

The Basics of AI and IoT A Beginner's Handbook

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The Basics of AI and IoT A Beginner's Handbook

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Preface

Welcome to "**The Basics of AI and IoT: A Beginner's Handbook.**" In this rapidly evolving digital age, understanding the fundamental concepts of Artificial Intelligence (AI) and the Internet of Things (IoT) is essential. These technologies have the potential to transform industries, enhance our daily lives, and shape the future of humanity. However, delving into the world of AI and IoT can be daunting, especially for beginners. This handbook is designed to demystify these complex topics and provide you with a clear, concise, and beginner-friendly introduction.

Whether you are a student, an entrepreneur, a tech enthusiast, or simply someone curious about the intersection of AI and IoT, this book aims to empower you with foundational knowledge. We have explored the basic principles, applications, and real-world implications of AI and IoT, breaking down intricate concepts into easily understandable explanations. Through practical examples and case studies, you will gain insights into how AI and IoT are revolutionizing various sectors, from healthcare and manufacturing to transportation and everyday devices.

This handbook is structured to cater to readers with varying levels of technical expertise. Whether you have a background in computer science or no prior knowledge of programming, you will find this book accessible and engaging. Each chapter builds upon the previous one, guiding you through the essentials of AI and IoT in a logical and systematic manner.

We encourage you to approach this book with curiosity and an open mind. Embrace the wonders of AI and IoT, and discover how these technologies are shaping the world around us. By the end of this journey, you will have a solid understanding of the foundational concepts, enabling you to explore more advanced topics and applications in the exciting fields of Artificial Intelligence and the Internet of Things.

Acknowledgement

We express our heartfelt gratitude to all those who have supported and inspired us throughout the journey of writing this book. First and foremost, we would like to thank our family and friends for their unwavering encouragement and understanding during the long hours we spent researching and writing. Their belief in us kept us going, and we are profoundly grateful for their love and support.

We extend our sincere appreciation to everyone who provided us with insightful information which made this book possible. The advancements in artificial intelligence have opened new horizons in our understanding of technology, and we are honoured to be a part of this transformative era.

We are deeply thankful to the experts and researchers in the fields of AI and IoT whose work paved the way for this book. Their contributions have been invaluable in shaping the content and ensuring its accuracy. We are indebted to the countless individuals and organizations whose innovative ideas and creations continue to push the boundaries of what is possible in the realm of artificial intelligence and the Internet of Things.

Special thanks to our editor and the publishing team for their guidance, patience, and expertise. Their feedback and suggestions have been instrumental in refining this handbook and making it accessible to beginners.

Last but not least, we are grateful to the readers, whose curiosity and enthusiasm for learning have inspired us to write this book. It is our sincere hope that this handbook serves as a helpful guide, enabling one to grasp the fundamentals of AI and IoT with ease.

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Dr. Anuradha Kanade

Ms. Jyoti Narayan Shrote

Mr. Abhijat

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About the Authors



Mrs. Varsha Atul Shukre presently working as an Assistant Professor in Department of Computer Science and Applications at Dr. Vishwanath Karad MIT- World Peace University, Pune. She has about 11 years of experience including 1 year of Industry and 10 years of Academic experience. She has completed her M.Sc. (Electronic Science) in 2012 from Savitribai Phule Pune University and qualified National Eligibility Test (UGC-NET) for the eligibility of lectureship in 2013. At present She is pursuing her Ph.D. from Savitribai Phule Pune University. Her fields of interest include Embedded Systems, Internet of things, Optoelectronics, Digital Systems, Analog Circuit Design, and Microcontrollers. She has published 12 research papers in various national and International Journals including conference proceedings. She has successfully completed many Faculty development programs and attended many conferences, workshops and seminars. She has an exceptional ability to inspire and empower students, fostering a love for learning, instilling critical thinking skills, and creating an inclusive and supportive educational environment.



Dr. Anuradha Kanade, presently working as Head, MSc (Computer Science) and PG Coordinator in Department of Computer Science and Applications at Dr. Vishwanath Karad MIT- World Peace University, Pune. She was awarded Ph.D. degree from Savitribai Phule Pune University and M.Phil. from BVDU, she has completed MCA, and B.Sc. (Physics) from Shivaji University and MBA(BA) from SPPU. She is enthusiastic and passionate for teaching and research and works with dedication and positive approach. She has a vast experience of more than 21 years including 19+ years of teaching and about 2 years of industry experience.

She is approved PhD supervisor at Dr. Vishwanath Karad MIT World Peace University and her research interests are Databases, Data Science, Blockchain Technology, Cloud Computing, Algorithmics.

She authored more than 38 research papers in various national, international journals and conferences, including IEEE and Springer, and UGC Care publications and she has also received best paper awards for her papers in 2021 and 2022. There are 8 patents on her name, including 6 Indian and 2 UK patents. Three of her patents are granted, three are accepted and two are published.

She has completed the BCUD funded research project in 2015 and currently working on sponsorship under Innovation Funds Policy since Feb 2022. She authored five books on different topics viz. Emerging Trends in Information Technology, R Programming, Fundamentals of Data Science, Terminology and Technical Foundations of Blockchains.

She is member of the professional bodies including ACM, Informing Science Institute, BOS member of Department of Computer Science and

Applications, Dr. Vishwanath Karad MIT World Peace University, Pune, Maharashtra, BOS member of Vivekanand Autonomous College, Kolhapur, Maharashtra, Pune, TPC member, Reviewer for many conferences and journals, Associated with state and private universities for research activities and collaborations.

She was invited as keynote speaker, session chair, invited speaker for many sessions on various topics.

She has worked as organizer and coordinator for many events such as International and National Conferences, Research Methodology Workshop, Guest sessions, industry expert seminars, inviting industries for internship and placement drives. She is having a huge experience of all academic, research and administrative responsibilities.



Ms. Jyoti Narayan Shrote currently holds the position of Assistant Professor in the Department of Computer Science at Indira College of Commerce and Science, Pune. With an extensive academic background spanning over 14 years, she earned her M.Sc. in Electronic Science from Savitribai Phule Pune University (SPPU) and has successfully qualified both the National Eligibility Test (UGC-NET) and the State Eligibility Test (SET).

Her expertise covers a diverse array of subjects, including Internet of Things (IoT), Embedded Systems, Communication Systems, Digital Systems, Analog Circuit Design, and Microcontrollers. Ms. Shrote has a prolific research portfolio, boasting more than 14 published papers featured in various national and peer-reviewed international journals, including conference proceedings.

Beyond her scholarly pursuits, she has completed numerous Faculty Development Programs and actively engages in conferences, workshops, seminars, Central Assessment Process, and Syllabus Designing. This highlights her unwavering commitment to professional development and continuous learning.



Mr. Abhijat is a multifaceted technologist and visionary creator known for pioneering advancements in the realm of operating systems and software development. Currently excelling as a Full Stack Developer at The Codebook Inc., Abhijat's expertise extends across various domains.

His academic journey includes a Bachelor's in Computer Science and Engineering from SRM University, a foundation that paved the way for my endeavors in the tech realm. One of my proudest accomplishments is the creation of ASH OS, a Linux-based Operating System meticulously designed to blend the best of Linux functionalities with an intuitive interface, catering to diverse user needs. Armed with a diploma in DIAT Certified Information Assurance Professional from DRDO and a

distinguished BTech in Computer Science and Engineering from SRM University, Abhijat is a luminary in the tech sphere.

The crowning achievement in Abhijat's repertoire is the birth of ASH OS, a revolutionary Linux-based Operating System meticulously designed to seamlessly integrate the functionalities of diverse operating systems. This innovation stands as a testament to Abhijat's commitment to simplifying technology adoption while enhancing user experience. Not confined to practical applications alone, Abhijat is a published author in the esteemed IEEE USA journal, presenting the groundbreaking research paper "ASH OS: A Comprehensive Linux Based Operating System with Optimized User Interface." This paper, showcased at ICTACS 2023 hosted by Amity University in KAZAKHSTAN, has garnered acclaim for its pioneering insights.

Beyond the realm of technology, Abhijat's altruistic endeavors shine brightly. Having collaborated with Atypical Advantages, an organization dedicated to empowering differently-abled individuals, Abhijat has demonstrated a profound commitment to leveraging technology for societal progress.

Moreover, Abhijat's stint with Basket hunt, an e-commerce startup, reflects a keen entrepreneurial spirit and a knack for driving innovation in diverse industries. A polymath in the truest sense, Abhijat's journey symbolizes a convergence of technical brilliance, innovative thinking, and a profound commitment to societal impact. Through groundbreaking creations, unwavering dedication to technological excellence, and a passion for empowering communities, Abhijat continues to redefine the boundaries of possibility in the ever-evolving landscape of technology.



Mr. Yogesha T has obtained M.Tech specialized in software engineering from VTU Belagavi and currently pursuing PhD in Dept of CSE VTU Mysuru. He is currently working as Assistant Professor and NSS program officer in the Department of Computer Science and Engineering, VTU, PG Center Mysuru. He is having 1 year of industry and 12 years of teaching experience. He has also worked as Special officer in VTU Academic Section. He has been honored with many prestigious awards which include Gold Medal (First Rank) Master of Technology in the field of Software Engineering from Sri Jayachamarajendra College of Engineering Mysuru. Young Research Investigator from Interscience Research Network, Award of honor from JSS Mahavidyapeeta. He is actively involved in various research activities and has published research papers in reputed national and international journals

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ABOUT THE BOOK

"**The Basics of AI and IoT: A Beginner's Handbook**" is an essential guide for anyone keen to unravel the mysteries of Artificial Intelligence (AI) and the Internet of Things (IoT). Written with clarity and expertise, this comprehensive book serves as a gateway for beginners into the intriguing world of AI and IoT technologies. It meticulously explores the fundamental concepts, principles, and applications of AI and IoT, breaking down complex topics into easy-to-understand explanations. From the basics of machine learning algorithms and neural networks to the intricacies of IoT devices, data communication, and security protocols, the book provides a step-by-step journey that empowers readers to grasp the core concepts with ease. Rich with real-world examples, case studies, and practical insights, the book not only demystifies the technical aspects but also delves into the ethical and societal implications of these transformative technologies. Whether you are a student, a hobbyist, or professional exploring new horizons, this handbook will equip you with the foundational knowledge needed to navigate the rapidly evolving fields of AI and IoT. Engaging and accessible, this book is an indispensable resource that fosters a deeper understanding of AI and IoT, making it a must-read for anyone curious about the future of technology and its impact on our lives.



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