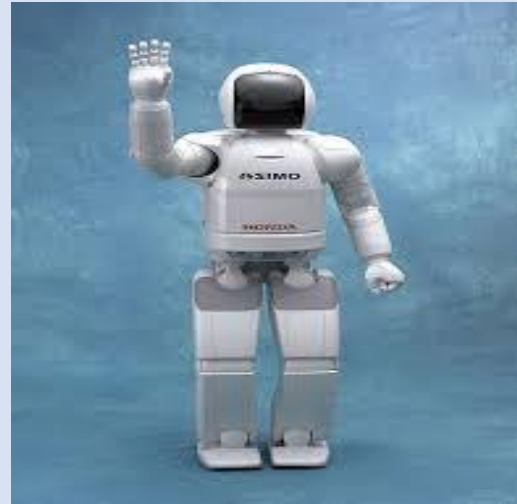
### **Skills:**

ASIMO was tossed with a purpose of aiding the needs of the elderly and disabled as well as manage household errands. ASIMO has human like features as it can make gestures, speak and interact like humans which makes it a friendlier robot. ASIMO holds the capability to sense the movements of numerous objects while capturing visual information by its camera eyes. Determination of direction and distance is also done by the two camera eyes of ASIMO. The former features of ASIM enables human like features.

### **Movement:**

ASIMO is accomplished in average walking with a speed of 2.7 kilometres per hour. Talking about running speed, ASIMO can run with an average speed of around 9 kilometres per hour. The movements of ASIMO are managed by aimed Zero Moment Point control as well as floor reaction control that allows ASIMO to stay firm at a particular position and maintain it healthily. The body position, length of steps and speed are adjustable by ASIMO. ASIMO's hands, legs, waist and neck have variable degrees of movement. The degree of freedom is defined specifically of each robot and to frame further, ASIMO has 57 degree of freedom. The fundamental body parts of ASIMO like wrist, shoulder, hip joints and neck individually has around three degrees of freedom whereas, hands with one thumb and four fingers have two degrees of freedom.

For determination of obstacles, ASIMO has visual sensors. In totality, ASIMO has sensors which helps it in autonomous navigation. The lower portion of ASIMO has one infrared sensor and one laser sensor. The infrared sensors help ASIMO determine the floor patterns to confirm the navigational path of strategic map while the laser sensor aids ASIMO to sense ground surface.



**Other Specifications of ASIMO: 1. Battery:** ASIMO runs on a Lithium ion battery which is fixed in its backpack and takes 3 hours to completely charge ASIMO. The battery weighs around 6 kg.

**2. Operating Time:**

ASIMO can successfully run or walk for a good one hour.

**3. Languages:**

ASIMO is skilled in English and Japanese language. The latest version of ASIMO was released in 2011 which came installed with more modified sensors and more balancing powers than its previous incarnations. ASIMO's most recent update comes with dexterous hands and refined touch sensors. To conclude, artificial intelligence has brilliantly taken birth in the present generation with one live example, ASIMO which in present time imparts lectures and teachings in various colleges. ASIMO has made presence in Disneyland and also at NASA which makes ASIMO a star of every world and in the other parallel worlds.

**The Verdict:** The level of technology used and years of tremendous research have made ASIMO a state-of-the-art creation. ASIMO is very costly which makes it attainable only by the celebrities or by the government. Well, now we all wait for ASIMO's presence in public healthcare hospitals, private hospitals and in households to assist elderly and their need. Although due to its star value, the era of an ASIMO in every house is years away.

Faculty: N. Tirumala Rao  
Assistant Professor  
Department of CSE



## 12. Augmented Analytics

Augmented analytics is the marrying of two technologies: analytics and AI. We discuss these separately, and then explain what happens when you bring them together in a single solution or platform that possesses contextual awareness.

**Analytics:** Analytics is the process of identifying patterns in data. It uses statistics, operations research, and other mathematical tools to make sense of information generated or collected by organizations. It is especially helpful as data volumes grow, when manual calculations are too difficult or complex.

In this era of big data, analytics has become essential to doing every- thing from understanding sales trends to segmenting customers based on their online behaviors to predicting how much inventory to hold. Yes, the data itself is a tremendous asset, but analytics is what makes data deliver value. And not just to business, but to sports, medicine, engineering, or any activity in which large amounts of data is involved.

**AI:** AI is the computer science practice of building automated systems that are able to perform tasks that normally require human intelligence. AI encompasses a broad range of technologies, such as computer vision, NLP, and neural networks.

Machine learning is one of the technologies that falls under the umbrella of AI. It makes it possible for systems to learn from processing data. In other words, computer systems don't need to be specifically programmed by humans to anticipate every scenario— they automatically learn and improve from what the data tells them, and from their experience with that data, to make better predictions or decisions.

IDC predicts that enterprise spending on AI solutions will top \$77.6 billion in 2022, more than three times the \$24.0 billion in 2018, as illustrated in Figure 1-3. This represents an “impressive” 37.3% CAGR between 2017 and 2022, according to IDC.

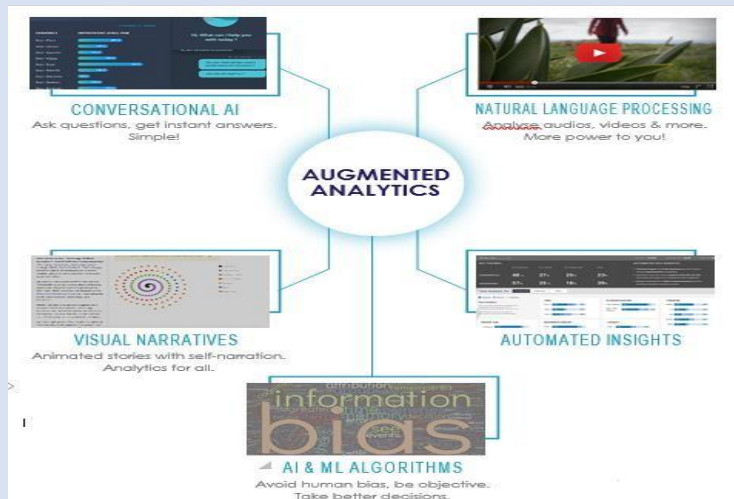
The top reason that marketers are adopting machine learning and analytics is to improve the customer experience. A full 82% of enterprises already use machine learning to personally target customers, and 64% use it to deliver targeted content and promotions to them.

**Bringing It All Together:** When you embed machine learning and AI into analytics, you get augmented analytics. Augmented analytics is a technology that auto- mates the selection and preparation of data, the generation of insights, and the communication of those insights. The main thing that is new in this space is the *democratization* of advanced analytics tools. Today, advanced analytics is available to a broad range of business users: executives, managers, line-of-business workers, and citizen data scientists—those employees who have a natural aptitude and excitement for data science without the formal training.

Augmented analytics solutions come prebuilt with models and algorithms so that companies don't need a data scientist to do this work. And these models are hidden under much friendlier interfaces so that users without data science training or PhDs in statistics can use

The tools. Indeed, this is one of the key differences between augmented analytics and traditional analytics. With augmented analytics, the AI and machine learning are built into the product. The very complex model-building and number-crunching is still happening

—but it's always on, always working in the background to continuously learn and help users make more accurate decisions.



Because leading augmented analytics platforms feature NLP, this allows nontechnical users to easily ask questions from source data; natural language generation (NLG) then automates the process of translating complex data into text with intelligent recommendations, thereby accelerating analytic insights.

By using automated recommendations for data enrichment and visualization, anyone can quickly uncover unseen patterns and predict trends to optimize the time it takes to go from data to insights to decisions.

NLP technology also helps drive the ability for non-expert users to make sense of large amounts of data. Users can ask questions of the data using standard business terminology, and the software will find and query the right data and make the results easy to digest using visualization tools or natural language output.

Augmented analytics can help every data-hungry user of analytics—from business analysts to IT professionals, to the C-suite—in the following ways:

#### *Recommend, prepare, and enrich data*

Rather than having to decide which datasets to query, as with traditional analytics, an augmented analytics solution will recommend which datasets to include in analyses, alert users when those datasets are updated, and suggest new datasets if users are not getting the results they expect.

#### *Create instant charts and graphics*

This helps interpret and communicate results in an easily understandable context to help make swift business decisions.

#### *Natural language interfaces*

This allows users to do querying in natural language, to activate speech-to-text capabilities, and to get results generated—and even spoken—using everyday business language.

#### *Forecast trending and clustering of data*

It takes just one click to get accurate forecasts and predictions based on historical data.

#### *Use proactive, personalized analytics with mobile applications*

Augmented analytics provides a personalized assistant that understands individual users—such as using their location to determine what charts to present to a client at an offsite sales meeting.

Augmented analytics will also be personalized and proactive to the extent that it will present insights based on patterns it detects in users' questions. Through self-learning, it will even anticipate future questions that perhaps a user hasn't yet thought of.

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“ You cannot change your  
future, but you can change  
your habits, and surely your  
habits will change your  
future.”

—A.P.J. Abdul Kalam

YourSelf  
Channel



Dreams

is not what you see  
in sleep

is the thing which  
doesn't let you sleep

- A. P. J. Abdul Kalam

