



NUTAN MAHARASHTRA INSTITUTE OF ENGINEERING & TECHNOLOGY, PUNE

RESEARCH AND DEVELOPMENT (R&D)



BOOK / BOOK CHAPTERS

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PCET'S and NMVPM's

Nutan Maharashtra Institute of Engineering and Technology

About NMVPM

Nutan Maharashtra Vidya Prasarak Mandal is a highly respected education society in Maharashtra and is credited with starting national education schools in the Maval Region of Pune district over 100 years ago. The great freedom fighter Lokmanya Bal Gangadhar Tilak was the founder member of the Mandal and was the Chairman of its Governing Body for almost 12 years. The late Hon. Vishnu G. Vijapurkar was the first Secretary of “Samarth Vidyalaya” – the first national school started by the Mandal. He was imprisoned by the British authorities for his so called anti British activities. Vishnu Ganesh Pingle was a Vibrant Student of Samarth Vidyalaya. He became a leader of the Gaddar Party of Lala Hardayal and was hanged by the British for his revolutionary activities when he was barely 26. The Mandal and its schools has such rich heritage.

During the first 80 years, the Mandal established good Primary and Secondary Schools in the Maval region with the sole intention of providing education to the youth of relatively backward area of the Pune District. In 1998, it established a Polytechnic College and during the last decade, over 1000 students received quality technical education in the Maval region. The Society (Mandal) has thus helped the nearby community in raising its economic and education standard. The progressive, dynamic and dedicated management of the Nutan Maharashtra Vidya Prasarak Mandal has decided to start a four year degree engineering college from academic year 2008-2009.

About NMIET

NMIET (Nutan Maharashtra Institute of Engineering and Technology) was founded in 2008. NMIET stands committed to provide quality technical education to its students.”Nutan Maharashtra Institute of Engineering & Technology (NMIET)” is approved by All India Council for Technical Education (AICTE), New Delhi and Director of Technical Education (DTE), Government of Maharashtra. It is affiliated to Pune University. It is a part of Pune's Savitribai Phule Pune University (SPPU). There are four undergraduate courses offered by the institute. Computer Engineering, Information Technology, Mechanical Engineering, Electronics, and Telecommunication Engineering are some of the undergraduate courses available.

Vision of Institute

To be a notable institution for providing quality technical education and ensuring ethical, moral and holistic development of students.

Mission of Institute

To nurture engineering graduates with state of the art competence, professionalism and problem solving skills to serve needs of industry as well as society.

Vision Research and Development

To be recognized as a creative and innovative department.

Mission Research and Development

Strengthening research culture thorough quality research publications and IPR on latest technology.

Objectives Research and Development

- To promote research in newly emerging and challenging frontier areas of Engineering & Technology.
- To encourages the students and faculties to undertake the research in emerging areas including multidisciplinary fields.
- To create awareness and improve number of Patents & IPR.
- To enhance the research output of the institute by publishing research paper in referred journals and reputed conferences.
- To organize various workshops/ seminar/ trainings related to promotion of research.

About the Research and Development Department

The Research and Development (R&D) Department at Nutan Maharashtra Institute of Engineering and Technology (NMIET) stands as a proud emblem of innovation and technological progress within the institution. At the core of NMIET's commitment to expanding the horizons of knowledge and fostering a culture of creativity, the R&D Department serves as a linchpin, propelling academic excellence and making substantial contributions to the broader scientific and engineering realm.

The R&D Department at NMIET boasts cutting-edge facilities and is staffed by an energetic cadre of researchers, scholars, and seasoned faculty members. Its central mission is to cultivate a research environment that nurtures curiosity, exploration, and collaborative learning. Through the pursuit of pioneering research, the department endeavors to address real-world challenges, effectively bridging the gap between theoretical insights and practical applications.

In its relentless quest for distinction, the R&D Department concentrates on a multitude of interdisciplinary research domains spanning engineering, technology, and the allied sciences. This expansive scope ensures that the outcomes of their research endeavors possess extensive implications and offer potential contributions to diverse industries and societal concerns.

Moreover, the R&D Department is a strong advocate for the active engagement of both faculty and students in research undertakings. It opens avenues for students to participate in hands-on research projects, thereby fostering a culture of innovation from the undergraduate level onwards. This approach not only hones the technical acumen of students but also instills a problem-solving mentality that transcends the boundaries of traditional classroom learning.

Collaboration stands as a cornerstone of the R&D Department's ethos. It actively seeks partnerships with industries, research institutions, and fellow academic entities to facilitate the exchange of knowledge and amplify its impact. By forging robust alliances, NMIET's R&D Department harnesses external expertise and resources, thereby enriching the quality and breadth of its research pursuits.

In summation, the Research and Development Department at Nutan Maharashtra Institute of Engineering and Technology stands as a symbol of intellectual inquisitiveness, innovation, and transformative research. With its emphasis on groundbreaking projects, student involvement, and collaborative initiatives, the department continues to make an enduring impression on the academic and technological landscape, making substantial contributions to the advancement of both society and industry.

From the President's Desk:



Dear Esteemed Members of the NMVPM Family,

I am delighted to address you through the pages of Research & Development, the remarkable Research and Development magazine of the Nutan Maharashtra Institute of Engineering and Technology (NMIET) Talegaon. This publication stands as a testament to our unwavering commitment to advancing the frontiers of knowledge, innovation, and research.

In today's fast-paced world, the pursuit of knowledge and innovation is more critical than ever before. Research and Development (R&D) not only drive technological advancements but also serve as the bedrock of progress in society. Research & Development, our R&D magazine, exemplifies our dedication to fostering a culture of inquiry, discovery, and collaboration within NMIET.

Within these pages, you will find a compendium of valuable insights, groundbreaking discoveries, and the impressive achievements of our students, faculty members, and researchers. This magazine encapsulates the essence of NMIET's research ecosystem and underscores our commitment to pushing the boundaries of engineering and technology.

Our researchers have been working diligently on projects that have the potential to shape industries, enhance human lives, and address pressing global challenges. From the seeds of innovation to the fruition of transformative ideas, each article in Research & Development reflects the diligence, expertise, and passion of the NMIET community.

I extend my heartfelt appreciation to our faculty members, students, and researchers who have contributed their time, energy, and expertise to this publication. Your dedication to advancing knowledge and pioneering solutions is commendable, and it is your collective efforts that elevate NMIET to be a renowned hub of academic excellence.

Thank you for your steadfast support of NMIET's mission to nurture intellectual growth, facilitate research excellence, and prepare the leaders of tomorrow. Together, we shall continue to achieve new heights and make a meaningful impact on the world through our collective dedication to education, research, and development.

Warm regards,

Hon. Shri. Sanjay (Bala) Vishwanath Bhegade
Ex Minister (Maharashtra Govt.),
President, Nutan Maharashtra Vidya Prasarak Mandal (NMVPM).

From the Director's Desk:



Dear Esteemed Members of the NMIET Family,

It is with great enthusiasm and pride that I address you through the pages of Research & Development, our cherished Research and Development magazine. As the Director of Nutan Maharashtra Institute of Engineering and Technology (NMIET), it is my privilege to introduce this platform that encapsulates the spirit of inquiry and innovation that defines our institution.

R&D stands as a beacon of inspiration, representing the collective dedication and unwavering commitment of our faculty, students, and researchers to the pursuit of knowledge and excellence. In today's fast-paced world, the importance of research and development cannot be overstated, and this magazine is a testament to our institution's leadership in this arena.

Within these pages, you will discover a treasure trove of ideas, discoveries, and projects that epitomize NMIET's commitment to pushing the boundaries of knowledge in the fields of engineering and technology. From pioneering innovations to transformative solutions for real-world challenges, each article in Research & Development reflects the passion, expertise, and dedication of our NMIET community.

At NMIET, we understand that our journey doesn't end with the publication of Research & Development—it is an ongoing endeavor to nurture intellectual growth, foster innovation, and prepare our students to become leaders in their respective fields. I have no doubt that our institution will continue to scale new heights in research and development, further cementing our reputation as a center of academic excellence.

I extend my sincere appreciation to the entire NMIET community for your unwavering support and dedication to our institution's mission. Together, we will continue to make meaningful contributions to the world through education, research, and innovation.

Thank you for being a part of our journey. Let us embrace the boundless opportunities that research and development present, for it is through our collective efforts that we will create a brighter and more promising future.

Warm regards,

Dr. Girish Desai, Director,

Nutan Maharashtra Institute of Engineering and Technology

From the Principal's Desk:



Dear Students, Faculty, and Researchers,

It gives me immense pleasure to extend my warm greetings to all of you through the pages of Research & Development, our esteemed Research and Development magazine. As the Principal of Nutan Maharashtra Institute of Engineering and Technology (NMIET), it fills me with pride to introduce this platform dedicated to showcasing the intellectual prowess and innovation that define our institution.

Research & Development is a testament to our relentless pursuit of knowledge and our unwavering commitment to research and development. It stands as a beacon of inspiration for the entire NMIET family, serving as a testament to our collective dedication to excellence.

In today's rapidly evolving world, research and development are the driving forces behind progress and innovation. They are the engines that power advancements in engineering and technology, shaping the future of industries and societies alike. Through Research & Development, we have the opportunity to celebrate and share the outstanding contributions of our faculty, students, and researchers in this dynamic field.

In the pages of this magazine, you will discover a treasure trove of insights, discoveries, and projects that underscore our institution's commitment to pushing the boundaries of knowledge. From groundbreaking technologies to innovative solutions for real-world challenges, each article in Research & Development reflects the dedication, passion, and expertise of our NMIET community.

I would like to express my deep appreciation to our talented faculty members, diligent students, and passionate researchers who have contributed to Research & Development's success. Your hard work and commitment to advancing research in diverse areas of engineering and technology are truly commendable, and they play a pivotal role in shaping our institution's identity.

I am confident that NMIET will continue to scale new heights in the realm of research and development. Through our unwavering dedication to education and innovation, we have the power to shape a brighter future for ourselves and for the world at large.

Dr. Vilas Deotare,

Principal, NMIET

From the R&D Dean's Desk:



Dear Colleagues, Researchers, and Innovators,

I am thrilled to address you through the pages of Research & Development, our cherished Research and Development magazine. As the R&D Coordinator of Nutan Maharashtra Institute of Engineering and Technology (NMIET), I am honored to introduce this platform that serves as a testament to our institution's dedication to research, innovation, and academic excellence.

Research & Development embodies the spirit of curiosity and discovery that drives our institution's research endeavors. In today's rapidly evolving world, research and development are at the forefront of technological advancements and societal progress. This magazine is a celebration of our collective commitment to pushing the boundaries of knowledge.

Within the pages of Research & Development, you will find a wealth of insights, discoveries, and projects that exemplify NMIET's commitment to excellence in engineering and technology. From groundbreaking research to innovative solutions addressing real-world challenges, each article in Research & Development reflects the passion, expertise, and dedication of our NMIET community.

I want to extend my heartfelt gratitude to our dedicated R&D Coordinators, esteemed faculty members, dedicated students, and passionate researchers who have contributed to the success of Research & Development. Your tireless efforts in advancing the frontiers of knowledge are truly commendable and are the driving force behind our institution's continued growth and impact.

I extend my sincere appreciation to the entire NMIET community for your dedication and support. Together, we will continue to make meaningful contributions to the world through education, research, and innovation. Let Research & Development serve as a testament to our commitment to excellence and our unwavering pursuit of knowledge.

Thank you for your invaluable contributions to our research and development endeavors. Together, we will continue to explore new horizons and pave the way for a brighter and more innovative future.

Warm regards,

Prof. Pritam Ahire

R&D Dean, NMIET.

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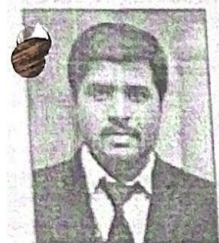
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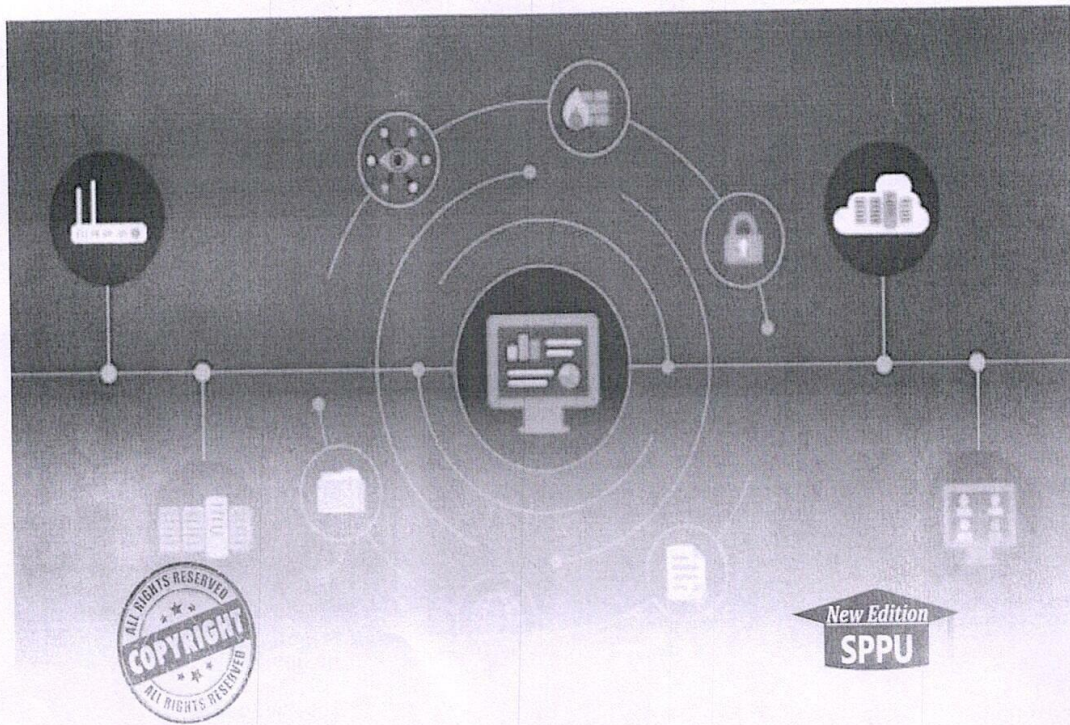


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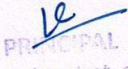
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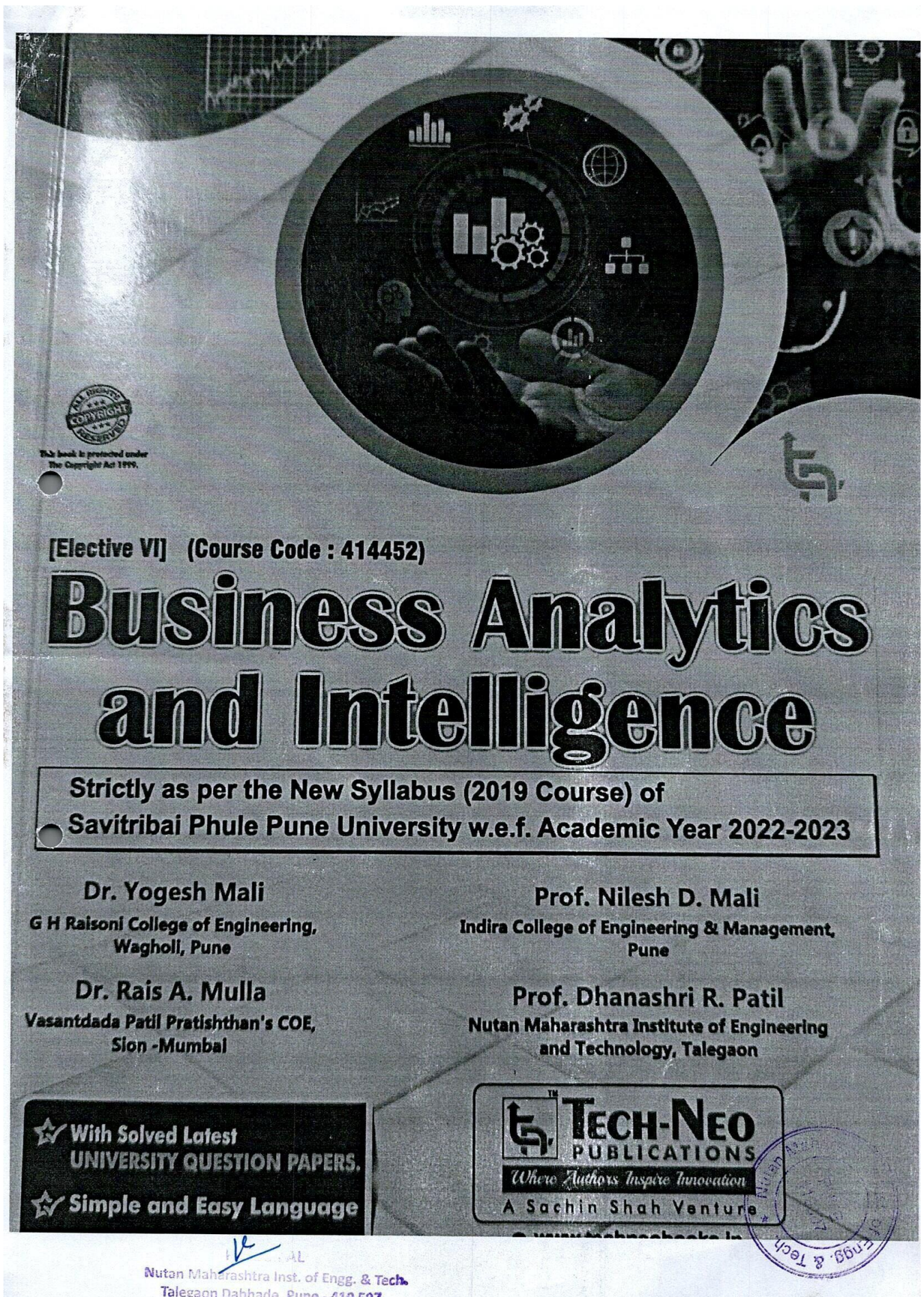
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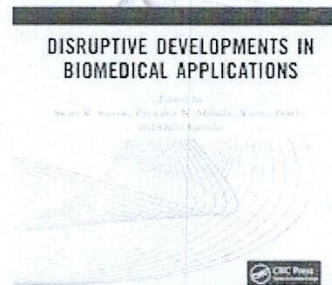
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14 Fetal Electrocardiogram Extraction Using Adaptive Filters Approach

Manjiri A. Ranjanikar, Sagar V. Joshi, Jaishri M. Waghmare, Swati V. Shinde, and Rachana Y. Patil

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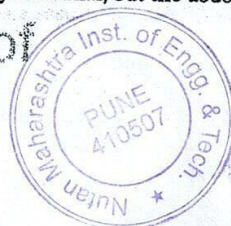
14.1 INTRODUCTION

Congenital heart abnormalities are one of the primary birth defects and the main reason for death from birth defects. The shape of cardiac electrical signals shows up in almost all cardiac abnormalities. The non-invasive analysis of fetal cardiac signals can be a useful tool for monitoring the unborn heart's health. This could be used to detect heart problems early on. The electrical potential created in connection with heart action is represented graphically by the ECG signal. It is one of the primary used physiological signals in medical backgrounds. A FECG signal can be used to determine the well-being and status of the fetus, much as it can be done in adults. Fetal electrocardiography, Doppler ultrasound, and fetal magnetocardiography are non-invasive fetal monitoring procedures. Doppler ultrasound is the most often utilized approach since it is inexpensive and easy to use. However, because this approach generates an averaged heart rate, it cannot provide beat-to-beat variability.

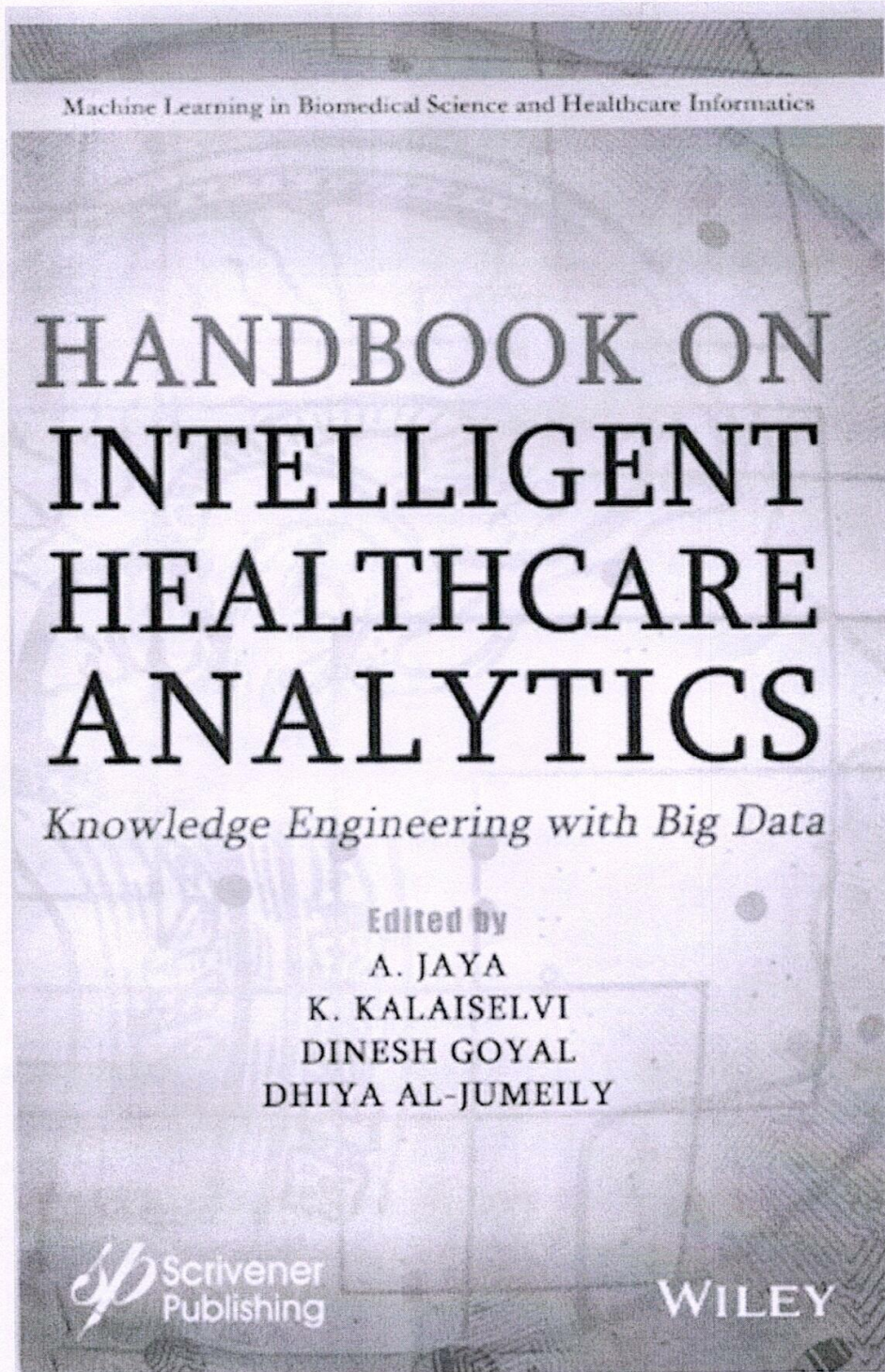
The advantage of a fetal ECG is that it can detect beat-to-beat variability. There are numerous procedural issues with non-invasive FECG extraction. Different forms of interference, such as maternal electrogram (MEMG), maternal electrocardiogram (MECG), baseline drift, and power line interference of 50 Hz contaminate the FECG signal. The extraction of FECG is stimulating because of the low amplitude of the signals, various forms of noise, and overlapping frequencies of the mother and FECG. The basic goals of electronic fetal monitoring are to abstract and examine the FECG signal. Digital signal processing methods were used extensively in the extraction of the neonatal ECG signal. The abdominal ECG signal (AECG) is thought to be a nonlinear mixture of the MECG, FECG signal, and numerous interference signals. The FECG is derived from two signals collected on the mother's skin in the thoracic and abdominal regions. The thoracic electrocardiogram (TECG) is thought to be nearly entirely maternal, but the abdominal electrocardiogram

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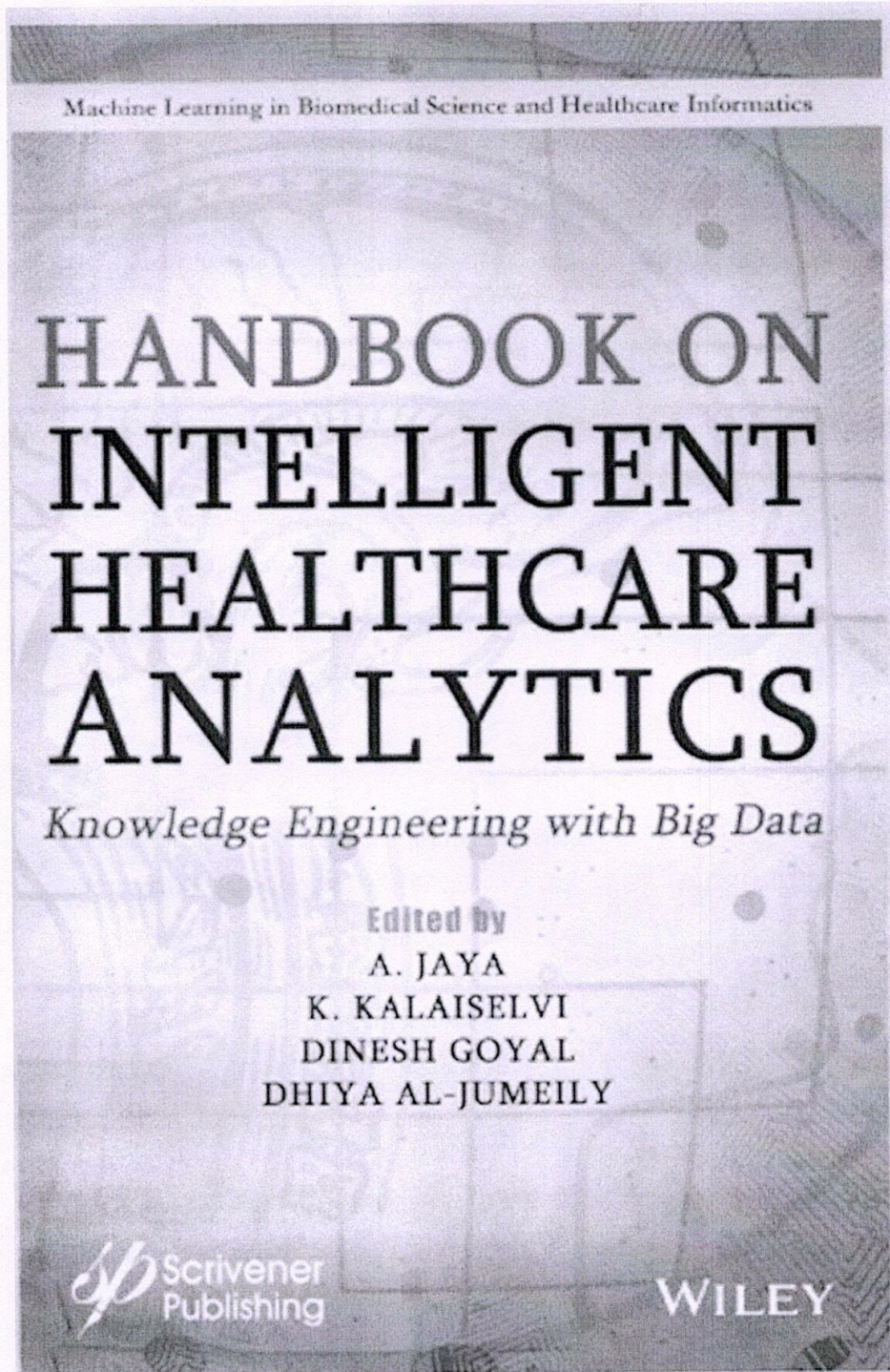


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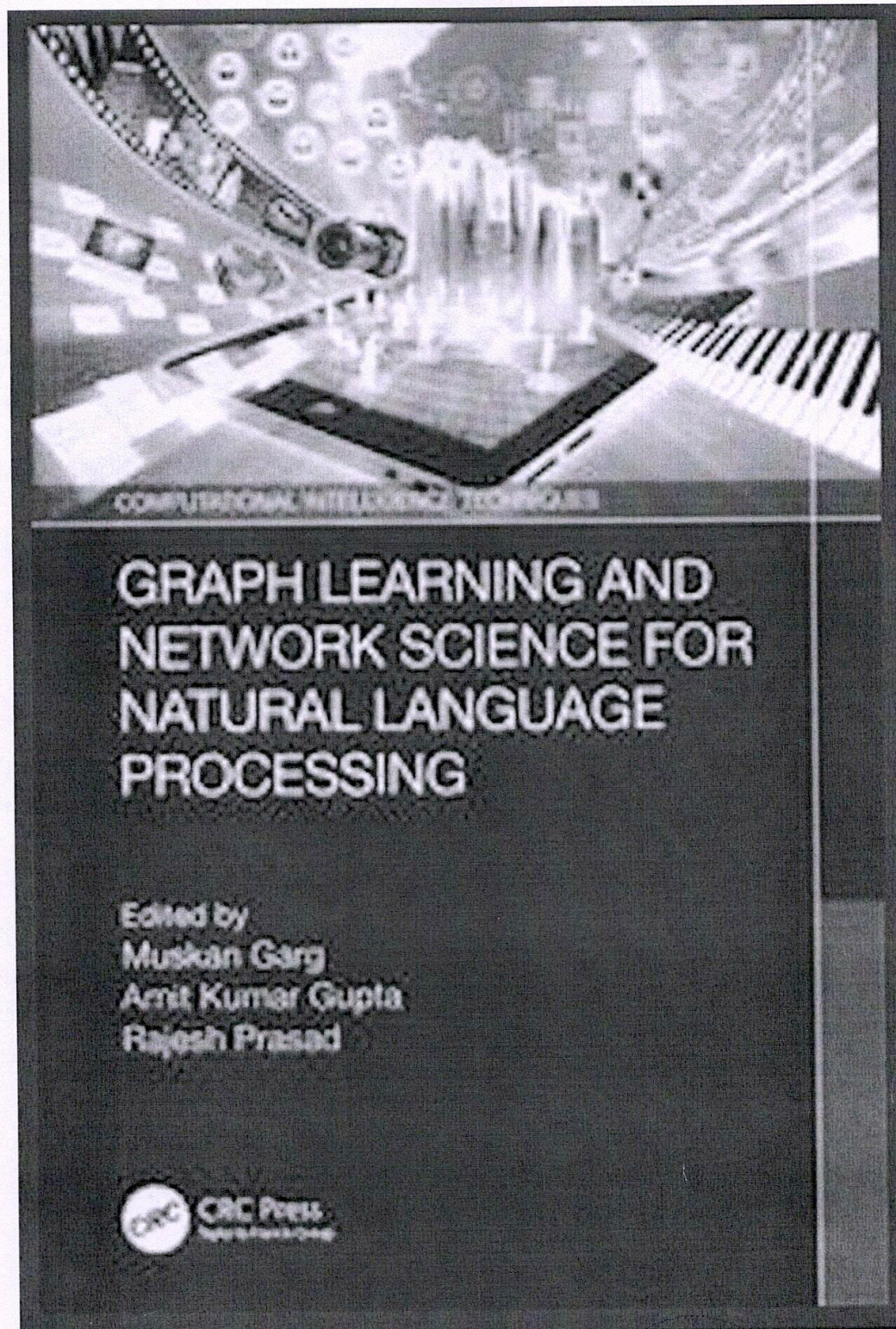

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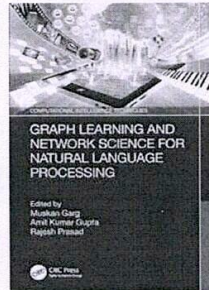



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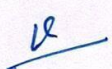


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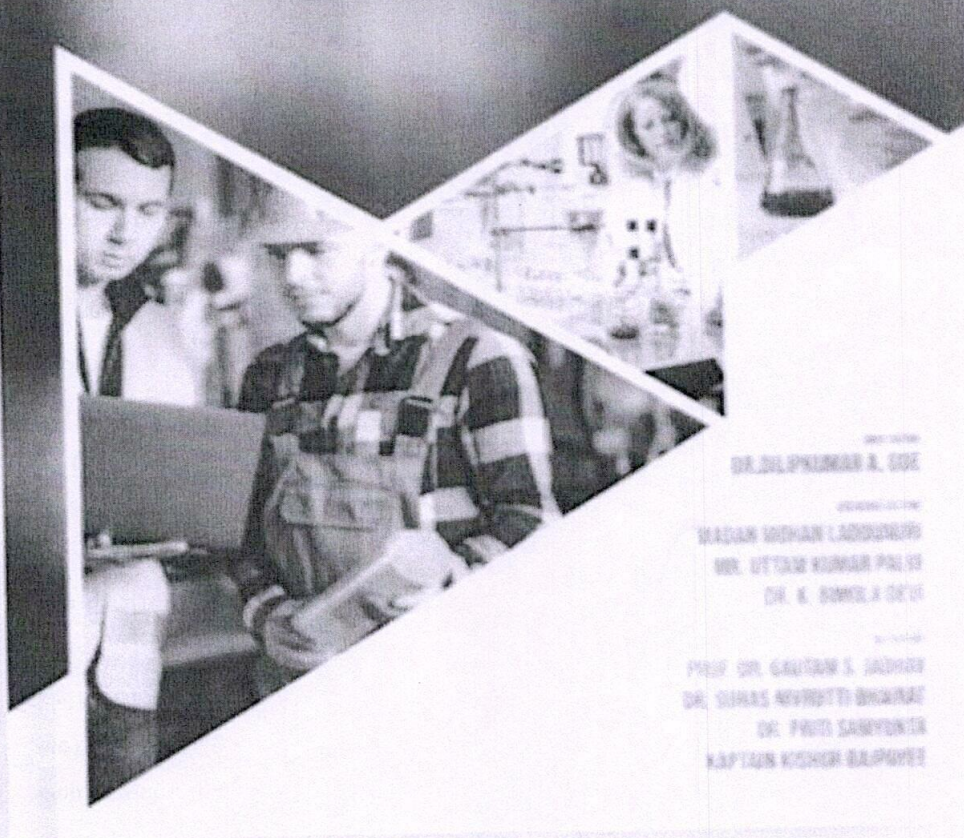
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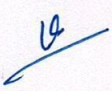
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Die manufacturing is one of most Accurate and High production methods of manufacturing. So, design of die is very crucial thing in this book progressive die for an industrial part is designed. In single stroke of press 3 operations are going to performed on 3 different stations. At each station required die and punch set along with supporting parts for die are designed with proper safety taken into account.

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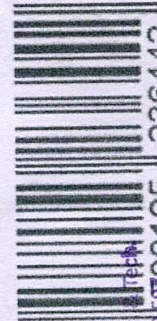
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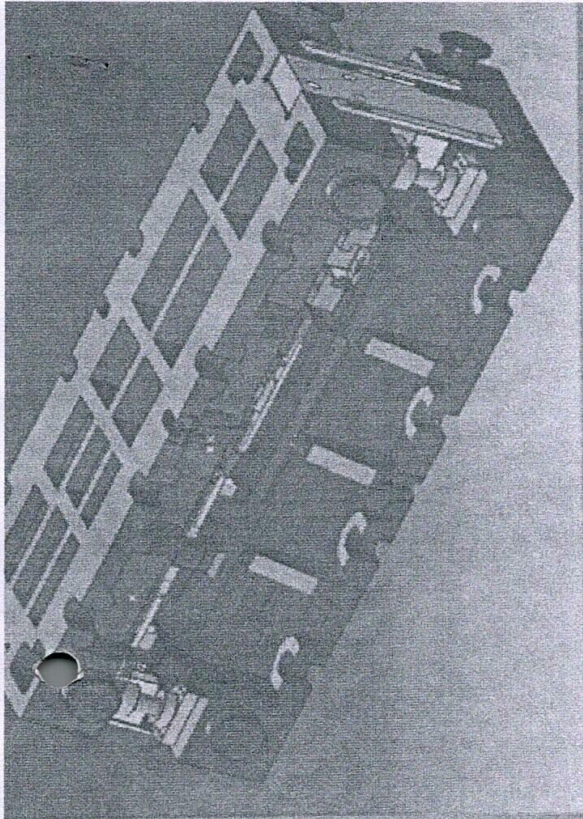
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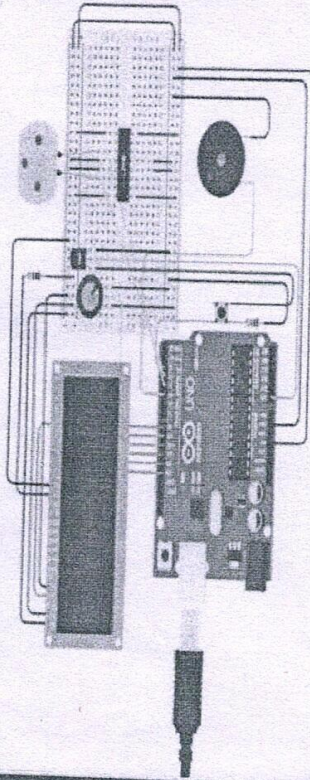
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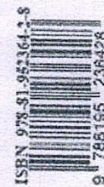


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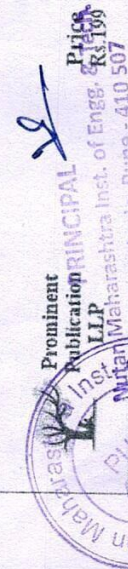
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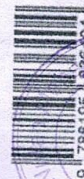
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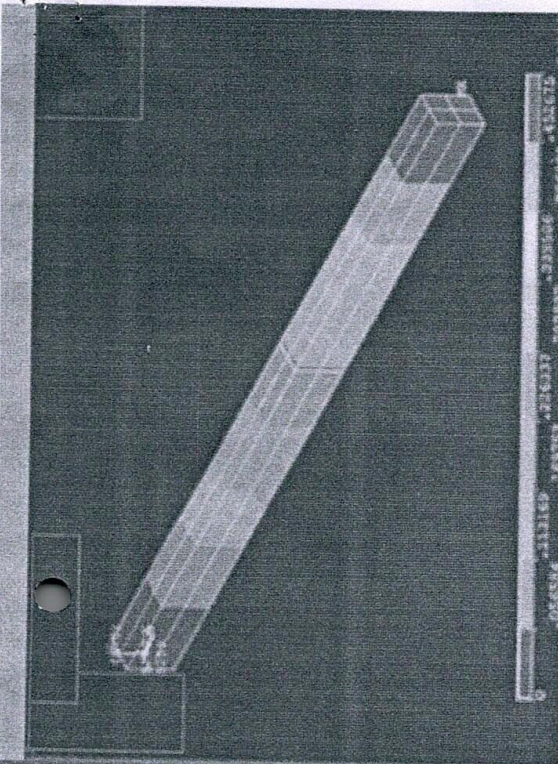
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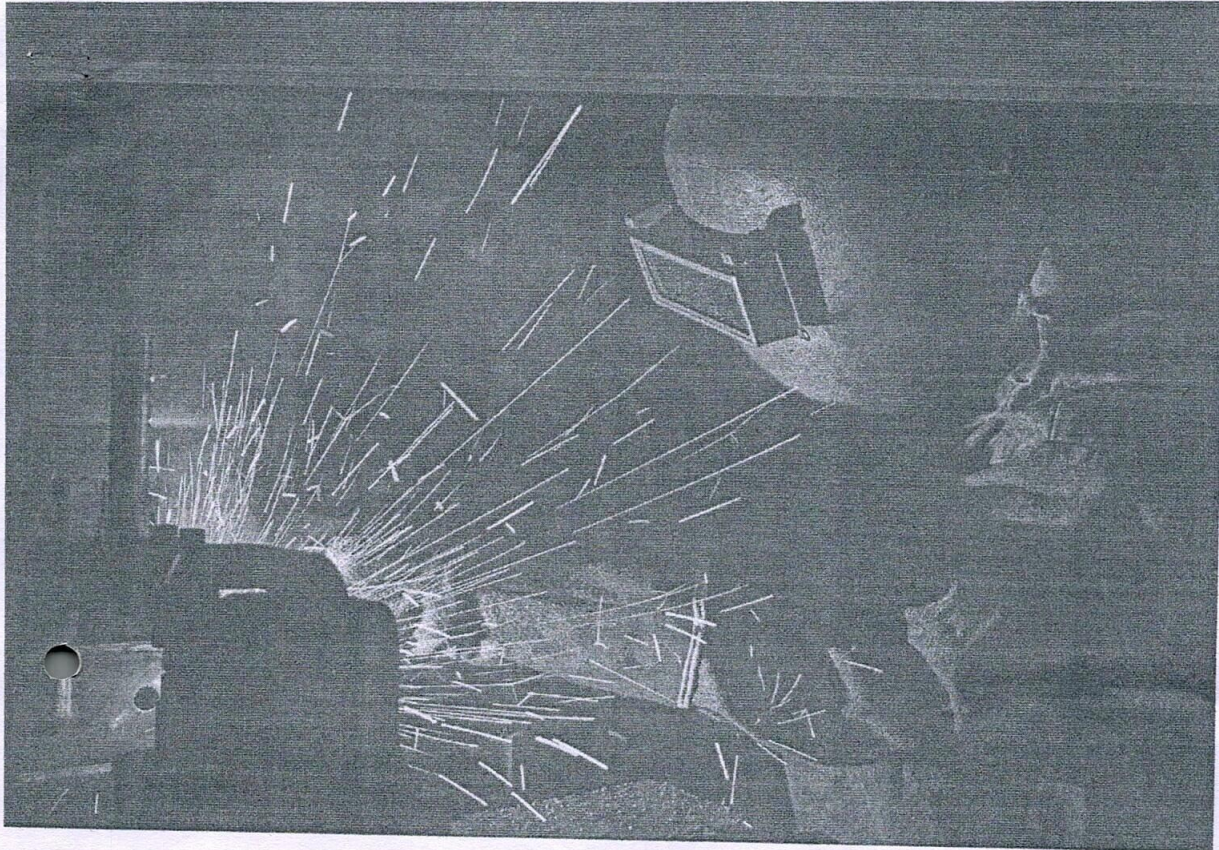
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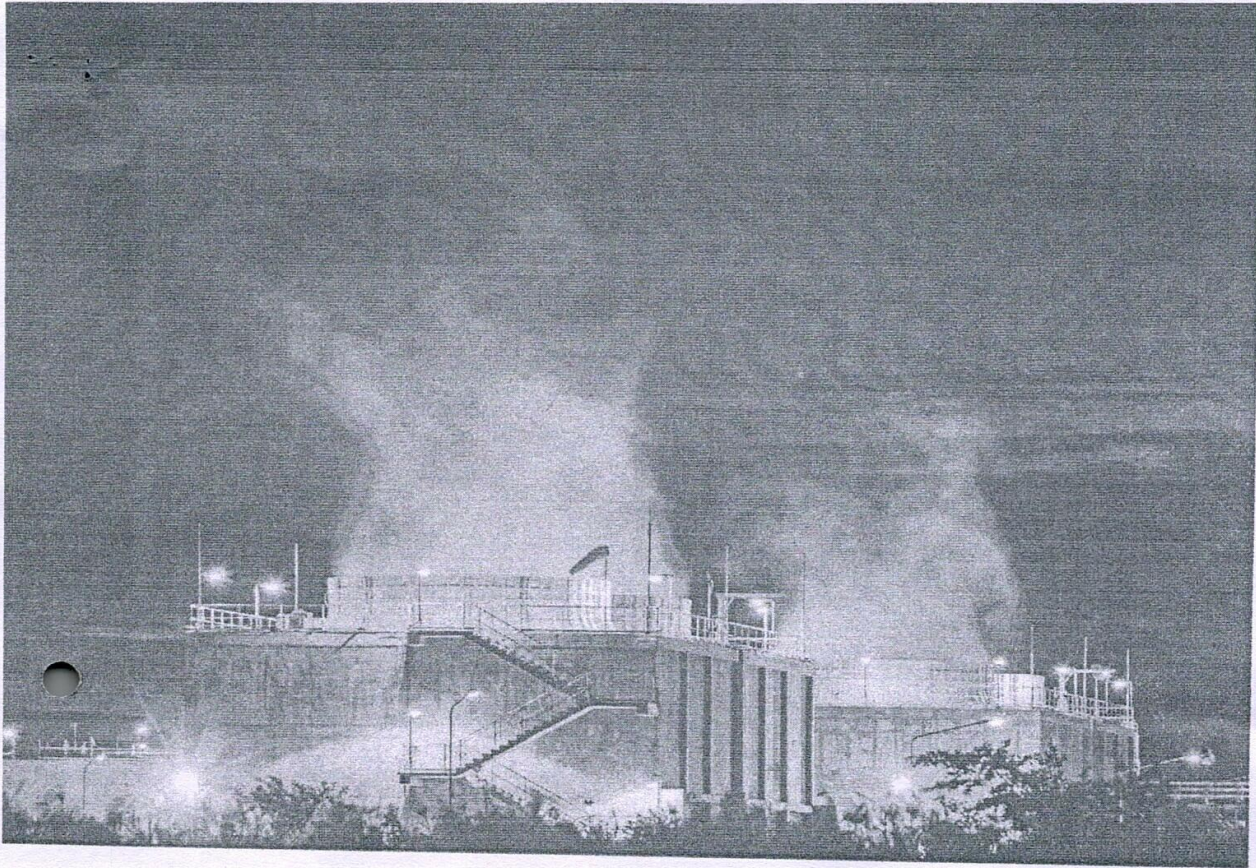


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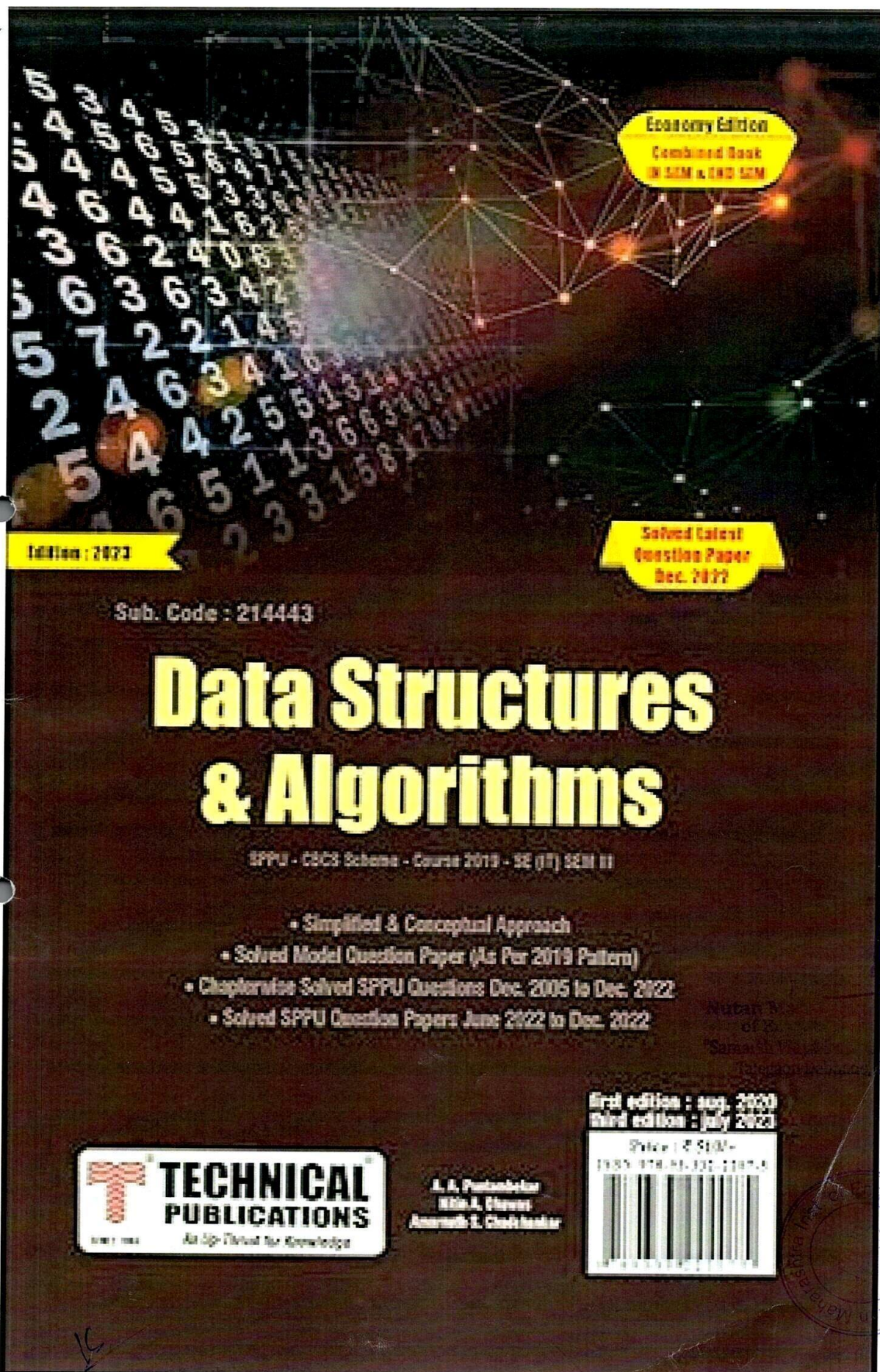
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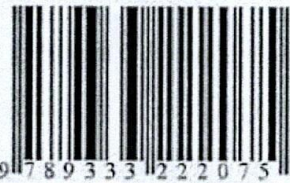
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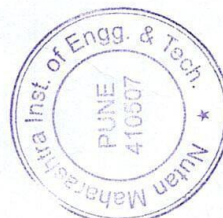
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