

# Basic Electrical and Electronics Engineering

**Dr. N. Karuppiah**  
**Dr. S. Muthubalaji**



# **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

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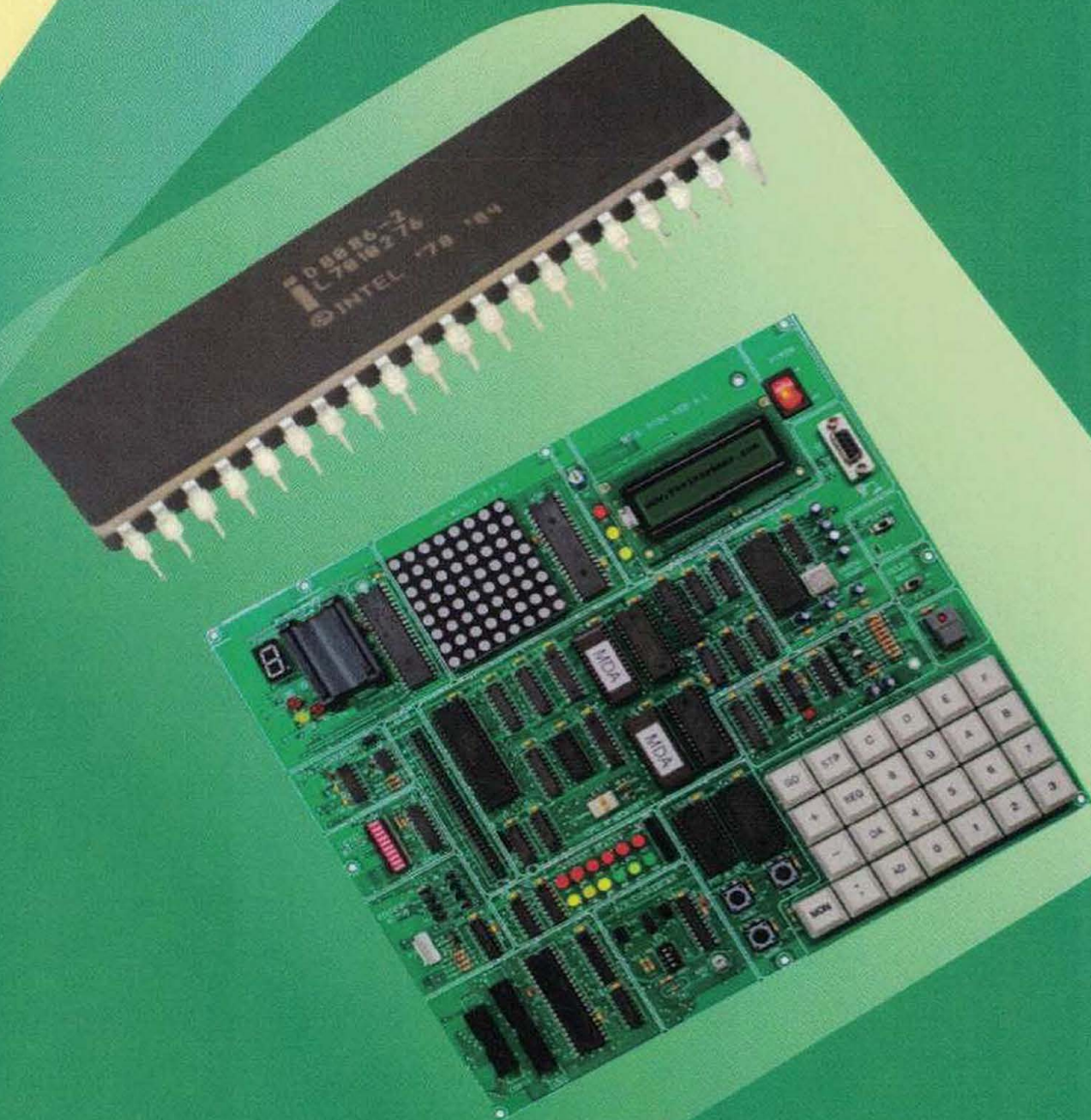


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# **MICROPROCESSOR AND MICROCONTROLLER**



**Dr. N. Karuppiah  
Dr. S. Ravivarman**

# **MICROPROCESSOR AND MICROCONTROLLER**

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## **OPERATION AND CONTROL IN POWER SYSTEM**

**B. RAJA GOPAL REDDY**



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# **OPERATION AND CONTROL IN POWER SYSTEM**

*Author*

**B. Raja Gopal Reddy**

Associate Professor

Vardhaman College of Engineering, Hyderabad



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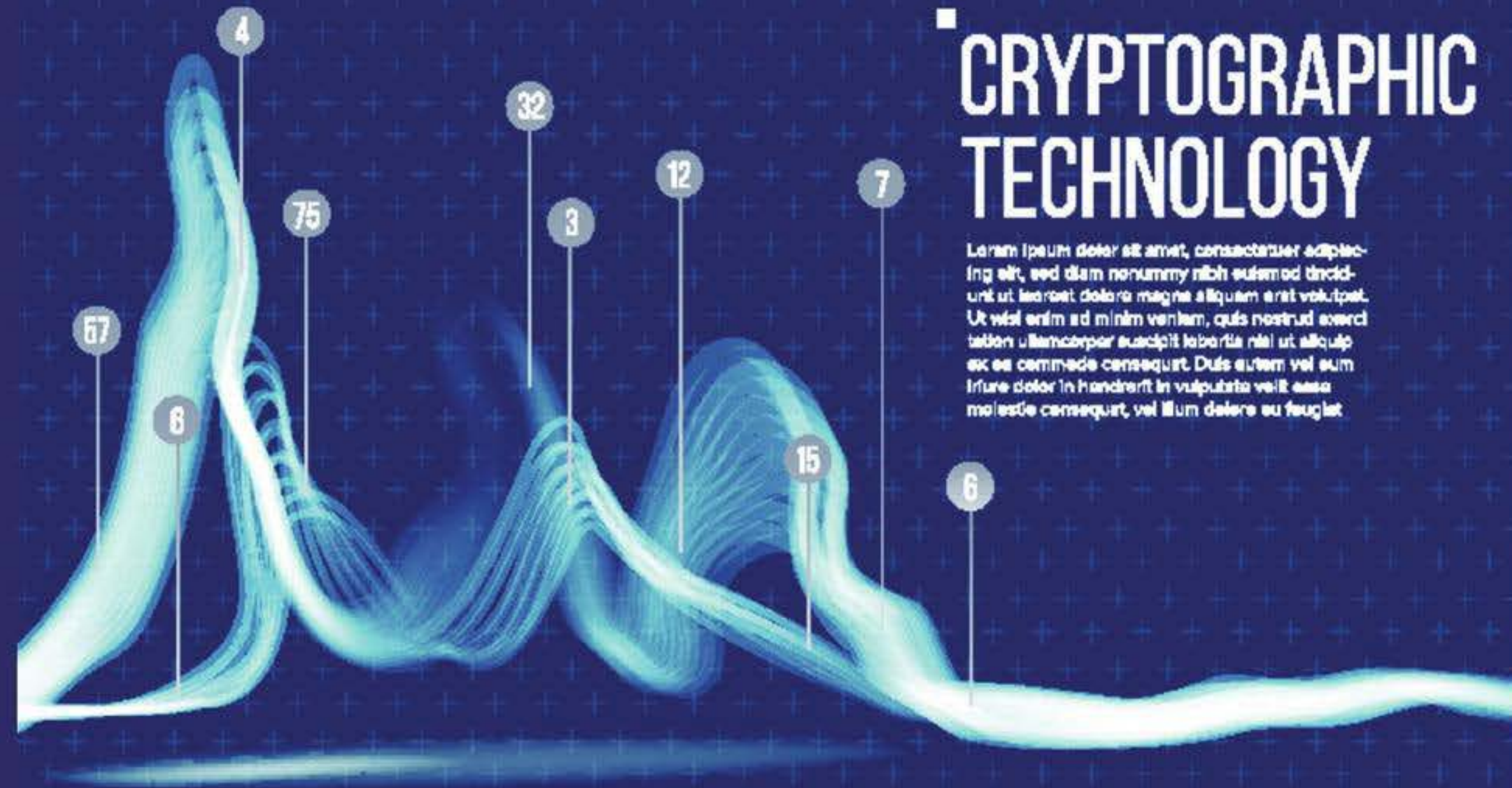


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In quantum cryptography, quantum key distribution protocols (QKDPs) employ quantum mechanisms to distribute session key and public discussions to check for eavesdroppers and verify the correctness of a session key. However, public distribution requires additional communication rounds between a sender and receiver. Although, QKDPs allow legitimate participants to establish a session key without initially sharing secret keys and do not need a TC, their security is based on the assumption of authenticated participants. By contrast, classical cryptography provides convenient techniques that enable efficient key verification and user authentication. In this work classical cryptography and quantum cryptography are combined to authenticate users and for successful detection of eavesdropping. Mathematical analysis of the integration is presented. The significant advantage of the integration is, it provides uncompromised security.

Quantum Cryptography



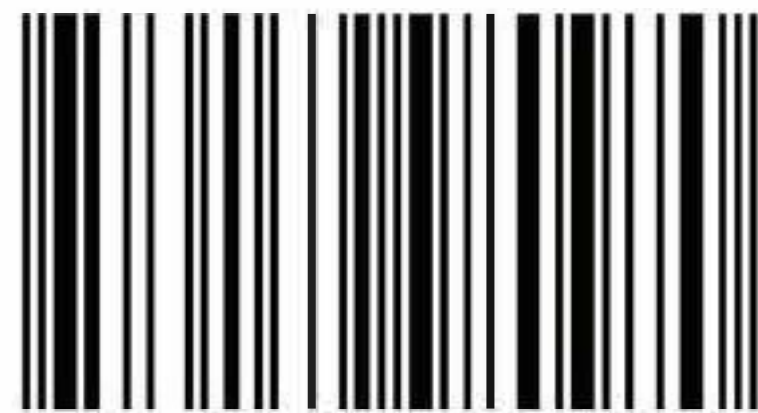
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Lalu Naik Ramavath

## Quantum Cryptography & Information Security

Quantum cryptography is a new method for secret communications offering the ultimate security assurance of the inviolability of a Law of Nature. In this book we shall describe the theory of quantum cryptography, its potential relevance and the development of a prototype system at HQKDPs, which utilizes the PRISUM TOOL of single-photon interference.



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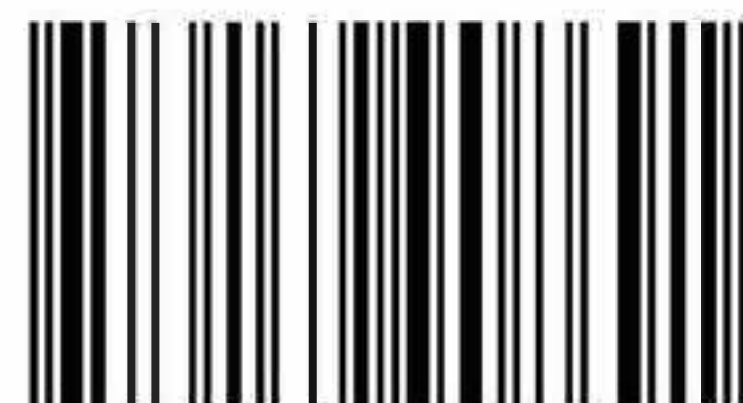
This book covers the types of Authorship Analysis techniques such as Authorship Verification, Authorship Attribution and Author Profiling. It covers the suitable stylistic features to increase the prediction accuracy of the demographic profiles such as gender, age and location. It covers the importance of feature selection algorithms to increase the accuracy of profiles prediction. It covers the importance of different term weight measures from various domains for better Author Profiling. In this book we explained one new term weight measure for strengthening the differentiating power of the feature thereby increasing the accuracies of profiles prediction in Author Profiling. This book also covers different types of approaches proposed by various researchers for Author Profiling with their merits, demerits, and limitations. This book also covers an alternative approach to address the draw backs of the existing approaches and to increase the efficiency of profiles prediction in Author Profiling.



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## Content-Aware Data Hiding Techniques



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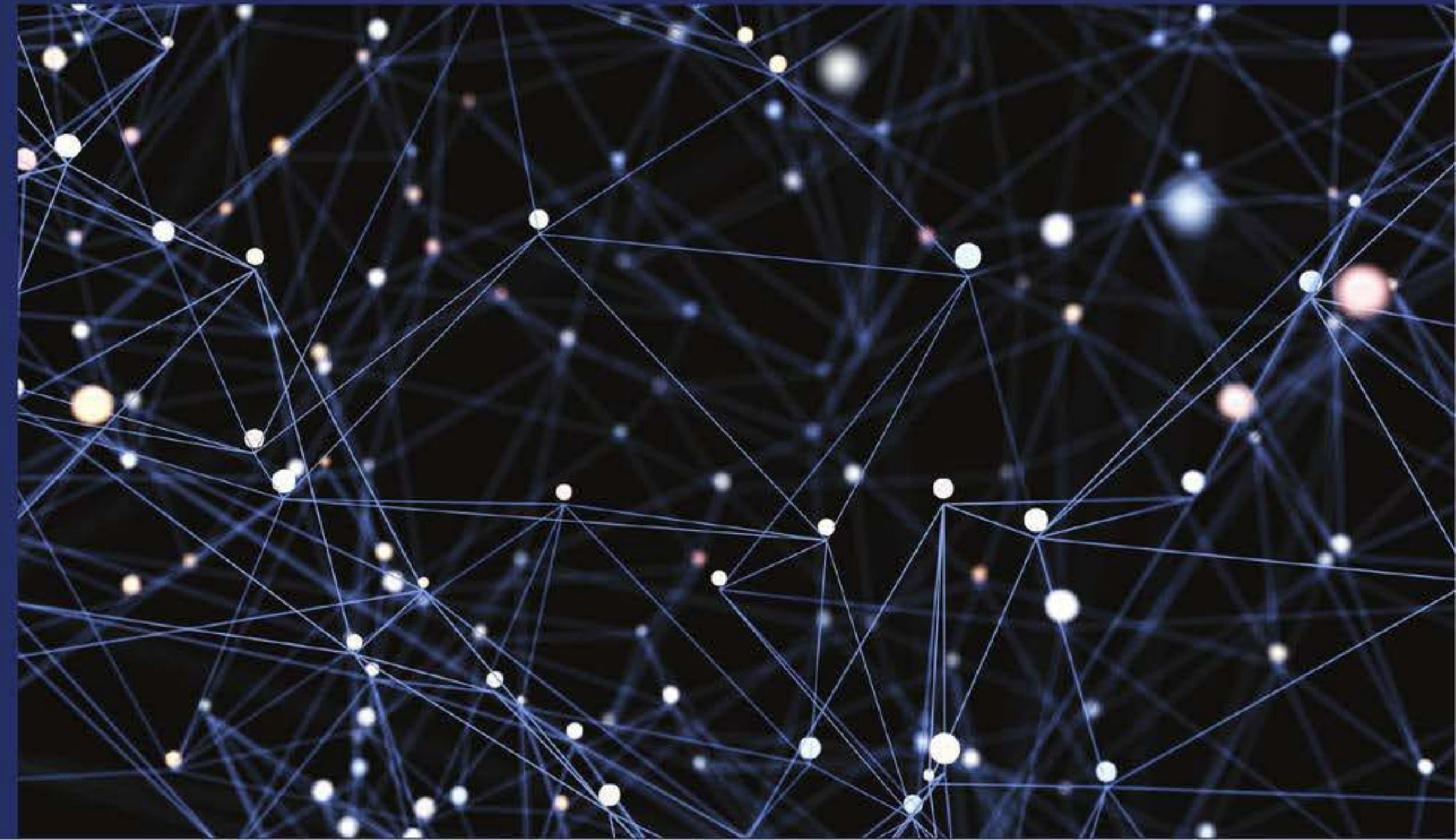


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This book covers the recent research trends in Mobile Adhoc Networks (MANETs). It explains the trust management methods in MANET through trust computation, aggregation, propagation and prediction. This book has a detailed discussion on soft computing methods in MANETs like fuzzy logic, fuzzy petrinets, Concurrent Reasoning Algorithm (CRA) and Dempster Shafer Theory (DST). This book explains the need of service oriented architecture in MANETs. It covers the different service discovery and composition methods. This book helps the students and researchers to understand the current trends in MANETs and to do the quality research.

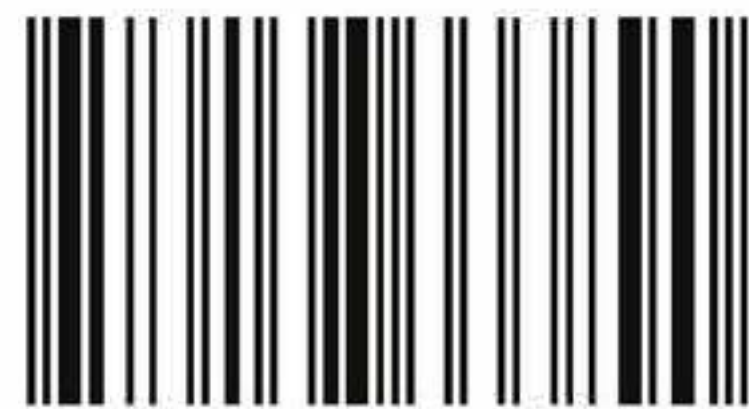
Mobile Adhoc Networks



Nageswara Rao Sirisala  
C. Shoba Bindu

# Mobile Adhoc Networks: A Research Perspective

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A Peer-to-Peer Network Perspective



Dr. Ramesh Shahabadkar

Dr. S. Sai Satyanarayana Reddy



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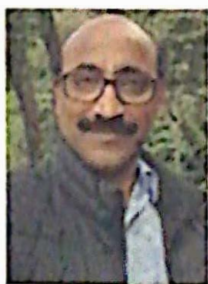




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I am an internationally known patent researcher, academician, and academic leader. I have excellent track records of enhancing academics, teaching-learning and training. I have 27 years of highly successful professional experience, out of which 5 years in patent research and 22 years in teaching at all levels of Engineering. I have been actively involved in technical education, corporate training programs and Intellectual property rights. I have taught various subjects in the area of computers and information technology across Telangana and Karnataka State, India. I am being recognized as an exceptional teacher and a Corporate Trainer of excellence for my unconventional approach towards teaching and abilities to give real life examples and case studies from my long professional career experience. Furthermore, have conceived, designed, delivered and managed the technology-schools and university curriculums in India and abroad with contemporary specializations with greater career prospects like Information Technology and Intellectual Property Rights with United States Patent and Trademark Office (USPTO). I have contributed in placement techniques to help students to groom themselves generation ahead of the rest of the technology schools and universities and achieved good placement. I am down to the earth, friendly, honest and sincere leader with a very high degree of hands on situational and motivational leadership skills. I have received best academician, distinguished faculty and best researcher awards for my contribution in academics and research.



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# Design of REINFORCED CONCRETE STRUCTURES

FIFTH EDITION



**MEDTECH**  
A Division of  
Scientific International

**P. Dayaratnam • P. Sarah**

# Design of REINFORCED CONCRETE STRUCTURES

FIFTH EDITION

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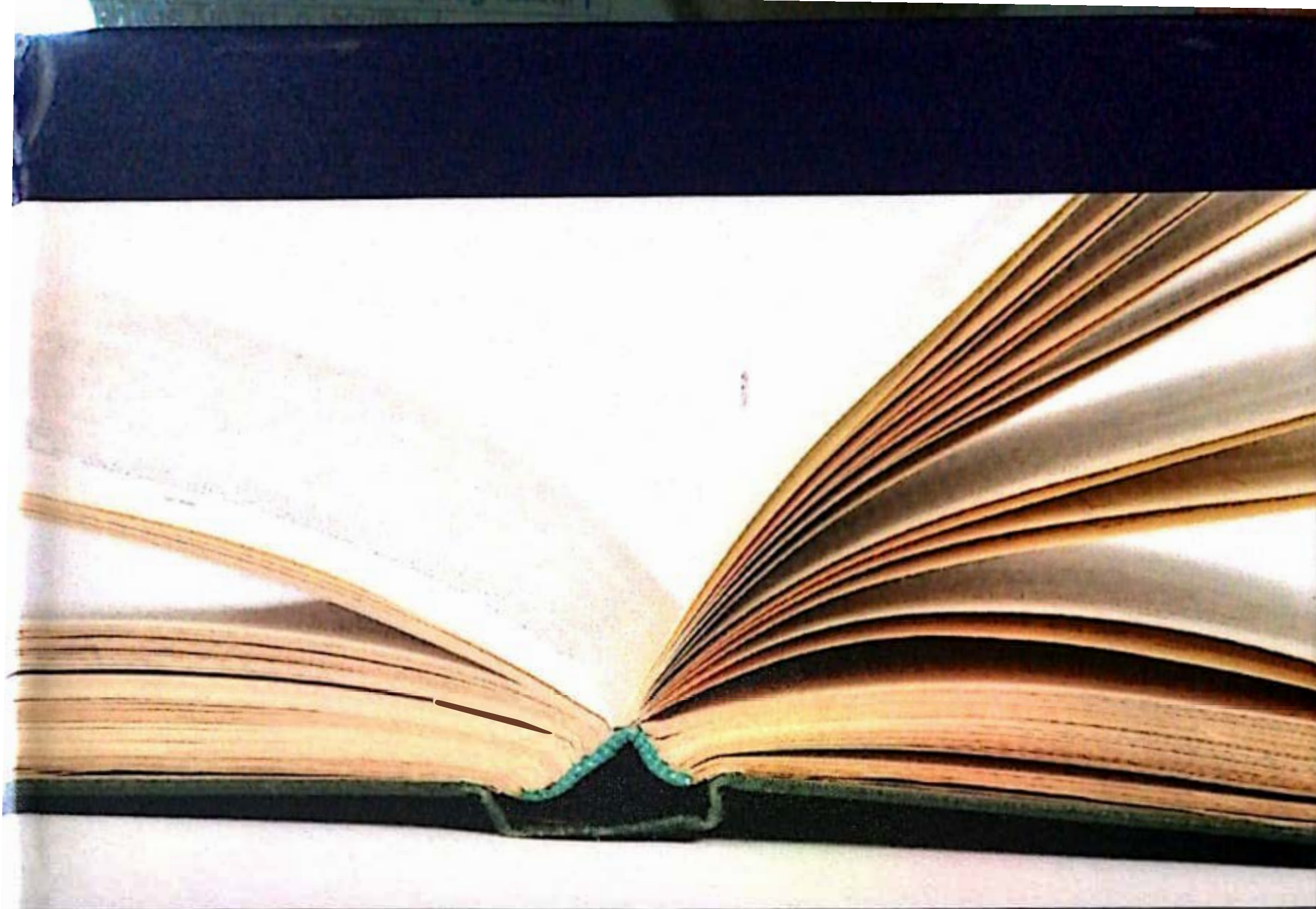
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P. Srinivasulu

# **A Survey of Medical College Libraries in Andhra Pradesh, India**

Medical Librarianship & Academic Library System

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**P. Srinivasulu**

**A Survey of Medical College Libraries  
in Andhra Pradesh, India**

**Medical Librarianship & Academic Library System**

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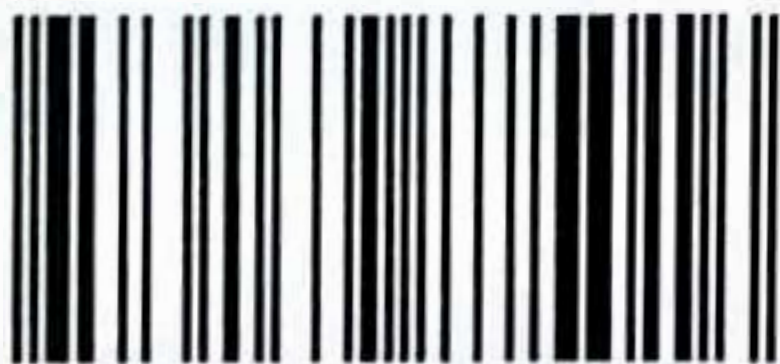
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Medical education occupies a crucial position as it involves a close and deep study of life itself and its vital process. It is no more a study of human illness and cure but a comprehensive body of knowledge dealing with health, and hence the productivity and well-being of the citizens. There is a growing awareness of the role of health development as a vital component of socio-economic development. In this direction, library is the fountain of knowledge that never runs dry. Libraries are the centres of learning and service oriented institutions. The medical science library is one of the several major resources that ensure the smooth flow of information to help improve the quality of health education, research and patient care. Most of the library surveys were conducted on public and academic libraries. Only a few studies have been conducted on medical college libraries. Hence, the present investigation has been undertaken to survey medical college libraries in A.P., India. With the views expressed by the respondents in survey, viable way to improve the existing library services and for creating new vistas in the proper development of the library in the optimal way are suggested.



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Cloud computing gives an opportunity to use Internet-based services by business organizations. Use of cloud infra structure will reduce start-up costs, lower capital expenditures for organizations. Organizations use cloud services on a pay-as-you-use basis, access applications only as needed, and quickly reduce or increase capacities. Security is a major concern for data stored on cloud. Security to the data and applications is provided by authorization and authentication. Authorization for accessing the data is provided by access control models. Traditional access control models are not sufficient to cater applications running on cloud due to its dynamic nature. Various attribute based access control models are proposed for cloud computing. This book discusses the various authorization security challenges and proposed attribute based access control models to ensure security. The authors discuss the extremely challenging topics of data ownership, privacy protection, majorly focuses on encryption based access control models. This book is mandatory reading for research scholars, students involved in security aspects of cloud computing.

Access Control Models cloud computing

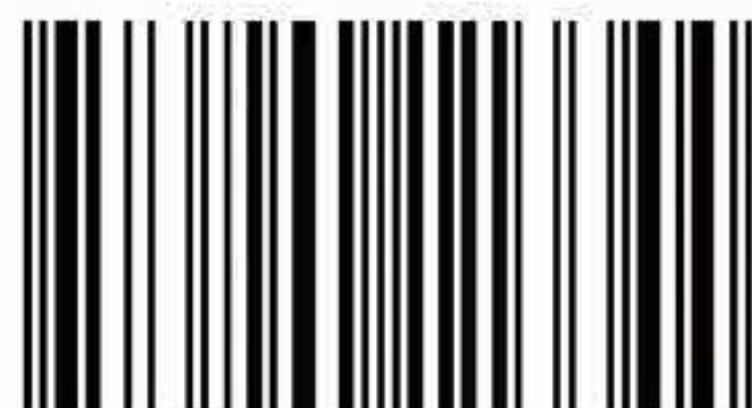


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Dr. Rajanikanth Aluvalu  
Dr. Lakshmi Muddana

# Access control models for cloud computing

Privacy, Security and Trust in Cloud Computing



978-620-0-11334-4

Aluvalu, Muddana





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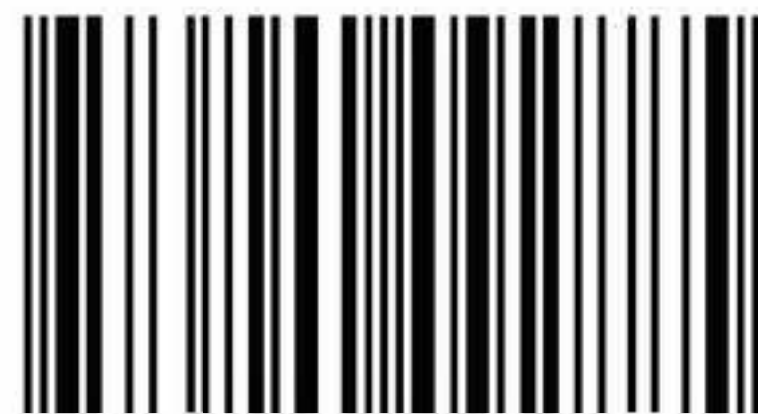
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The contents of this book represent a series of lectures given in the engineering level class on cloud Computing. We have great pleasure in presenting the First edition of this book. "CLOUD COMPUTING PARADIGM" is a core subject for B-Tech, BE, BSc, MCA, BCA and Diploma Students for interring the computer technology. This book is primarily intended to serve as a textbook in according with syllabus of Cloud Computing offered by various universities in India as well as abroad. Cloud Computing is a movement started sometime during the middle of the first decade of the new millennium; the movement is motivated by the idea that information processing can be done more efficiently on large farms of computing and storage systems accessible via the Internet The authors have identified the problems of the student "level" in this book, a significant effort has been made to find simple ways to develop theoretical as well as Practical of Fundamentals of Cloud Computing.

Prof.(Dr.) Raman Dugyala, B.Tech,M.Tech,PhD,Presently working in Vardhaman College of Engineering Telangana State India, Patent published 06,Having DST Projects worth 1 Crore. Prof.(Dr) Beg Raj, Principal, AITM Engineering Institute, Varanashi,UP,India. Prof.(Dr) Yashpal Singh, Professor & Dean Sree Chaitanya College of Engineering, TS, India.



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Prof. (Dr) Yashpal Singh  
Prof. (Dr) Raman Dugyala  
Prof. (Dr) Beg Raj

# Cloud Computing Paradigm

A complete Reference book

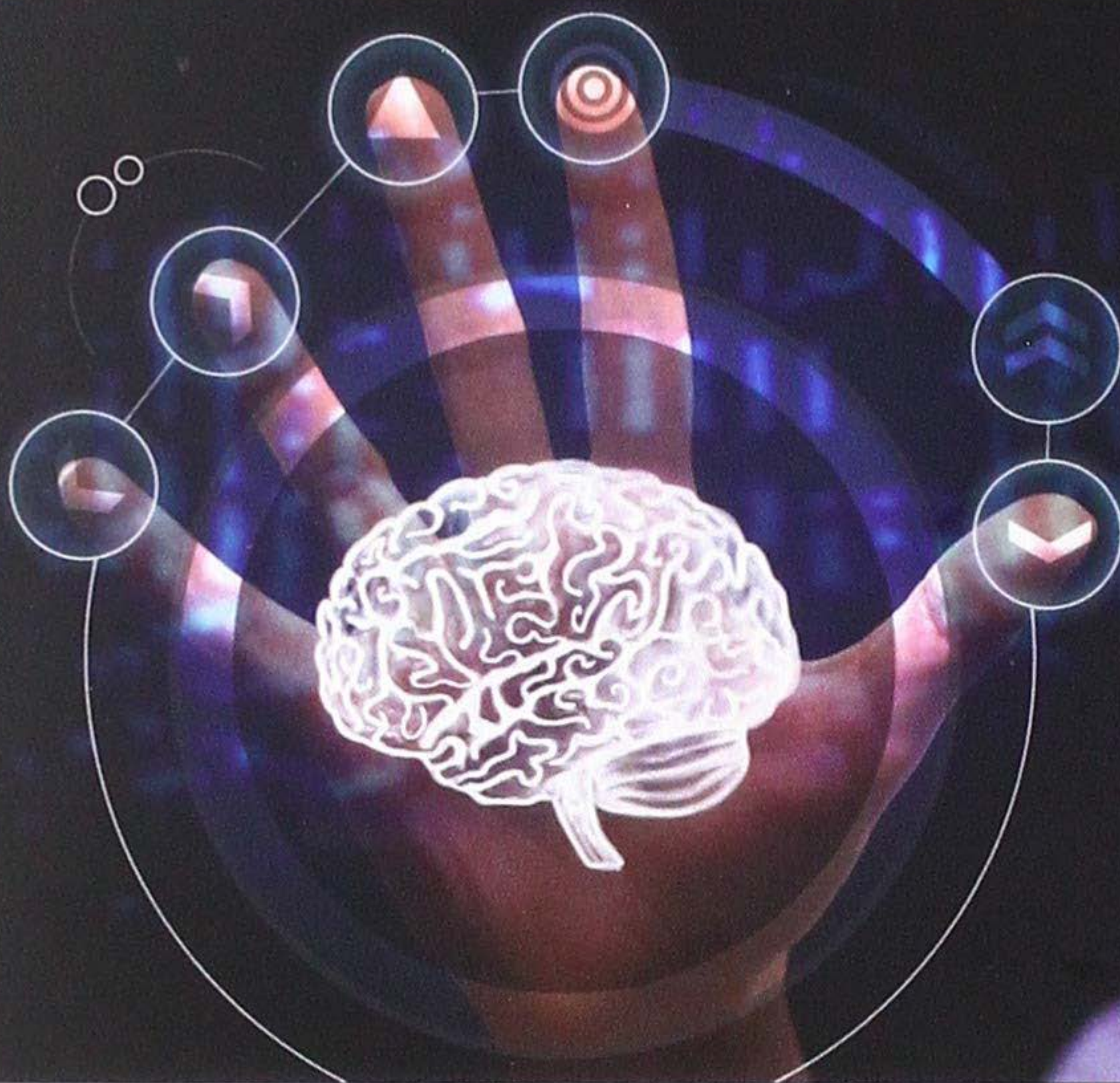


# A WAY TO CYBERTHON



Dr. S. Shithamb  
Dr. M. Saravanan  
Dr. S. Venkatesan  
Mrs. K. Sangeetha





Akhil Jabbar Meerja  
BL Deekshatulu

# Heart Disease Data Classification using Data Mining Techniques

 **LAMBERT**  
Academic Publishing



This book is an essential reference work for academicians, professionals, researchers, and students interested in the relationship between data mining and medical database. This book offers an overview of machine learning technologies and evolutionary techniques in decision support systems for the diagnosis of heart disease based on medical data. Data collected from various hospitals were selected and preprocessed for this study. These techniques are used to explore risk factors associated with heart disease. This book also covers state-of-the-art research toward developing a decision support system for heart disease prediction with machine learning approaches. The book presents numerous techniques, algorithms, and models. It describes neural networks, evolutionary techniques like genetic algorithms, associative classification, and statistical models, and machine learning approaches for heart disease prediction. We discussed how these machine learning techniques are used to classify heart disease data sets.



Dr. M.A. JABBAR is a Professor, Dept of CSE at, Vardhaman College of Engineering, Hyderabad, India. He has been teaching for more than 19 years. He obtained his Ph.D. from JNTUH. He is serving as a vice chair of the IEEE Computer Society chapter (Hyderabad) Section. He received the best faculty researcher award from CSI and Fossee labs Mumbai.



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# Digital India

## A road ahead

Edited by  
Dr. Tazyn Rahman

# **Digital India – A road ahead**



**EMPYREAL PUBLISHING HOUSE**

**Guwahati**





# **Digital India – A road ahead**

Edited By:

**Dr. Tazyn Rahman**

Associate Professor & Head Scholar's Program

Institute of Management Studies,

Noida



First Impression: 2017

# **Digital India – A road ahead**

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## PREFACE

*India* is now one of the fastest growing economies in the world. *India* is progressing with a lightning speed. In this progress technology is playing a vital role and with the Digital India Project being introduced under the governance of Prime Minister Narendra Modi, India is all set to go Digital. Digital India is a campaign launched to achieve the ultimate goal of ‘inclusion of everyone’ and to ensure that Government services are made available to citizens electronically by improving online infrastructure and by increasing Internet connectivity or by making the country digitally empowered. This campaign will also act as a facilitator for Right to Information which is mandated by the constitution of India, as the same right includes facilities to be provided for the purpose of accessing information. The vision of Digital India program is inclusive growth in areas of electronic services, products, manufacturing and job opportunities etc. and it is centered on three key areas – Digital Infrastructure as a Utility to Every Citizen, Governance & Services on Demand and Digital Empowerment of Citizens.

Digital India- A road ahead is a compilation of 24 chapters which includes articles, research and conceptual papers contributed by various academicians and research scholars. The theme of the book is kept keeping in view the present scenario where India is entering a new phase of Digitization.

The book is devoted to examining some key dimensions of digitalization. It throws light on various aspects of digitalization like E- Services, E – Marketing, E – Retailing and Digital Library. This book tries to open up an enchanting window on how digitalization in various areas is being implemented and what are the challenges that are being faced while implementing the same. The chapters contributed for this book have been clubbed into 6 major sections:

### **Part – 1: Digital India**

### **Part – 2: E – Services**

### **Part – 3: E – Commerce**

### **Part – 4: E – Marketing**

### **Part – 5: E - Retailing**

### **Part – 6: Digital Library**

The purpose of this book is to bring forth the various aspects of digital India. We hope that this book will be helpful for students, researchers, corporate fraternity and all stakeholders of Digital India.

October, 2017  
Ghaziabad

**Dr. Tazyn Rahman**



## **Acknowledgement**

This compilation is an outcome of the efforts and hard work put in by the contributors, whose papers provide richness of content to this book. I convey our sincere thanks to all the authors who have contributed their papers.

Word fails to express my indebtedness for the cooperation and generous support of my spouse Mr Akhter Alam and my son Irfan Alam who lost my attention during the entire period of working on this book. In fact, they are my strength and the will power behind to work harder and harder.

I am obliged to Mr. Zahir Ahmed and Mr. Arvind Kumar of Empyreal Publication House for publishing this book in a very short duration.

Without the active involvement and support of all those mentioned above, this volume would not have been possible.

Last but not the least I bow my head to the Almighty who always gave me the strength to move on in life on the right path.

**Dr. Tazyn Rahman**

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Part - 1

# Digital India



## CHALLENGES AND OPPORTUNITIES OF DIGITALIZATION INDIA

Y Prakash and Y Sagarika

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### ABSTRACT

*Digital India initiative aims at reaching the unreached through broadband highway, universal access to mobile connectivity, public internet access programme. Digitalization of business and delivery of services leads to ease of access, transparency and reduction in transaction cost such as e-Governance, e-Kranti-Electronic delivery of services. The digitalization creates IT jobs for the skilled youth results in income level that contribute to economic growth. Infrastructure play a vital role for electronic manufacturing to target zero imports by 2020. Advancement in ICT technologies leads to greater benefits to the citizen engagement with government. The Government needs technological partners who can provide integrated facilities like cloud storage for huge data, data analytics, integration of technologies with business enterprises and government need of the hour. Digitalization provides efficient services in agriculture, education, and healthcare, Banking, Financial Service and Insurance. Introduction of ICT in Agriculture such as e-NAM, NeGP can input farmers on soil test, seeds, nutrients, pests, weather forecast, marketing of produce and to remove asymmetric information between buyers and sellers. The Opportunities in education provides quality and virtual education system to prevent dropouts, infrastructure development helps in installation and utilization of incubation centers for Research and Developmental activities. For example, RUSA like apps creates capable people and good citizen. Digitalization in Healthcare has greater advantage to the medical profession in research and development activities, track the patients' health records and telemedicine in rural areas allows the patients to access better healthcare, Government impetus such as incentivizing private players, digitalization in primary health centers creates awareness to access robust healthcare. ICT play a vital role in Banking, Financial Services and Insurance (BFSI). Apart from this broadband connectivity, penetration of smartphones at cheaper price are the need of the hour to make Digital India a success. Due to demonetization, there is huge increase in mobile apps such as BHIM app, wallets, usage of POS machine, banking applications for smooth banking transaction with less transaction cost. With advancement in mobile application, requirements of customer has created a threat to the theft of data due to cyberattack. This has to be address with a holistic policy on cybersecurity measures to protect the privacy of data. Integration of e-sign technologies can reduce the breach of data of costumers.*

*Keywords: Challenges of Digital India, Digital India, Opportunities of Digital India, e-governance, e-kranti.*

### INTRODUCTION

The National e-Governance Plan approved in 2006 has not ensured effective progress in electronics manufacturing and e-Governance in the country but has made a steady progress through Mission Mode projects and Core ICT Infrastructure<sup>1</sup>. In order to serve better to the citizens of the country the Government of India announced Digital India. The Digital India programme supports infrastructure and provides measures to ensure the citizens electronic services, manufacturing devices/products and job opportunities to empower them and create knowledge economy that promotes inclusive growth.

### REVIEW OF LITERATURE

The author concluded that vision of digital India is a huge step to empower nation<sup>2</sup>. It is also said that implementation of nine pillars of the mission faced serious challenges in implementation Seema Dua (2017). The research highlights that increased digitalization reaped the gains in economies, societies and functioning of public sectors<sup>3</sup>. During 2011, Digitalization contributes to world economy an additional \$193 bn. and 6million jobs worldwide. "Digitization creates jobs, with a 10 point increase in the digitization score leading to a 1.02 percent drop in the unemployment rate<sup>4</sup>". The new public governance approaches are required to be support a shift from citizen-centric approaches to citizen-driven approaches<sup>5</sup>. Improved service delivery and internal public sector efficiency should go hand-in-hand promotes economic growth, societal equality and good governance with greater transparency, integrity and citizen engagement, if not it results in economic and financial crisis.

## RESEARCH METHODOLOGY

The data is secondary data collected from Journals, Magazine, Annual Reports, Recommendations of Councils, Web content of Government Organizations that relates to subject matter.

## OBJECTIVE OF THE STUDY

1. To examine the concept of Digital India
2. To explore the various areas of Digitalization in India
3. To identify the opportunities in Digital India programme to tap the untapped opportunities.
4. To analysis the challenges that act as barriers to Digital India.
5. To describe the benefits of Digitalization in India that contributes to economic growth.

## AIM OF DIGITAL INDIA

Digital India Programmes aims to support the thrust areas includes:

- (1) **Broadband Highway:**It includes Broadband for All-Rural, Broadband for All-Urban, National Information Infrastructure (NII)<sup>6</sup>.
- (2) **Universal Access to Mobile Connectivity:** It focuses on network penetration and filling the gaps in connectivity in the country<sup>7</sup>. To provide access to the uncovered villages in a phased manner. There are about 55,619 villages in the country that does not have access to mobile connectivity.
- (3) **Public Internet Access Programme:** The two sub components includes (Common Services Centres, Post Offices as multi-service centres) for delivery of government and business services<sup>8</sup>.
- (4) **e-Governance: Reforming Government Through Technology:** Government Process Re-engineering using IT to simplify and make the government processes more efficient is critical for transformation to make the delivery of government services more effective across various government domains and therefore needs to be implemented by all Ministries/ Departments<sup>9</sup>.

The Guiding principles includes:(i) Form simplification and field reduction (ii) Online applications and tracking (iii) Online repositories (iv) Integration of services and platforms.

- (5) **e-Kranti - Electronic Delivery of Services:** To Transform e-Governance and promote mobile Governance and Good Governance<sup>10</sup>. The Key Principle includes:
  - a) Transformation and not Translation
  - b) Integrated Services and not Individual Services
  - c) Government Process Reengineering to be mandatory in every MMP (Mission Mode projects)
  - d) ICT infrastructure on Demand
  - e) Cloud by Default
  - f) Mobile First
  - g) Fast Tracking Approvals
  - h) Mandating Standards and Protocols
  - i) Language Localization
  - j) National GIS (Geo-Spatial Information System)
  - k) Security and Electronic Data Preservation
- (6) **Information for All:** Online Hosting of Information and documents to facilitate open and easy access to information for citizens.
- (7) **Electronics Manufacturing:** To promote electronics manufacturing in the country with the target of **NET ZERO imports by 2020**.Inorder to attain NET Zero imports, the coordination is required at different levels<sup>11</sup>that includes:



- Taxation, incentives
- Economies of scale, eliminating cost disadvantages
- Focus on Mobiles, Set top boxes, Consumer & Medical Electronics, Smart Energy meters, Smart Cards, Micro-ATMs
- Incubators, Clusters
- Skill Development, Enhancing Ph.D.
- Government Procurement
- Safety Standards - Compulsory Registration, Support for Labs and MSMEs
- National Award, Marketing, Brand Building
- National Centers - Flexible Electronics, Security Forces
- R & D in Electronics

**(8) IT for Jobs:** It focuses on providing training to the youth in skills required for availing employment opportunities in the IT/ITES sector.

**(9) Early Harvest Programmes<sup>12</sup>**

The Early Harvest Programmes includes:

- a) IT Platform for Messages
- b) Government Greetings to be e-Greetings
- c) Biometric attendance
- d) Wi-Fi in All Universities
- e) Secure Email within Government
- f) Standardize Government Email Design
- g) Public Wi-Fi hotspots
- h) School Books to be eBooks
- i) SMS based weather information, disaster alerts
- j) National Portal for Lost & Found Children

**DISCUSSION AND ANALYSIS**

Indian telecom network is the second largest in the world after China<sup>13</sup>. The country has 971.01 million telephone connections, including 944.01 million wireless telephone connections. Overall tele-density in the country is 77.59%. Urban tele-density is 147.75%, whereas rural tele-density is 46.14%. The share of wireless telephones in total telephones is 97.22%. The share of private sector in total telephones is 89.15%. Number of Broadband connections is 85.74 million.

The country has increased telephone connections<sup>14</sup> to 1036.57 million from 971.01 million, wireless telephone connections increased to 1011.05 million from 944.01 million. Tele-density in the country increased to 81.85% from 77.59%. The rural tele-density increased to 49.82% from 46.14%. The number of Broadband connections increased to 131.49 million from 85.74 million at the end of November 2015.

The country has increased telephone connections<sup>15</sup> to 1124.41 million from 1036.57 million, Wireless telephone connections increased to 1099.97 million from 1011.05 million. Tele-density in the country increased to 87.85% from 81.85%. The rural tele-density increased to 52.97% from 49.82%. The number of Broadband connections increased to 218.43 million from 131.49 million at the end of October 2016.

The change in telephone connections is 115.79%, Wireless telephone connection is 116.52% and broadband connections is 254.75% during 2014-15 to 2016-17. This percentage change in telecom indicators indicate that people are going forward to Digital India initiatives of Government of India.

Telecom Development Indicators

Sl. No.	Item	At the end of					
		March'14	March'15	March'16	December'15	November'16	
1	Number of Telephones (In million)	Overall	933.02	996.13	1059.33	1036.57	1124.41
2		Wire line	28.50	26.59	25.22	25.52	24.44
3		Wireless	904.52	969.54	1034.11	1011.05	1099.97
4		Rural	377.78	416.08	447.77	434.23	465.20
5		Urban	555.23	580.05	611.56	602.34	659.22
6	Tele-density (Telephones per 100 persons)	Overall	75.23	79.36	83.40	81.85	87.85
7		Rural	44.01	48.04	51.26	49.82	52.97
8		Urban	145.46	149.04	154.18	152.57	164.13
9	%age share	Wireless	96.95	97.33	97.62	97.54	97.83
10		Public	12.87	10.07	10.26	10.12	10.42
11		Private	87.13	89.93	89.74	89.88	89.58
12	%age growth of Total Telephones – over previous year		3.90	6.76	6.34	6.75	8.47

Source: Government of India, Ministry of Communication and Information Technology, Department of Telecommunication, Annual Report 2016-17

The Table shows that percentage growth of total telephones over the years to 8.47 from 3.90 during March 2014 to November 2016.

“ERNET India has been focusing on addressing the ICT requirements of the highly deprived sections of the society like the rural and remote school children, farmers and the disabled<sup>16</sup>”. The state-of-the art technologies promotes the Digital India success.

“As consumers evolve in parallel and demand wide-spread seamless connectivity, it is inevitable that the home will eventually become their major hubs of cohesion”. One-third of all Indian respondents are early adopters of technology, potential for smart devices and services than any other country across Asia Pacific that begins digital transformation at home. Business in India are optimistic with 41% ready to embrace the interoperability of services and applications<sup>17</sup>. There is an opportunities for the business to formulate unique strategies to improve services, brand value with affordable pricing competition.

“In a short span, Digital India has enabled the roll-out of many new projects and products, covering the entire spectrum of e-governance in the country<sup>18</sup>”.

### OPPORTUNITIES OF DIGITALIZATION

Rashtriya Uchatat Shiksha Abiyan (RUSA) a unique and mobile app has launched Prakash Javadekar, Union HRD Minister in New Delhi that created 17 facilities in one go in 14 states to improve the quality of education to enable them create capable people and good citizens<sup>19</sup>. It enhances quality of education by improving smart classrooms, research lab infrastructure and other programmes to add value to the quality enhancement to students. The Ministry has increased the expenditure to the tune of Rs.2800cr and provided Rs.1300 in 2017-18 budget to create infrastructure in many universities, colleges and model colleges.

“There is a need for establishing POS Infrastructure and converting that into a profitable business case for merchants”. Digitalization helps merchant-less and a presence-less banking<sup>20</sup>. eMudhra has been instrumental in setting up the e-sign technology as part of the Digital India programme. It has more than 100 large customers including banks and governments.

Sensors, mobile app, cloud service and intervention are the major components of a telemedicine solution in rural and semi-urban India to reduce the diagnostic costs, innovative device for Primary Health Centers<sup>21</sup>.

Mobile technology will play a significant role in providing healthcare services, as per the report of PwC Indian growth in mHealth market will have revenue opportunity worth Rs.3000cr. and \$23 bn. for the world by 2017<sup>22</sup>. PwC identifies factors for that lead to the growth of mHealth includes, Government should encourage the mHealth to improve access, affordability of healthcare and providing incentives to private service providers offering mHealth services. Regulators has to address the limitation and standardization in providing the mhealth services. Healthcare Industry along with Government support has to accept this



service in the medical profession. Finally, user adoption will drive the exponential growth and opportunity in the mHealth market that can happen backed by medical professionals, affordability and availability of content and devices.

According to Gartner, The IT spending on the Indian public sector, i.e., the central government, the state governments and local governments expected to reach \$7.8 billion in 2017. The ERP, Supply chain management, CRM (Customer relationship management) and other applications tools expected to reach \$1 billion in 2017 with a growth of 15.7 per cent<sup>23</sup>. IT services includes business process outsourcing, consulting, hardware support, implementation and software support expected to reach \$2 billion in 2017 with a growth of 14.6 percent.

Internet penetration in rural areas stood at 13 per cent at the end of December 2016. There are 55000 villages untapped by telecom industry Digital India aims to promote digital literacy, enhancing infrastructure and e-governance<sup>24</sup>. Increase in broadband penetration in rural areas leads to increase in income level, thus drive the GDP growth of India. The Telecom operators has to explore new business and service model to tap the untapped opportunities in the rural India to provide data access at lower price, device manufacture has to ensure that supply of handset at cheaper price.

There is a great impetus to the telecom operators due to growing need of voice to data. An In-building solution if offered can avoid loss of signal, power radiation should be high to macro sites to provide efficient services inside buildings as it accounts for 60-65 per cent of mobile usage<sup>25</sup>. The Telecom Operators has an investment opportunity of \$2trillion in the next 30 years towards the Digital India and Smart Cities.

Telecom connectivity in rural areas empower nearly two-thirds of the population through Digital India and BharatNet that enhance rural service such as agricultural, education and healthcare sectors<sup>26</sup>. Digitalization empowers rural population in governance initiatives; generate new employment opportunities, e-banking, e learning.

The Government of India announced DigiGaon initiatives in the Union Budget 2017-18 aims to provide services using ICT applications in the fields of agriculture, digital payments, education, e-governance, Healthcare. The opportunities in the agriculture through e-agriculture with ICT intervention government introduced National e-Governance Plan (NeGP) to provide information on crops, farm machinery, nutrients, pests, seeds, soil health and weather to the farmers through CSCs, internet Kiosks and SMSs. electronic National Agriculture Market (e-NAM) has launched to remove information asymmetry between buyers and sellers<sup>27</sup>. So far, 13 States have joined e-NAM platform that provides information and services on commodity arrivals and prices, trade offers, material flows and brings transparency in auction process. This helps in tracking of actual demand and supply, reduces the transaction costs.

In 2014, a study conducted by Government revealed that nearly 60 percent of students in rural areas lacks reading skills and ability to solve simple mathematical problems at the age of 10. Nearly 50 percent of dropouts at the age of 14 to the existing above problems. Use of ICT solutions to provide virtual classroom in rural areas on soft skill courses on computer literacy and hardware software solutions<sup>28</sup>. A Massive Open Online Courses has planned to the students to pursue courses of their choice from any institution across the country.

### **CHALLENGES TO DIGITAL INDIA**

The challenges to the Government enterprises in managing ICT includes network downtime, lack of qualified IT staff to oversee day-to-day IT operations, integration of multiple technologies, need for timely upgradation of systems and increasing cost of technologies<sup>29</sup>. One of the major challenge the government enterprises face is threat of information security.

Due to growth from voice to data, the telecom operators need to invest in an efficient mobile backhaul networks to ensure voice and data connectivity<sup>30</sup>. Fiber infrastructure in India is about 20 per cent sites compared to developed countries is a bottleneck in rendering quality data services.

Some of the Countries such as Malaysia, US, China and UK has considered significance of telecom services as a tool for driving socio-economic development<sup>31</sup>. In the similar lines, the Government of India has to

support the Telecom Infrastructure in rural areas through some incentives, regulatory policies and effective measures to bridge the digital divide between rural and urban areas.

m-Kisan portal provides information and advisories services on agricultural and allied sectors by central and state government organization to farmers through SMSs in preferred language<sup>32</sup>. In order to reach to all sections of farmers the need of the hour is to create awareness through local bodies to uneducated farmers.

Digital payment has increased after demonetization of high currency and measure taken by Government of India towards “less -cash” society<sup>33</sup>. Efforts of Government of India on BHIM (Bharat Interface for Money) app created much awareness on urban areas but a challenge is on low smartphone penetration, banking infrastructure and internet connectivity in rural areas.

The Banking, Financial Services and Insurance enterprises have major risk from cyberattack. Security is concern in a technology-based network of financial environment as it contains information about businesses and customer<sup>34</sup>. With the increase in online transaction, there is a threat to theft of consumer data. Increase in consumer expectations poses another challenge for effective implementation of core banking solutions in a transparency and responsive manner. Change in the customer requirements and technological advancement has led the banks to integrate technology at the enterprise level has become a challenge task.

National Cyber Security Policy in 2013 was the first broad policy on cybersecurity has developed with increase in incidents of cybersecurity breaches. Some of the Institutes has created awareness of cybersecurity infrastructure at their business environment such as RBI, SEBI, IRDA and Aadhaar Act 2016 for the safety and security of Aadhaar numbers and other core biometric details. “Enterprises should move away from a simple “buy-and-deploy approach for cybersecurity and adopt solutions that address their specific industry security profile, business context, risk appetite and threat profile”.

The challenges faced by healthcare providers include high cost of diagnostic equipment and lack of trained professionals to provide medical services.

## CONCLUSION

Digital India initiatives of the Government of India has certain opportunities due to digitalization of e-governance services to the citizen maintains transparency, prevention of corruption, record maintenance at affordable cost with efficiency. There are good number of opportunities in terms of agriculture, Banking, Finance Insurance and services, healthcare. ICT integration of all these sectors with partner ensures the specific sectorial benefits of digitalization. Employment opportunities to the Youth in IT and ITES in customer relationship management, product development, enterprise resource planning, cloud computing storage services, mobile application development, and data analytics enhance the income level contributes to GDP of the country. There arises challenges with the opportunities includes broadband connectivity, device manufacturing, smartphone penetration, safeguard of application from cyberattack through a holistic framework on cybersecurity policy to dealt with theft of data of consumers, business entities. Government impetus to the private players in the field of mhealth, tele medicine, e-agriculture, infrastructure development can overcome the challenges to empower the citizen to acquire knowledge economy and engage with the government for effective consumer service. The Central Government, State Governments and Local Governmental bodies has to create awareness among citizens on the use of digitalization can results in achieving the aim of the Digital India i.e., empower citizen to knowledge economy and engage citizen-government in an efficient and effective manner with automation.

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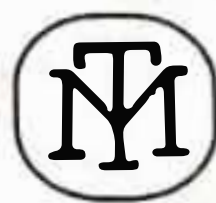
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# Prestressed Concrete Structures

The book is designed to serve as the first course for civil engineering students and a guide to design engineers. It is an outcome of more than 25 years of teaching of the subject to IIT Kanpur students and experience of field problems. Three basic methods of design, namely Working Stress Design (WSD), Limit State Design (LSD) and Ultimate Strength Design (USD) which are in practice are dealt with. The Limit State Design being the latest, very extensive presentation of the method applied to fully and partially prestressed concrete structures is made. An introduction to the probability failure analysis leading to the limit state concepts is illustrated along with some statistics of observations. Full and partial prestress designs based on the latest codes of practice are explained with a number of examples on variety of elements, such as beams, ties, columns, slabs, shells and bridges. Detailed design examples on minimum weight design of beams is presented to enable the students and designers to look for rational solutions. Cost analysis of components of materials and formwork in beams is illustrated. Some of the key features of the book are:

1. Discussion on limit state design of full and partial prestressed concrete beam.
2. Detailed examples of design of small to long span beams, water tanks, cylindrical shells, folded plates, domes and bridges are illustrated.
3. Latest codes of practice are incorporated and comparison of the designs based on different methods and illustrated.
4. Economical analysis and the influence of design variable and methods on cost are discussed.
5. Useful design aids for beams, cylindrical shells are given in appendices.
6. A set of objective questions which will enable a student or an engineer to find most rational solutions and concepts are listed in the appendix.

**Dr. Pasala Dayaratnam**, Ph.D. (1962) in Civil Engineering, University of Colorado, Boulder, USA joined IIT Kanpur in 1965 after teaching at Andhra University, Waltair with brief experience in Andhra Pradesh PWD. He taught variety of subjects at undergraduate and postgraduate levels both at Andhra University and at IIT Kanpur for about 30 years, guided research students and a number of sponsored research projects. He has been a consultant in design of complex industrial structures, tall buildings, towers, bridges and shell structures. As a member of Bureau of Indian Standards Committees, he is associated with development of many codes of practice in structural engineering. He has experimented on teaching methods, evaluation procedures and testing sequences. He authored nine textbooks in structural engineering, 110 research papers and about 150 reports on design, testing and evaluation. Dr. Dayaratnam is a recipient of awards during his entire student career from high school to Ph.D. level and some of his research publications have also won awards.

**Dr. Pasala Sarah**, Professor and Dean R&D, Vardhaman College of Engineering, is an accomplished academician with over 20 years of teaching experience blended with additional experience in Research & Administration. The Research experience includes execution of projects from DRDO, BARC in identifying materials for different needs of the Industry. The administrative experience includes Vice Principal, Dean and Head Portfolios in large Engineering College of over 2500 students. Dr. Sarah has published over 50 Papers in International and National Journals and Conferences and has organized International and National Conferences on Nanomaterials, Nanotechnology and Composite Materials. Dr. Sarah has written 4 Text books. Dr. Sarah has unique experience of blending her core competency of Materials with modern technological practices which will enable the students to innovate, Adapt to change and Adopt to the new technologies.

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## Brick and Reinforced Brick Structures

Brick and brick masonry is one of the most durable and widely used building and structural materials. This book has been developed not merely as a textbook for students but also as a guide to designers and builders. The book incorporates feedback from students while a course on structural design was taught, experience in testing of materials at the IIT Kanpur, and author's design expertise as a consultant. Many brick buildings have been analysed and their statistics have been presented. A certain amount of research component based on a sponsored project from the Department of Science and Technology, New Delhi has been added to enable engineers to get more depth in the subject. The first two chapters are an introduction to the properties of bricks, mortar and masonry. The histograms and statistical analyses give an insight of the chapter of brick and brick masonry in some parts of India. The third chapter presents the design of load-bearing brick walls and columns, and design of retaining walls. Design of reinforced brick slabs and beams is presented in chapter four. Some problems associated with reinforced brick construction have also been highlighted.

**Dr. Pasala Dayaratnam**, Ph.D. (1962) in Civil Engineering, University of Colorado, Boulder, USA joined IIT Kanpur in 1965 after teaching at Andhra University, Waltair with brief experience in Andhra Pradesh PWD. He taught variety of subjects at undergraduate and postgraduate levels both at Andhra University and at IIT Kanpur for about 30 years, guided research students and a number of sponsored research projects. He has been a consultant in design of complex industrial structures, tall buildings, towers, bridges and shell structures. As a member of Bureau of Indian Standards Committees, he is associated with development of many codes of practice in structural engineering. He has experimented on teaching methods, evaluation procedures and testing sequences. He authored nine textbooks in structural engineering, 110 research papers and about 150 reports on design, testing and evaluation. Dr. Dayaratnam is a recipient of awards during his entire student career from high school to Ph.D. level and some of his research publications have also won awards.

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# I - B.Sc. (Electronics) / Semester II

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### UNIT-I

**PN JUNCTION DIODES:** P-N junction Diode, Depletion region, Barrier Potential, Working in Forward and Reverse bias condition – Junction capacitance, Diode current equation - Effect of temperature on reverse saturation current – Construction, Working, V-I characteristics and simple applications of varactor diode, Zener diode and Tunnel diode.

*Notes: These topics are covered in Unit-3.*

### UNIT-II

**BIPOLAR JUNCTION TRANSISTOR AND ITS BIASING (D.C):** Introduction, Transistor Construction, Operation, and characteristics of CB, CE and CC-Configurations. Complete hybrid equivalent model, Transistor as a switch.

**BJT Biasing:** Fixed-Bias Circuit, Emitter-Stabilized Bias Circuit, Voltage-Divider Bias, Bias Stabilization.

*Notes: These topics are covered in Unit-4.*

### UNIT-III

**FIELD EFFECT TRANSISTORS, UJT & SCR:** Introduction, Construction, Operation and Characteristics of FET/JFET, Drain and Transfer characteristics, Depletion-type, and Enhancement-Type MOSFETs.

**FET Biasing:** Fixed-Bias Configuration, Self-Bias Configuration, Voltage-Divider Biasing, UJT construction-working, V-I characteristics, UJT as a Relaxation oscillator.

**Silicon Controlled Rectifier (SCR):** Structure and working of SCR. Two transistor representation, Characteristics of SCR. Experimental set up to study the SCR characteristics, Application of SCR for power control.

*Notes: These topics are covered from Unit-5 and 7.*

### UNIT-IV

**PHOTO ELECTRIC DEVICES:** Light-Emitting Diodes (LEDs), IR Emitters, Photo diode, Photo transistors, Structure and operation of LDR and Opto-Isolators.

*Notes: These topics are covered in Unit-8.*

### UNIT-V

**POWER SUPPLIES: Rectifiers:** Half wave, full wave and bridge rectifiers-Efficiency-ripple factor- Regulation, Types of filter-choke input(inductor) filter, shunt, L-section &  $\pi$ -section filters. Three terminal fixed voltage I.C.regulators (78XX and 79XX)- Principle and working of SMPS (switch mode power supplies).

*Notes: These topics are covered in Unit-9.*



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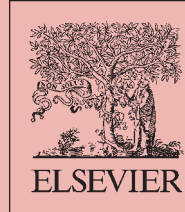
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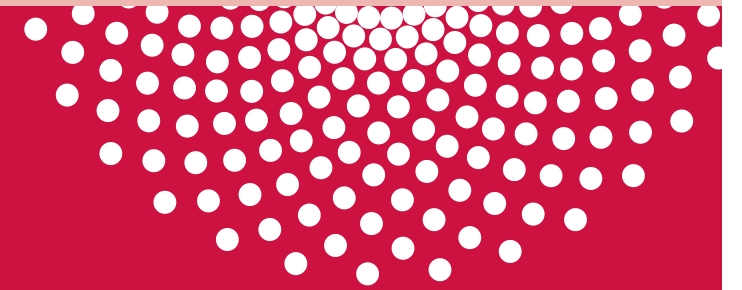


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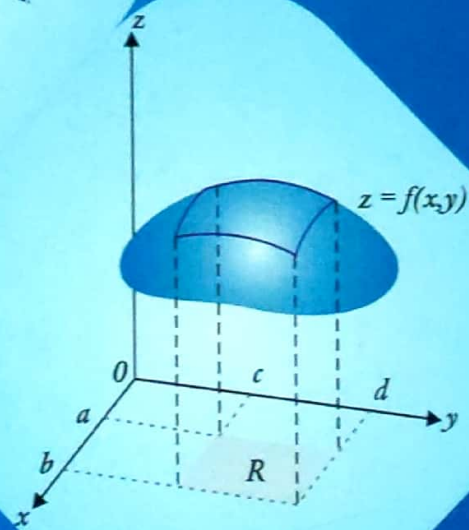
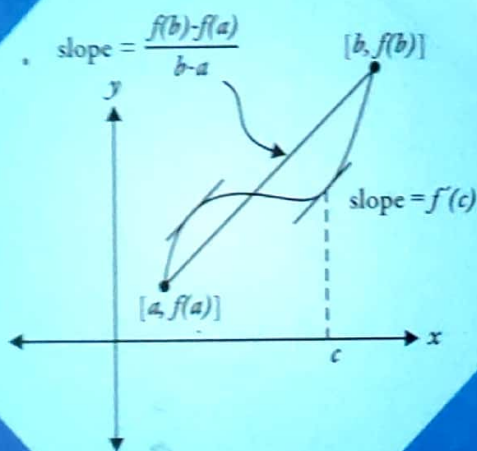
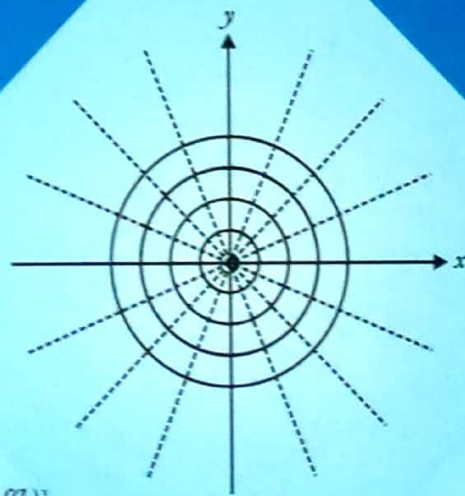
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# ENGINEERING MATHEMATICS – I



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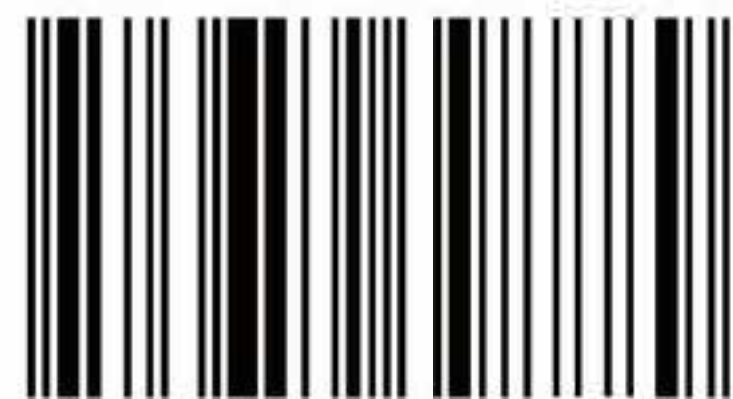
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