



Cyber-Physical, IoT, and Autonomous Systems in Industry 4.0

Edited by

Vikram Bali

Vishal Bhatnagar

Deepti Aggarwal

Shivani Bali

Mario José Diván



CRC Press

Taylor & Francis Group

First edition published 2022

by CRC Press

6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

and by CRC Press

2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

CRC Press is an imprint of Taylor & Francis Group, LLC

© 2022 selection and editorial matter, Vikram Bali, Vishal Bhatnagar, Deepti Aggarwal, Shivani Bali, and Mario José Diván; individual chapters, the contributors

Reasonable efforts have been made to publish reliable data and information, but the author and publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The authors and publishers have attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged please write and let us know so we may rectify in any future reprint.

Except as permitted under U.S. Copyright Law, no part of this book may be reprinted, reproduced, transmitted, or utilized in any form by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without written permission from the publishers.

For permission to photocopy or use material electronically from this work, access www.copyright.com or contact the Copyright Clearance Center, Inc. (CCC), 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400. For works that are not available on CCC please contact mpkbookspermissions@tandf.co.uk

Trademark notice: Product or corporate names may be trademarks or registered trademarks and are used only for identification and explanation without intent to infringe.

Library of Congress Cataloging-in-Publication Data

Names: Bali, Vikram, editor. | Bhatnagar, Vishal, 1977- editor. | Aggarwal,

Deepti, editor. | Bali, Shivani, editor.

Title: Cyber-physical, IoT, and autonomous systems in industry 4.0 / edited

by Vikram Bali, Vishal Bhatnagar, Deepti Aggarwal, Shivani Bali, and Mario José Diván.

Description: First edition. | Boca Raton : CRC Press, 2022. | Includes

bibliographical references and index.

Identifiers: LCCN 2021021790 (print) | LCCN 2021021791 (ebook) | ISBN

9780367705152 (hardback) | ISBN 9780367705169 (paperback) | ISBN 9781003146711 (ebook)

Subjects: LCSH: Industry 4.0.

Classification: LCC T59.6 .C93 2022 (print) | LCC T59.6 (ebook) | DDC 658.4/0380285574--dc23

LC record available at <https://lcn.loc.gov/2021021790>

LC ebook record available at <https://lcn.loc.gov/2021021791>

ISBN: 978-0-367-70515-2 (hbk)

ISBN: 978-0-367-70516-9 (pbk)

ISBN: 978-1-003-14671-1 (ebk)

DOI: 10.1201/9781003146711

Typeset in Times

by SPi Technologies India Pvt Ltd (Straive)

Contents

Preface.....	ix
Editors.....	xvii
Contributors	xix
Chapter 1 Cyber Systems and Security in Industry 4.0.....	1
<i>Bhogaraju Padma and Thalatam Mohana Naga Vamsi</i>	
Chapter 2 A Demand Response Program for Social Welfare Maximization in the Context of the Indian Smart Grid: A Review.....	25
<i>Sachin Ramnath Gaikwad and R. Harikrishnan</i>	
Chapter 3 Cloud Computing Security Framework Based on Shared Responsibility Models: Cloud Computing	39
<i>Umesh Kumar Singh and Abhishek Sharma</i>	
Chapter 4 Performance Analysis of a Hypervisor and the Container-based Migration Technique for Cloud Virtualization.....	57
<i>Aditya Bhardwaj</i>	
Chapter 5 Segmentation of Fine-Grained Iron Ore Using Deep Learning and the Internet of Things.....	73
<i>Ada Cristina França da Silva and Omar Andres Carmona Cortes</i>	
Chapter 6 Amalgamation of Blockchain Technology and Cloud Computing for a Secure and More Adaptable Cloud.....	87
<i>Himanshu V. Taiwade and Premchand B. Ambhore</i>	
Chapter 7 Cloud, Edge, and Fog Computing: Trends	103
<i>Siddhant Thapliyal, Lisa Gopal, Piyush Bagla, and Kuldeep Kumar</i>	
Chapter 8 Progression in Cyber Security Concerns for Learning Management Systems: Analyzing the Role of Participants.....	117
<i>Tejaswini Apte and Sarika Sharma</i>	

Chapter 9	A Security Model for Cloud-computing-based E-governance Applications.....	133
	<i>Aditya Makwe, Anand More, Priyesh Kanungo, and Niranjan Shrivastava</i>	
Chapter 10	Automatic Time and Motion Study Using Deep Learning.....	147
	<i>Jefferson Hernandez, Sofia Lopez, Gabriela Valarezo, and Andres G. Abad</i>	
Chapter 11	Applications of IoT Based Frameworks in Industry 4.0: Applications of IoT Based Frameworks	163
	<i>Kaushik Ghosh, Sugandha Sharma, Piyush Bagla, and Kuldeep Kumar</i>	
Chapter 12	Impact of Deep Learning and Machine Learning in Industry 4.0.....	179
	<i>Umesh Kumar Lilhore, Sarita Simaiya, Amandeep Kaur, Devendra Prasad, Meenu Khurana, Deepak Kumar Verma, and Afsan Hassan</i>	
Chapter 13	IoT Applications and Recent Advances	199
	<i>T. Mohana Naga Vamsi and Pratibha Lanka</i>	
Chapter 14	A Spatio-temporal Model for the Analysis and Classification of Soil Using the IoT	221
	<i>M. Umme Salma, Subbaiah Rachana, and Narasegouda Srinivas</i>	
Chapter 15	A Critical Survey of Autonomous Vehicles	235
	<i>Nipun R. Navadia, Gurleen Kaur, Harshit Bhardwaj, Aditi Sakalle, Yashpal Singh, Taranjeet Singh, Arpit Bhardwaj, and Divya Acharya</i>	
Chapter 16	A Meta-learning Approach for Algorithm Selection for Capacitated Vehicle Routing Problems.....	255
	<i>Neha Sehta and Urjita Thakar</i>	
Chapter 17	Early Detection of Autism Disorder Using Predictive Analysis.....	269
	<i>T. Harshvardhan, G. Preethi, S. Aishwarya, T. Vinod, and K. S. Meghana</i>	

Chapter 18	Computing Technologies for Prognosticating the Emanation of Carbon Using an ARIMA Model.....	283
	<i>Shyla, Kapil Kumar, and Vishal Bhatnagar</i>	
Chapter 19	DWT and SVD-based Robust Watermarking Using Differential Evolution with Adaptive Optimization.....	297
	<i>Meenal Kamlakar, Chhaya Gosavi, Vaidehee Salunkhe, Priyanka Bagul, Aishwarya Keskar, and Shweta Barge</i>	
Chapter 20	A Novel Framework Based on a Machine Learning Algorithm for the Estimation of COVID-19 Cases	311
	<i>Rashmi Welekar, Sharvari Tapase, Shubhi Bajaj, Isha Pande, Abhishek Verma, Ashutosh Katpatal, and Vaibhav Mishra</i>	
Chapter 21	Assessing the Impact of Coronavirus on Pollutant Concentration: A Case Study in Malaysia.....	331
	<i>Imam Wahyu Amanullah, Sharifah Sakinah Syed Ahmad, and Emaliana Kasmuri</i>	
Chapter 22	A Comprehensive Review of SLAM Techniques	341
	<i>Karthi Mohan, Surya Bharath Achalla, and Arpit Jain</i>	
Chapter 23	A Novel Evolutionary Computation Method for Securing the Data in Wireless Networks.....	371
	<i>Inderpreet Kaur, Vibha Tripathi, and Nidhi</i>	
Index		389