


# **Engineering Cyber-Physical Systems and Critical Infrastructures**

Volume 3

## **Series Editor**

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The aim of this book series is to present state of the art studies, research and best engineering practices, real-world applications and real-world case studies for the risks, security, and reliability of critical infrastructure systems and Cyber-Physical Systems. Volumes of this book series will cover modelling, analysis, frameworks, digital twin simulations of risks, failures and vulnerabilities of cyber critical infrastructures as well as will provide ICT approaches to ensure protection and avoid disruption of vital fields such as economy, utility supplies networks, telecommunications, transports, etc. in the everyday life of citizens. The intertwine of cyber and real nature of critical infrastructures will be analyzed and challenges of risks, security, and reliability of critical infrastructure systems will be revealed. Computational intelligence provided by sensing and processing through the whole spectrum of Cloud-to-thing continuum technologies will be the basis for real-time detection of risks, threats, anomalies, etc. in cyber critical infrastructures and will prompt for human and automated protection actions. Finally, studies and recommendations to policy makers, managers, local and governmental administrations and global international organizations will be sought.

Jude Hemanth · Danilo Pelusi ·  
Joy Iong-Zong Chen  
Editors

# Intelligent Cyber Physical Systems and Internet of Things

ICoICI 2022

 Springer

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ISSN 2731-5002

ISSN 2731-5010 (electronic)

Engineering Cyber-Physical Systems and Critical Infrastructures

ISBN 978-3-031-18496-3

ISBN 978-3-031-18497-0 (eBook)

<https://doi.org/10.1007/978-3-031-18497-0>

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*We are honored to dedicate the proceedings  
of ICoICI 2022 to all the participants and  
editors of ICoICI 2022.*

# Preface

It is with deep satisfaction that I write this preface to the proceedings of the ICoICI 2022 held in JCT College of Engineering and Technology, Coimbatore, Tamil Nadu, India, during August 11–12, 2022.

This conference proceedings volume contains the written versions of most of the contributions presented during the conference of ICoICI 2022. The conference provided a setting for discussing recent developments in a wide variety of topics including Cyber-Physical Systems, Data Communication, Computer Networking, Communicational Technologies, Cryptography, Big Data, Cloud Computing, IoT, and Healthcare Informatics. The conference has been a good opportunity for participants coming from various destinations to present and discuss topics in their respective research areas.

ICoICI 2022 conference tends to collect the latest research results and applications on Intelligent Cyber Physical Systems and Internet of Things. It includes a selection of 65 papers from 302 papers submitted to the conference from universities and industries all over the world. All of accepted papers were subjected to strict peer-reviewing by 2–4 expert referees. The papers have been selected for this volume because of quality and the relevance to the conference.

ICoICI 2022 would like to express our sincere appreciation to all authors for their contributions to this book. We would like to extend our thanks to all the referees for their constructive comments on all papers, especially, we would like to thank to committee members for their hard working. Finally, we would like to thank the Springer publications for producing this volume.

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Teramo, Italy  
Dacun, Taiwan

Guest Editors—ICoICI 2022  
Prof. Dr. Jude Hemanth  
Dr. Danilo Pelusi  
Prof. Dr. Joy Iong-Zong Chen

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## About this book

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This book highlights the potential research areas of Information and Communication Technologies (ICT), such as the research in the field of modern computing and communication technologies that deal with different aspects of data analysis and network connectivity to develop solution for the emerging real-time information system challenges; contains a brief discussion about the progression from information systems to intelligent information systems, development of autonomous systems, real-time implementation of Internet of Things (IoT) and Cyber Physical Systems (CPS), fundamentals of intelligent information systems and analytical activities; helps to gain a significant research knowledge on modern communication technologies from the novel research contributions dealing with different aspects of communication systems, which showcase effective technological solutions that can be used for the implementation of novel distributed wireless communication systems. The individual chapters included in this book will provide a valuable resource for the researchers, scientists, scholars, and research enthusiasts, who have more interest in Information and Communication Technologies (ICT).

Encompassing the contributions of professors and researchers from Indian and other foreign universities, this book will be of interest to students, researchers, and practitioners, as well as members of the general public interested in the realm of Internet of Things (IoT) and Cyber Physical Systems (CPS).

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## Keywords

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**Cyber-Physical Systems**

**Human-Machine Interactions**

**IoT Enabling Technologies**

**Mobile and Wearable Devices**

**Communication Technologies**

**Mobile Computing and Network Security**

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<b>Book Title</b>	<b>Book Subtitle</b>	<b>Editors</b>
Intelligent Cyber Physical Systems and	ICoICI 2022	Jude Hemanth, Danilo Pelusi, Joy long-Zong Chen

Internet of Things

<b>Series Title</b>	<b>DOI</b>	<b>Publisher</b>
<a href="#">Engineering Cyber-Physical Systems and Critical Infrastructures</a>	<a href="https://doi.org/10.1007/978-3-031-18497-0">https://doi.org/10.1007/978-3-031-18497-0</a>	Springer Cham

<b>eBook Packages</b>	<b>Copyright Information</b>	<b>Hardcover ISBN</b>
<a href="#">Engineering, Engineering_(R0)</a>	The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG 2023	978-3-031-18496-3 Published: 04 February 2023

<b>Softcover ISBN</b>	<b>eBook ISBN</b>	<b>Series ISSN</b>
978-3-031-18499-4 Due: 18 February 2024	978-3-031-18497-0 Published: 03 February 2023	2731-5002

<b>Series E-ISSN</b>	<b>Edition Number</b>	<b>Number of Pages</b>
2731-5010	1	XIV, 913

<b>Number of Illustrations</b>	<b>Topics</b>
103 b/w illustrations, 370 illustrations in colour	<a href="#">Cyber-Physical Systems, Data Engineering, Computational Intelligence, Big Data, Artificial Intelligence</a>

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## BizGuru 1.0: Design and Development of a Mobile-Based Digital Marketing Guide for Elderly

[Ahmad Sofian Shminan](#) , [Nur Zulaikha Mohamed Aziyen](#), [Lee Jun Choi](#) & [Merikan Aren](#)

Conference paper | [First Online: 04 February 2023](#)

**92** Accesses

Part of the [Engineering Cyber-Physical Systems and Critical Infrastructures](#) book series (ECPSCI, volume 3)

### Abstract

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BizGuru 1.0 is an online learning platform using mobile devices known as mobile-based learning. It is a modernized alternative to acquiring knowledge which is suitable with the current digitalized environment. BizGuru provides learning materials that promote business-related knowledge, focusing on Digital Marketing. However, in this study, the mobile application design will be focusing on the elder's group to cater for their needs. The target users are people aged 60 years old and above, who

use an Android smartphone and are interested in gaining new knowledge. The purpose of the proposed application is to help these retired elderlies find an alternative that enables them to gain income at late age to continue supporting their living expenses. With the current pandemic situation and how they are often related to poverty, both circumstances result in the elders having to struggle to survive financially. Therefore, by using BizGuru, the elderlies do not only get to familiarize themselves with modern devices, but also they could look for other alternatives to gain income and avoid poverty which helps to fulfil the 1st goal of Sustainable Development Goals (SDG) on the eradication of poverty issues. Besides, this proposed application also provides learning opportunities for elderlies who have the desire to gain knowledge at late age which can help fulfil the 4th goal of SDG which is promoting life-long learning opportunities for all.

#### Keywords

**Mobile-based learning      Digital marketing**

**Elderly community**

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1. Rothe F-F (2020) Rethinking positive and negative impacts of 'ICT for development' through the holistic lens of the sustainable development goals. Inf Technol Dev 26:653–669. <https://doi.org/10.1080/02681102.2020.1756728>
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2. Galhotra B, Dewan A (2020) Impact of COVID-19 on digital platforms and change in E-commerce shopping trends. In: 2020 fourth international conference on I-SMAC (IoT in social, mobile, analytics and cloud) (I-SMAC), pp 861–866

---

3. Winarsih, Indriastuti M, Fuad K (2021) Impact of Covid-19 on digital transformation and sustainability in small and medium enterprises (SMEs): a conceptual framework. In: Barolli L, Poniszewska-Maranda A, Enokido T (eds) Complex, intelligent and software intensive systems. Springer International Publishing, Cham, pp 471–476

---

4. Masud J, Hamid T, Haron SA (2015) Measuring poverty among elderly Malaysians

---

5. Mohidin R, Jamal AAA, Arokiadasan CG et al (2013) Revisiting the relationship between attitudes and retirement planning behavior: a study on personal financial planning. *Int J Multi Thought* 3:449–461

---

6. Sharma DU, Thakur PKS (2020) A study on digital marketing and its impact on consumers purchase. *Int J Adv Sci Technol* 29:13096–13110

---

7. Bala M, Verma D (2018) A critical review of digital marketing. *Social Science Research*

8. Poverty Eradication | Poverty Eradication.  
<https://www.un.org/development/desa/socialperspectiveondevelopment/issues/poverty-eradication.html>. Accessed 6 Jun 2022

---

9. de Barros AC, Leitão R, Ribeiro J (2014) Design and evaluation of a mobile user interface for older adults: navigation, interaction and visual design recommendations. Proc Comput Sci 27:369–378.  
<https://doi.org/10.1016/j.procs.2014.02.041>

---

10. Alkasirah NAM, Nor NMM (2019) Potential usage of mobile learning via short messaging system (SMS) for enhancing Islamic knowledge of adult learners

---

11. Patzer Y, Lambertz J, Schulz B, Pinkwart N (2018) Mobile online courses for the illiterate: the eVideo approach. In: Miesenberger K, Kouroupetroglou G (eds) Computers helping people with special needs. Springer International Publishing, Cham, pp 379–383

---

12. Leen-Thomele E, Hetzner S, Held P (2016) Mobile learning concepts for older adults: results of a pilot study with tablet computers in France and Germany. In: Zhou J, Salvendy G (eds) Human aspects of IT for the aged

population. healthy and active aging. Springer International Publishing, Cham, pp 319–329

---

13. Kurland J, Wilkins AR, Stokes P (2014) iPractice: Piloting the effectiveness of a tablet-based home practice program in aphasia treatment. *Semin Speech Lang* 35:51–64.  
<https://doi.org/10.1055/s-0033-1362991>
- 

14. Farage MA, Miller KW, Ajayi F, Hutchins D (2012) Design principles to accommodate older adults. *Glob J Health Sci* 4:2–25.  
<https://doi.org/10.5539/gjhs.v4n2p2>
- 

15. Roberson DN (2004) The nature of self-directed learning in older rural adults. *Ageing Int* 29:199–218.  
<https://doi.org/10.1007/s12126-004-1017-0>
- 

16. Shin S, Bae Y (2015) A study on the hierarchical instructional system design of software education by school system. *J Korean Assoc Inf Educ* 19:533–544.  
<https://doi.org/10.14352/jkaie.2015.19.4.533>
- 

17. Shminan AS, Choi LJ, Sharif S (2020) AntiTEACCH: Mobile-based learning in a structured teaching approach for autistic children caregivers. In: 2020 international conference on informatics, multimedia, cyber and information system (ICIMCIS), pp 259–264

---

18. Uz R, Uzun A (2018) The influence of blended learning environment on self-regulated and self-directed learning skills of learners. *Eur J Educ Res* 7:877–886

---

19. Valverde-Berrocoso J, Fernández-Sánchez MR (2020) Instructional design in blended learning: theoretical foundations and guidelines for practice. In: Martín-García AV (ed) *Blended learning: convergence between technology and pedagogy*. Springer International Publishing, Cham, pp 113–140

---

20. Magliaro SG, Shambaugh N (2006) Student models of instructional design. *Educ Tech Res Dev* 54:83–106.  
<https://doi.org/10.1007/s11423-006-6498-y>

---

21. Castro MDB, Tumibay GM (2021) A literature review: efficacy of online learning courses for higher education institution using meta-analysis. *Educ Inf Technol* 26:1367–1385.  
<https://doi.org/10.1007/s10639-019-10027-z>

---

22. Figliolia AC, Sandnes FE, Medola FO (2020) Experiences using three app prototyping tools with different levels of fidelity from a product design student's perspective. In: Huang T-C, Wu T-T, Barroso J et al (eds) *Innovative*

technologies and learning. Springer  
International Publishing, Cham, pp 557–566

---

23. Stoeva M (2021) Model and prototype of interactive assistant for compliant interface development—MayUI tool. In: 2021 international conference automatics and informatics (ICAI), pp 295–300

---

24. Deiss R, Henneberry R (2017) Digital marketing Fd, 1st edn. For Dummies, Hoboken

---

25. Perez RS, Fleming Johnson J, Emery CD (1995) Instructional design expertise: a cognitive model of design. *Instr Sci* 23:321–349.  
<https://doi.org/10.1007/BF00896877>

---

26. Shminan AS, Choi LJ, Barawi MH et al (2021) InVesa 1.0: the conceptual framework of interactive virtual academic advisor system based on psychological profiles. In: 2021 13th international conference on information and communication technology and system (ICTS), pp 112–117

---

27. Macefield R (2009) How to specify the participant group size for usability studies: a practitioner’s guide. *J Usability Stud* 5:34–45

---

28. Fetaji M, Fetaji B (2011) Comparing developed MLUAT (mobile learning usability attribute testing) methodology with qualitative user testing method and heuristics evaluation. In: Proceedings of the 12th international conference on computer systems and technologies. Association for Computing Machinery, New York, pp 516–523

---

29. Arain AA, Hussain Z, Rizvi WH, Vighio MS (2016) Evaluating usability of M-learning application in the context of higher education institute. In: Zaphiris P, Ioannou A (eds) Learning and collaboration technologies. Springer International Publishing, Cham, pp 259–268

---

30. Le Maistre C (1998) What is an expert instructional designer? Evidence of expert performance during formative evaluation. ETR&D 46:21–36.  
<https://doi.org/10.1007/BF02299759>

---

31. Norman G (2010) Likert scales, levels of measurement and the “laws” of statistics. Adv in Health Sci Educ 15:625–632.  
<https://doi.org/10.1007/s10459-010-9222-y>

---

32. Bangor A, Kortum PT, Miller JT (2009) Determining what individual SUS scores mean: adding an adjective rating scale. Undefined

---

33. Mishra A, Jaiswal A, Chaudhari L, Bodade V (2022) Health record management system—a web-based application. *J IoT Soc Mob Anal Cloud* 3:301–313

---

34. Shakya S (2020) Survey on cloud based robotics architecture, challenges and applications. *JUCCT* 2:10–18.  
<https://doi.org/10.36548/jucct.2020.1.002>

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Cite this paper

Shminan, A.S., Aziyen, N.Z.M., Choi, L.J., Aren, M. (2023).  
BizGuru 1.0: Design and Development of a Mobile-Based  
Digital Marketing Guide for Elderly. In: Hemanth, J., Pelusi,  
D., Chen, J.I.Z. (eds) Intelligent Cyber Physical Systems and  
Internet of Things. IColCI 2022. Engineering Cyber-  
Physical Systems and Critical Infrastructures, vol 3.  
Springer, Cham. [https://doi.org/10.1007/978-3-031-18497-0\\_37](https://doi.org/10.1007/978-3-031-18497-0_37)

[.RIS](#) [.ENW](#) [.BIB](#)

DOI

[https://doi.org/10.1007/978-3-031-18497-0\\_37](https://doi.org/10.1007/978-3-031-18497-0_37)

Published	Publisher Name	Print ISBN
04 February 2023	Springer, Cham	978-3-031-18496-3

Online ISBN	eBook Packages
978-3-031-18497-0	<a href="#">Engineering</a> <a href="#">Engineering (R0)</a>



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Consortium (3000254928) - 8354 Springerlink Malaysia consortium (3000519906) - 15828 SpringerLink Malaysia LNCS  
Consortium (3991448967) - 6816 SpringerLink Malaysia eJournal Consortium - Higher Education (3000155375) - 12471  
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(3000916360)

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