Communications in Computer and Information Science 1973

Editorial Board Members

Joaquim Filipe, *Polytechnic Institute of Setúbal, Setúbal, Portugal*
Ashish Ghosh, *Indian Statistical Institute, Kolkata, India*
Raquel Oliveira Prates, *Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil*
Lizhu Zhou, *Tsinghua University, Beijing, China*

Rationale
The CCIS series is devoted to the publication of proceedings of computer science conferences. Its aim is to efficiently disseminate original research results in informatics in printed and electronic form. While the focus is on publication of peer-reviewed full papers presenting mature work, inclusion of reviewed short papers reporting on work in progress is welcome, too. Besides globally relevant meetings with internationally representative program committees guaranteeing a strict peer-reviewing and paper selection process, conferences run by societies or of high regional or national relevance are also considered for publication.

Topics
The topical scope of CCIS spans the entire spectrum of informatics ranging from foundational topics in the theory of computing to information and communications science and technology and a broad variety of interdisciplinary application fields.

Information for Volume Editors and Authors
Publication in CCIS is free of charge. No royalties are paid, however, we offer registered conference participants temporary free access to the online version of the conference proceedings on SpringerLink (http://link.springer.com) by means of an http referrer from the conference website and/or a number of complimentary printed copies, as specified in the official acceptance email of the event.

CCIS proceedings can be published in time for distribution at conferences or as post-proceedings, and delivered in the form of printed books and/or electronically as USBs and/or e-content licenses for accessing proceedings at SpringerLink. Furthermore, CCIS proceedings are included in the CCIS electronic book series hosted in the SpringerLink digital library at http://link.springer.com/bookseries/7899. Conferences publishing in CCIS are allowed to use Online Conference Service (OCS) for managing the whole proceedings lifecycle (from submission and reviewing to preparing for publication) free of charge.

Publication process
The language of publication is exclusively English. Authors publishing in CCIS have to sign the Springer CCIS copyright transfer form, however, they are free to use their material published in CCIS for substantially changed, more elaborate subsequent publications elsewhere. For the preparation of the camera-ready papers/files, authors have to strictly adhere to the Springer CCIS Authors' Instructions and are strongly encouraged to use the CCIS LaTeX style files or templates.

Abstracting/Indexing
CCIS is abstracted/indexed in DBLP, Google Scholar, EI-Compendex, Mathematical Reviews, SCImago, Scopus. CCIS volumes are also submitted for the inclusion in ISI Proceedings.

How to start
To start the evaluation of your proposal for inclusion in the CCIS series, please send an e-mail to ccis@springer.com.

Sagaya Aurelia · Chandra J. · Ashok Immanuel ·
Joseph Mani · Vijaya Padmanabha
Editors

Computational Sciences and Sustainable Technologies

First International Conference, ICCSST 2023
Bangalore, India, May 8–9, 2023
Revised Selected Papers

Springer

Editors
Sagaya Aurelia
CHRIST University
Bangalore, India

Ashok Immanuel
CHRIST University
Bangalore, India

Vijaya Padmanabha
Modern College of Business and Science
Muscat, Oman

Chandra J.
CHRIST University
Bangalore, India

Joseph Mani
Modern College of Business and Science
Muscat, Oman

ISSN 1865-0929 ISSN 1865-0937 (electronic)
Communications in Computer and Information Science
ISBN 978-3-031-50992-6 ISBN 978-3-031-50993-3 (eBook)
https://doi.org/10.1007/978-3-031-50993-3

© The Editor(s) (if applicable) and The Author(s), under exclusive license
to Springer Nature Switzerland AG 2024

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Paper in this product is recyclable.

Preface

"Research is to see what everybody else has seen, and to think what nobody else has thought" - Albert Szent-Györgyi. What is said is not as important as what we feel. That is why we make an effort to experience conferences in a setting where the still small voice of the spirit can be clearly heard, felt and understood.

The International Conference on Computational Sciences and Sustainable Technologies (ICSSST 2023) was formally inaugurated on 8th May, 2023 by the Vice Chancellor of Christ University, Fr. Dr. Jose C.C., and Mr. Hari Saravanan, IIM-C Bengaluru and Optum Global Solutions, Bengaluru. Chief guest Mr. Saravanan spoke about the modern-day gadgets that use AI as a backend, the knowledge which overburdens the current generation and With the availability of high-end technology, the present generation should focus on finding solutions that have social impact and sustainability.

The conference covered topics such as Artificial Intelligence, Blockchain Technology, Cloud Computing, Cyber Security, Data Science, E-Commerce, Computer Architecture, Image and Video Processing, Pandemic Preparedness and Digital Technology, and Pattern Recognition and Classification.

This book is a compilation of selected papers presented during ICCSST 2023. The primary goal was to bring together academics, researchers, engineers, entrepreneurs, industry experts, and budding research scholars worldwide to exchange and share their research findings and discuss the challenges faced and the solutions adopted.

We are grateful to all the authors who submitted their research work, the reviewers who dedicated their time and made valuable suggestions for the authors to improve their work, the members of the committees and the participants who made this event a dynamic and enriching experience. Without your commitment and dedication, this conference would not have been possible.

The papers in this book span a wide range of ICCSST 2023 themes, reflecting the diversity and depth of the research presented during the conference. We believe that the content in this volume will be of great value to academicians, professionals and researchers.

There are no secrets to success. It is the result of preparation, hard work and learning from failure. The International Conference on Computational Sciences and Sustainable Technologies (ICSSST 2023) has been one such event.

Sagaya Aurelia
Chandra J.
Ashok Immanuel
Joseph Mani
Vijaya Padmanabha

Acknowledgements

You need to be aware of what others are doing,
applaud their efforts,
acknowledge their success,
and encourage them in their pursuits.
When we all help and acknowledge one another, everybody wins

Jim Stovall

On behalf of the International Conference on Computational Sciences and Sustainable Technologies (ICCSST 2023) committee and the entire fraternity of the institution, I, first of all, extend my most sincere thanks to the Almighty God for giving us strength, knowledge, and good health for conducting this international conference successfully.

I am happy to acknowledge Dr. Fr. Jose, our respected Vice-Chancellor, Dr. Joseph Varghese, then Director, Center for Research, beloved registrar Dr. Anil Joseph Pinto, and all the management authorities for giving us permission and logistic support to conduct this international conference in a hybrid mode which made this event a historical benchmark in the history of CHRIST (Deemed to be University) and the Modern College of Business and Science, Sultanate of Oman. I also extend my sincere gratitude to our beloved Dean of Sciences Dr. George Thomas and Associate Dean of Sciences Dr. T.V. Joseph for their kind support throughout the conference.

I offer my wholehearted thanks to Dr. Ashok Immanuel, General Chair and Head, Department of Computer Science, for being the backbone of this entire conference. I will fail in my duty if I don't remember the staff of Springer CCIS, without whom this publication would not have been possible.

I sincerely recognize Mr. Hari Saravanan of IIM-C Bengaluru and Optum Global Solutions, Bengaluru, for delivering a thought-provoking talk during the inaugural ceremony of the conference.

I humbly acknowledge all the eminent keynote speakers: Dr. Pravin Hungund, Chief Technology Officer at MetaZ Digital, Bengaluru, Karnataka, India; Dr. Zahid Akhtarm, State University of New York Polytechnic Institute; and Mr. Bharani P. Jagan Mohan, Manager, Seagen.

Special recognition goes to internal session chairs and external session chairs Dr. Anita, Dr. Kavitha, Dr. Vaidhehi, Dr. Ramesh Chandra, Dr. Senthilnathan, Dr. Deepa V. Jose, Dr. Thirunavukarasu, Dr. Nizar Banu, Dr. Rohini, Dr. Sandeep, Dr. Poornima, Dr. Suresh, Dr. Nismon Rio, Dr. Venkata Subramanian, Dr. Joseph Mani, MCBS, Muscat, Dr. Vijaya Padmanaban, MCBS, Muscat, Dr. Basant Kumar, MCBS, Muscat, Dr. A. Jayanthiladevi, Srinivas University, Ms. Mritula C., Siemens R & D, Dr. Savitha Choudary, Sir MVIT, Dr. J. Thilagavathi, Arjun College of Technology, Dr. Sriram Krish Vasudevan, Intel, and Dr. Prasanna M., VIT.

I acknowledge Dr. Tomy K. Kallarakal, Dean, School of Commerce, Finance and Accountancy, for accepting our invitation and gracing the occasion with his enlightened speech for the valedictory function.

I also acknowledge all the external and internal reviewers for providing their helpful comments and improving the quality of papers presented in the forum.

My sincere gratitude goes to all IT support staff members, student volunteers and non-teaching staff for their support throughout the conference; they worked day and night to make this event a grand success. I thank all the advisory committee members, coordinators, committee heads and members, faculties of Computer Science, CHRIST University, India, and Modern College of Business and Science, Sultanate of Oman. Their names are listed below.

I acknowledge all the authors who submitted papers and congratulate those whose papers were accepted with a deep sense of appreciation.

Sagaya Aurelia
Chandra J.
Ashok Immanuel
Department of Computer Science
CHRIST (Deemed to be University)
Bangalore, Karnataka India

Organization

Organizing Committee

Abraham V. M.	CHRIST (Deemed to be University), India
Ahmed Al Naamany	Modern College of Business and Science, Oman
Joseph C. C.	CHRIST (Deemed to be University), India
Anil Joseph Pinto	CHRIST (Deemed to be University), India
George Thomas C.	CHRIST (Deemed to be University), India
Joseph T. V.	CHRIST (Deemed to be University), India
Moosa Al Kindi	Modern College of Business and Science, Oman
Khalfan Al Asmi	Modern College of Business and Science, Oman
Hothefa Shaker	Modern College of Business and Science, Oman
Ashok Immanuel	CHRIST (Deemed to be University), India
Vinay	CHRIST (Deemed to be University), India

Conference Chairs

Chandra J.	CHRIST (Deemed to be University), India
Mani Joseph	Modern College of Business and Science, Oman

Conveners

Sagaya Aurelia	CHRIST (Deemed to be University), India
Arokia Paul Rajan R.	CHRIST (Deemed to be University), India
Basant Kumar	Modern College of Business and Science, Oman

Organizing Secretaries

Kirubanand V. B.	CHRIST (Deemed to be University), India
Vijaya Padmanabha	Modern College of Business and Science, Oman

Advisory/Review Committee

Ajay K. Sharma	IKG Punjab Technical University, India
Arockiasamy Soosaimanickam	University of Nizwa, Oman
S. Karthikeyan	College of Applied Sciences, Oman
Rajkumar Buyya	University of Melbourne, Australia
Inder Vir Malhan	Central University of Himachal Pradesh, India
Jose Orlando Gomes	Federal University, Brazil
Richmond Adebiaye	University of South Carolina Upstate, USA
Ahmad Sobri Bin Hashim	University Teknologi Petronas, Malaysia
John Digby Haynes	University of Sydney Business School, Australia
Subhash Chandra Yadav	Central University of Jharkhand, India
Rajeev Srivastava	Indian Institute of Technology, Varanasi, India
Inder Vir Malhan	Central University of Himachal Pradesh, India
Abhijit Das	Indian Institute of Technology Kharagpur, India
Muralidhara B. L	Jnanabharathi Campus, Bangalore University, India
K. K. Shukla	Indian Institute of Technology (BHU), Varanasi, India
Pabitra Mitra	Indian Institute of Technology Kharagpur, India
Hanumanthappa M.	Jnanabharathi Campus, Bangalore University, India
Subhrabrata Choudhury	National Institute of Technology Durgapur, India
P. Santhi Thilagam	National Institute of Technology Karnataka, India
Tandra Pal	National Institute of Technology Durgapur, India
Dilip Kumar Yadav	National Institute of Technology Jamshedpur, India
P. Santhi Thilagam	National Institute of Technology Karnataka, India
Annappa	National Institute of Technology, Karnataka, India
R. Thamaraiselvi	Bishop Heber College, India
P. Mukilan	Bule Hora University, Ethiopia
Gnanaprakasam	Gayatri Vidya Parishad College of Engineering (Autonomous), India
Tanmay De	National Institute of Technology Duragpur, India
Saravanan Chandran	National Institute of Technology Duragpur, India
Rupa G. Mehta	Sardar Vallabhbhai National Institute of Technology, Surat, India
Bibhudatta Sahoo	National Institute of Technology Rourkela, India
Baisakhi Chakraborty	National Institute of Technology Durgapur, India
Rajiv Misra	Indian Institute of Technology, Patna, India
Sherimon P.	Arab Open University, Oman
Nebojsa Bacanin	Singidunum University, Serbia

Website, Brochures, Banners and Posters

Tirunavukkarasu (Chair)	CHRIST University, India
Cecil Donald	CHRIST University, India
Santhosh Nair	Modern College of Business and Science, Oman

Communication and Publicity

Rohini (Chair)	CHRIST University, India
Kavitha	CHRIST University, India
Gobi	CHRIST University, India
Lokanayaki	CHRIST University, India
Poornima	CHRIST University, India
Chia Zargeh	Modern College of Business and Science, Oman
Rajeev Rajendran	Modern College of Business and Science, Oman
Muhammad Naeem	Modern College of Business and Science, Oman
Nassor Suleiman	Modern College of Business and Science, Oman

Finance Committee and Sponsorship

Rajesh Kanna (Chair)	CHRIST University, India
Shoney Sebastian	CHRIST University, India
Deepa V. Jose	CHRIST University, India
Sandeep	CHRIST University, India
Nismon Rio	CHRIST University, India
Joseph Ajin	Modern College of Business and Science, Oman

Registration, Mementos, Conference Kits and Certificates

Kavitha (Chair)	CHRIST University, India
Vaidhehi	CHRIST University, India
K. N. Saravanan	CHRIST University, India
Saravanakumar	CHRIST University, India
Ramamurthy	CHRIST University, India
Loganayaki	CHRIST University, India
Reshmi	CHRIST University, India

Session Management, Execution and Technical Support

Senthilnathan (Chair)	CHRIST University, India
Shoney Sebastian	CHRIST University, India
Beulah	CHRIST University, India
Nismon	CHRIST University, India
Gobi	CHRIST University, India
Mohanapriya	CHRIST University, India
Rajesh Kanna	CHRIST University, India
Poornima	CHRIST University, India
Suresh	CHRIST University, India
Somnath	CHRIST University, India

Publication

Nizar Banu (Chair)	CHRIST University, India
Said Nassor (Co-chair)	Modern College of Business and Science, Oman
Anita	CHRIST University, India
Cecil Donald	CHRIST University, India
Deepa V. Jose	CHRIST University, India
Prabu P.	CHRIST University, India
Poornima	CHRIST University, India
Ramamurthy	CHRIST University, India
Ramesh Poonima	CHRIST University, India
Tirunavukkarasu	CHRIST University, India
Manjunatha	CHRIST University, India
Nismon Rio	CHRIST University, India
Mohanapriya	CHRIST University, India
Somnath	CHRIST University, India
Abdelkawy A. Abdelaziz	Modern College of Business and Science, Oman
Ahmed Mounir	Modern College of Business and Science, Oman
Maryam Al Washahi	Modern College of Business and Science, Oman

Chief Guests, Keynote and Session Resource Persons

Manjunatha (Chair)	CHRIST University, India
Anita	CHRIST University, India
Nizar Banu	CHRIST University, India
Ramesh Poonima	CHRIST University, India
Rohini	CHRIST University, India

Hospitality and Report

Smitha Vinod (Chair)	CHRIST University, India
Peter Augustine	CHRIST University, India
Ruchi	CHRIST University, India

Lunch, Refreshments and Accommodation

Sandeep (Chair)	CHRIST University, India
Saravanakumar	CHRIST University, India
K. N. Saravanan	CHRIST University, India
Beaulah	CHRIST University, India
Loganayaki	CHRIST University, India
Peter Augistine	CHRIST University, India
Prabu P.	CHRIST University, India
Suresh	CHRIST University, India

Event Management

Vaishnavi	CHRIST University, India
Ruchi	CHRIST University, India

Contents

Performance Evaluation of Metaheuristics-Tuned Deep Neural Networks for HealthCare 4.0 1
Luka Jovanovic, Sanja Golubovic, Nebojsa Bacanin, Goran Kunjadic, Milos Antonijevic, and Miodrag Zivkovic

Early Prediction of At-Risk Students in Higher Education Institutions Using Adaptive Dwarf Mongoose Optimization Enabled Deep Learning 15
P. Vijaya, Rajeev Rajendran, Basant Kumar, and Joseph Mani

Decomposition Aided Bidirectional Long-Short-Term Memory Optimized by Hybrid Metaheuristic Applied for Wind Power Forecasting 30
Luka Jovanovic, Katarina Kumpf, Nebojsa Bacanin, Milos Antonijevic, Joseph Mani, Hothefa Shaker, and Miodrag Zivkovic

Interpretable Drug Resistance Prediction for Patients on Anti-Retroviral Therapies (ART) 43
Jacob Muhire, Ssenoga Badru, Joyce Nakatumba-Nabende, and Ggaliwango Marvin

Development of a Blockchain-Based Vehicle History System 54
Mani Joseph, Hothefa Shaker, and Nadheera Al Hosni

Social Distancing and Face Mask Detection Using YOLO Object Detection Algorithm 66
Riddhiman Raguraman, T. S. Gautham Rajan, P. Subbulakshmi, L. K. Pavithra, and Srimadhaven Thirumurthy

Review on Colon Cancer Prevention Techniques and Polyp Classification 80
T. J. Jobin, P. C. Sherimon, and Vinu Sherimon

Security Testing of Android Applications Using Drozer 89
Kamla AL-Aufi and Basant Kumar

Contemporary Global Trends in Small Project Management Practices and Their Impact on Oman 104
Safiya Al Salmi and P. Vijaya

Early Prediction of Sepsis Using Machine Learning Algorithms: A Review 113
N. Shanthi, A. Aadhishri, R. C. Suganthe, and Xiao-Zhi Gao

Solve My Problem-Grievance Redressal System 126
Sridhar Iyer, Deshna Gandhi, Devraj Mishra, Rudra Trivedi, and Tahera Ansari

Finite Automata Application in Monitoring the Digital Scoreboard of a Cricket Game 143
K. Kaushik, L. K. Pavithra, and P. Subbulakshmi

Diabetes Prediction Using Machine Learning: A Detailed Insight 159
Gour Sundar Mitra Thakur, Subhayu Dutta, and Bratajit Das

Empirical Analysis of Resource Scheduling Algorithms in Cloud Simulated Environment 174
Prathamesh Vijay Lahande and Parag Ravikant Kaveri

A Recommendation Model System Using Health Aware- Krill Herd Optimization that Develops Food Habits and Retains Physical Fitness 183
N. Valliammal and A. Rathna

Video Summarization on E-Sport 200
Vani Vasudevan, M. R. Darshan, J. V. S. S. Pavan Kumar, Saiel K. Gaonkar, and Tallaka Ekeswar Reddy

SQL Injection Attack Detection and Prevention Based on Manipulating the SQL Query Input Attributes 213
R. Mahesh, Samuel Chellathurai, Meyyappan Thirunavukkarasu, and Pandiselvam Raman

Comparative Analysis of State-of-the-Art Face Recognition Models: FaceNet, ArcFace, and OpenFace Using Image Classification Metrics 222
Joseph K. Iype and Shoney Sebastian

Hash Edward Curve Signcryption for Secure Big Data Transmission 235
S. Sangeetha and P. Suresh Babu

An Energy Efficient, Spontaneous, Multi-path Data Routing Algorithm with Private Key Creation for Heterogeneous Network 248
K. E. Hemapriya and S. Saraswathi

A Hybrid Model for Epileptic Seizure Prediction Using EEG Data 264
P. S. Tejashwini, L. Sahana, J. Thriveni, and K. R. Venugopal

Adapting to Noise in Forensic Speaker Verification Using GMM-UBM I-Vector Method in High-Noise Backgrounds 275
K. V. Aljinu Khadar, R. K. Sunil Kumar, and N. S. Sreekanth

Classification of Code-Mixed Tamil Text Using Deep Learning Algorithms 288
R. Theninpan and P. Valarmathi

The Road to Reducing Vehicle CO_2 Emissions: A Comprehensive Data Analysis 299
S. Madhurima, Joseph Mathew Mannooparambil, and Kukatlapalli Pradeep Kumar

A Deep Learning Based Bio Fertilizer Recommendation Model Based on Chlorophyll Content for Paddy Leaves 310
M. Nirmala Devi, M. Siva Kumar, B. Subbulakshmi, T. Uma Maheswari, Karpagam, and M. Vasanth Kumar

A Comparison of Multinomial Naïve Bayes and Bidirectional LSTM for Emotion Detection 322
S. K. Lakshitha, V. Naga Pranava Shashank, Richa, and Shivani Gupta

Hybrid Region of Interest Based Near-Lossless Codec for Brain Tumour Images Using Convolutional Autoencoder 333
Muthalaguraja Venugopal and Kalavathi Palanisamy

An Empirical and Statistical Analysis of Classification Algorithms Used in Heart Attack Forecasting 351
Gifty Roy, Reshma Rachel Cherish, and Boppuru Rudra Prathap

Healthcare Data Analysis and Secure Storage in Edge Cloud Module with Blockchain Federated Sparse Convolutional Network++ 363
R. Krishnamoorthy and K. P. Kaliyamurthie

A Multi-layered Approach to Brain Tumor Classification Using VDC-12 379
Anant Mehta, Prajit Sengupta, and Prashant Singh Rana

An Efficient Approach of Heart Disease Diagnosis Using Modified Principal Component Analysis (M-PCA) 392
G. Lakshmi and P. Sujatha

Smart Driving Assistance Using Deep Learning 402
S. N. Baba Shankar, B. Karthik Reddy, B. Koushik Reddy, Venuthurla Venkata Pradeep Reddy, and H. B. Mahesh

Design of Advanced High-Performance Bus Master to Access a SRAM Block 419
M. S. Mallikarjunaswamy, Jagadeesh Dambal, Amish Kuthethure, G. Ashwini, and K. Sumanth

EFMD-DCNN: Efficient Face Mask Detection Model in Street Camera Using Double CNN 427
R. Thamarai Selvi, N. Arulkumar, and Gobi Ramasamy

Reflecting on Technology: A Review of the Smart Mirror Advancements and Applications 438
Divyesh Divakar, H. M. Bharat, and G. M. Dhanush

MobNetCov19: Detection of COVID-19 Using MobileNetV2 Architecture for Multi-mode Images 452
H. S. Suresh Kumar, S. Bhoomika, C. N. Pushpa, J. Thriveni, and K. R. Venugopal

Analysis of Machine Learning Approaches to Detect Pedestrian Under Different Scale Using Frame Level Difference Feature 464
A. Sumi and T. Santha

Eye Support: AI Enabled Support System for Visually Impaired Senior Citizens 474
Vani Vasudevan, Thota Thanmai, Riya Yadav, Pola Udaya Sowjanya Reddy, and Subrina Pradhan

The Evolution of Block Chain Technology 488
Indumathi Karthikeyan and M. G. Shruthi

Author Index 499

SPRINGER NATURE Link

Log in

Menu Search Cart

Diabetes Prediction Using Machine Learning: A Detailed Insight

| Conference paper | First Online: 03 February 2024

| pp 159–173 | Cite this conference paper

Computational Sciences and Sustainable Technologies

(ICCSST 2023)

Gour Sundar Mitra Thakur, Subhayu Dutta & Bratajit Das

Part of the book series: Communications in Computer and Information Science ((CCIS,volume 1973))

Included in the following conference series: International Conference on Computational Sciences and Sustainable Technologies

187 Accesses

Abstract

Diabetes often referred to as Diabetes mellitus is a general, continuing and deadly syndrome occurring all over the world. It is characterized by hyperglycemia which occurs due to abnormal insulin secretion which results in an irregular rise of glucose level in the blood. It is affecting numerous people all over the world. Diabetes remained untreated over a long period of time, may include complications like premature heart disease and stroke, blindness, limb amputations and kidney failure, making early detection of diabetes mellitus important. Now a days in healthcare, machine learning is used to draw insights from large medical data sets to improve the quality of patient care, improve patient outcomes, enhance operational efficiency and accelerate medical research. In this paper, we have applied different ML algorithms like Logistic Regression, Gaussian Naive Bayes, K-nearest neighbors, Support Vector Machine, Decision Tree, Random Forest, Gradient Boost, AdaBoost and Multi Layered Perceptron using Artificial Neural Network on reduced PIMA Indian Diabetes dataset and provided a detailed performance comparison of the algorithms. From this article readers are expected to gain a detailed insight of different symptoms of diabetes along with their applicability in different ML algorithms for diabetes onset prediction.

This is a preview of subscription content, log in via an institution to check access.

Access this chapter

Log in via an institution

Chapter

EUR 29.95
Price includes VAT (India)

Available as PDF
Read on any device
Instant download
Own it forever

Buy Chapter

eBook EUR 71.68

Softcover Book EUR 84.99

Tax calculation will be finalised at checkout

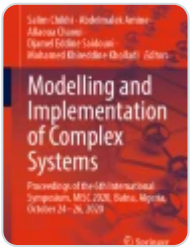
Purchases are for personal use only

Institutional subscriptions →

Similar content being viewed by others

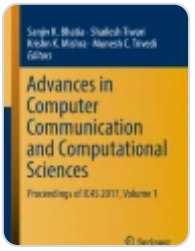
Analysing Effectiveness of ML Algorithms Used to Predict Diabetes Mellitus

Chapter | © 2022



Comparative Analysis of Machine Learning Algorithms for Early Prediction of Diabetes...

Chapter | © 2021



Comparative Analysis of Prediction Algorithms for Diabetes

Chapter | © 2019

References

1. Ahmad, H.F., Mukhtar, H., Alaqail, H., Seliaman, M., Alhumam, A.: Investigating health-related features and their impact on the prediction of diabetes using machine learning. Appl. Sci. 11(3), 1173 (2021)

Article Google Scholar

2. Aminian, A., et al.: Predicting 10-year risk of end-organ complications of type 2 diabetes with and without metabolic surgery: a machine learning approach. Diabetes Care 43(4), 852–859 (2020)

Article MathSciNet Google Scholar

3. Bastaki, S.: Diabetes mellitus and its treatment. Dubai Diabetes Endocrinol. J. 13, 111–134 (2005)

Google Scholar

4. Birjais, R., Mourya, A.K., Chauhan, R., Kaur, H.: Prediction and diagnosis of future diabetes risk: a machine learning approach. SN Appl. Sci. 1(9), 1–8 (2019)

Article Google Scholar

5. Dritsas, E., Trigka, M.: Data-driven machine-learning methods for diabetes risk prediction. Sensors 22(14), 5304 (2022)

Article Google Scholar

6. Faruque, M.F., Sarker, I.H., et al.: Performance analysis of machine learning techniques to predict diabetes mellitus. In: 2019 International Conference on Electrical, Computer and Communication Engineering (ECCE), pp. 1–4. IEEE (2019)

Google Scholar

7. Gadekallu, T.R., et al.: Early detection of diabetic retinopathy using PCA-firefly based deep learning model. Electronics 9(2), 274 (2020)

Article Google Scholar

8. Islam, M.T., Raihan, M., Akash, S.R.I., Farzana, F., Aktar, N.: Diabetes mellitus prediction using ensemble machine learning techniques. In: Saha, A., Kar, N., Deb, S. (eds.) ICCISIoT 2019. CCIS, vol. 1192, pp. 453–467. Springer, Singapore (2020). https://doi.org/10.1007/978-981-15-3666-3_37

Chapter Google Scholar

9. Islam, M.M.F., Ferdousi, R., Rahman, S., Bushra, H.Y.: Likelihood prediction of diabetes at early stage using data mining techniques. In: Gupta, M., Konar, D., Bhattacharyya, S., Biswas, S. (eds.) Computer Vision and Machine Intelligence in Medical Image Analysis. AISC, vol. 992, pp. 113–125. Springer, Singapore (2020). https://doi.org/10.1007/978-981-13-8798-2_12

Chapter Google Scholar

10. Kandhasamy, J.P., Balamurali, S.: Performance analysis of classifier models to predict diabetes mellitus. Procedia Comput. Sci. 47, 45–51 (2015)

Article Google Scholar

11. Larabi-Marie-Sainte, S., Aburahmah, L., Almohaini, R., Saba, T.: Current techniques for diabetes prediction: review and case study. Appl. Sci. 9(21), 4604 (2019)

Article Google Scholar

12. Maniruzzaman, M., Rahman, M., Ahammed, B., Abedin, M., et al.: Classification and prediction of diabetes disease using machine learning paradigm. Health Inf. Sci. Syst. 8(1), 1–14 (2020)

Article Google Scholar

13. Mujumdar, A., Vaidehi, V.: Diabetes prediction using machine learning algorithms. Procedia Comput. Sci. 165, 292–299 (2019)

Article Google Scholar

14. Nadeem, M.W., Goh, H.G., Ponnusamy, V., Andonovic, I., Khan, M.A., Hussain, M.: A fusion-based machine learning approach for the prediction of the onset of diabetes. In: Healthcare, vol. 9, p. 1393. MDPI (2021)

Google Scholar

15. Naz, H., Ahuja, S.: Deep learning approach for diabetes prediction using PIMA Indian dataset. J. Diabetes Metab. Disord. 19(1), 391–403 (2020)

Article Google Scholar

16. Patil, R., Tamane, S.: A comparative analysis on the evaluation of classification algorithms in the prediction of diabetes. Int. J. Electr. Comput. Eng. 8(5), 3966 (2018)

Google Scholar

17. Sisodia, D., Sisodia, D.S.: Prediction of diabetes using classification algorithms. Procedia Comput. Sci. 132, 1578–1585 (2018)

Article Google Scholar

18. Smith, J.W., Everhart, J.E., Dickson, W., Knowler, W.C., Johannes, R.S.: Using the ADAP learning algorithm to forecast the onset of diabetes mellitus. In: Proceedings of the Annual Symposium on Computer Application in Medical Care, p. 261. American Medical Informatics Association (1988)

Google Scholar

19. Sneha, N., Gangil, T.: Analysis of diabetes mellitus for early prediction using optimal features selection. J. Big Data 6(1), 1–19 (2019)

Article Google Scholar

20. Swapna, G., Vinayakumar, R., Soman, K.: Diabetes detection using deep learning algorithms. ICT Express 4(4), 243–246 (2018)

Article Google Scholar

Author information

Authors and Affiliations

Department of Artificial Intelligence and Machine Learning, Dr. B. C. Roy Engineering College, Durgapur, West Bengal, India
Gour Sundar Mitra Thakur

Department of Computer Science and Engineering, Dr. B. C. Roy Engineering College, Durgapur, West Bengal, India
Subhayu Dutta & Bratajit Das

Corresponding author

Correspondence to Gour Sundar Mitra Thakur .

Editor information

Editors and Affiliations

CHRIST University, Bangalore, India
Sagaya Aurelia

CHRIST University, Bangalore, India
Chandra J.

CHRIST University, Bangalore, India
Ashok Immanuel

Modern College of Business and Science, Muscat, Oman
Joseph Mani

Modern College of Business and Science, Muscat, Oman
Vijaya Padmanabha

Rights and permissions

Reprints and permissions

Copyright information

© 2024 The Author(s), under exclusive license to Springer Nature Switzerland AG

About this paper

Cite this paper

Thakur, G.S.M., Dutta, S., Das, B. (2024). Diabetes Prediction Using Machine Learning: A Detailed Insight. In: Aurelia, S., J., C., Immanuel, A., Mani, J., Padmanabha, V. (eds) Computational Sciences and Sustainable Technologies. ICCSST 2023. Communications in Computer and Information Science, vol 1973. Springer, Cham. https://doi.org/10.1007/978-3-031-50993-3_13

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-3-031-50993-3_13

Published
03 February 2024

Publisher Name
Springer, Cham

Print ISBN
978-3-031-50992-6

Online ISBN
978-3-031-50993-3

eBook Packages
Computer Science
Computer Science (R0)

Publish with us

Policies and ethics