# 2021 International Conference on Computing, Computational Modelling and Applications (ICCMA 2021)

**Brest, France**
**14 – 16 July 2021**

**IEEE Catalog Number:** CFP21T52-POD
**ISBN:** 978-1-6654-2568-1

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.**
**All Rights Reserved**

*Copyright and Reprint Permissions*: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

| | |
|---|---|
| IEEE Catalog Number: | CFP21T52-POD |
| ISBN (Print-On-Demand): | 978-1-6654-2568-1 |
| ISBN (Online): | 978-1-6654-2567-4 |

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

# 2021 International Conference on Computing, Computational Modelling and Applications (ICCMA)

# ICCMA 2021

## Table of Contents

**Preface** x
**Organizing Committee** xi
**Program Committee** xiii
**Keynotes** xv

## 2021 International Conference on Computing, Computational Modelling and Applications (ICCMA 2021)

Potential of Applying kNN with Soft Walltime to Improve Scheduling Performance 1
*Thanh Hoang Le Hai (Advanced Institute of Interdisciplinary Science and Technology; Ho Chi Minh City University of Technology (HCMUT), Vietnam), Loc La Hoang (Vietnam National University Ho Chi Minh City, Ho Chi Minh City, Vietnam), and Nam Thoai (Vietnam National University Ho Chi Minh City, Ho Chi Minh City, Vietnam)*

Using Machine Learning to Predict Students' Academic Performance During Covid-19 9
*Delali Kwasi Dake (University of Education, Winneba), Daniel Danso Essel (University of Education, Winneba), and Justice Edem Agbodaze (University of Education, Winneba)*

DDoS and Flash Event Detection in Higher Bandwidth SDN-IoT using Multiagent Reinforcement Learning 16
*Delali Kwasi Dake (Kwame Nkrumah University of Science and Technology, Ghana), James Dzisi Gadze (Kwame Nkrumah University of Science and Technology, Ghana), and Griffith Selorm Klogo (Kwame Nkrumah University of Science and Technology, Ghana)*

Lane Change Prediction Based on Trajectory Analysis and Driver Actions Tracking 21
*Anish Dixit (Sardar Patel Institute of Technology, India), Shreya Oak (Sardar Patel Institute of Technology, India), Shaney Mantri (Sardar Patel Institute of Technology, India), Anant Nimkar (Sardar Patel Institute of Technology, India), and Meghana Naik (Sardar Patel Institute of Technology, India)*

Machine Learning: Challenges, Limitations, and Compatibility for Audio Restoration Processes 27
*Owen Casey (University of Wisconsin Eau Claire, United States), Rushit Dave (University of Wisconsin Eau Claire, United States), Naeem Seliya (University of Wisconsin Eau Claire, United States), and Evelyn R Sowells Boone (North Carolina A&T State University, United States)*

Improved Botnet Attack Detection Using Principal Component Analysis and Ensemble Voting Algorithm 33
*Stephen Opoku Oppong (University of Education, Winneba, Ghana), Emmanuel Kwesi Baah (Kwame Nkrumah University of Science and Technology, Ghana), Mathias Agbeko (University of Education, Winneba, Ghana), and Justice Nueteh Terkper (University of Professional Studies, Accra, Ghana)*

An Android Application for Clinical Diagnosis Using NLP and Fuzzy Logic 39
*Samuel Afoakwa (Ghana Communication Technology University, Ghana), Crentsil Kwayie (Ghana Communication Technology University, Ghana), and Joseph Owusu (University of Energy and Natural Resources, Ghana)*

An Emergent Design Approach to Test the Quality of the Software System 43
*Hajarisena Razafimahatratra (University of Fianarantsoa), Mihaela Ilie (University of Craiova), Andrianjaka Miary Rapatsalahy (University of Fianarantsoa), Thomas Mahatody (University of Fianarantsoa), Sorin Ilie (University of Craiova), and Nicolas Raft (University of Fianarantsoa)*

A DSS-Based Comparator for Facial Race Age Estimation 49
*Ebenezer Nii Ayi Hammond (University of Electronic Science and Technology of China, China; Council for Scientific and Industrial Research), Shijie Zhou (School of Information and Software Engineering), and Qihe Liu (School of Information and Software Engineering)*

Hyperspace Neighbor Penetration Approach to Dynamic Programming for Model-Based Reinforcement Learning Problems with Slowly Changing Variables in a Continuous State Space 57
*Vincent Zha (TELUS, Canada) and Ivey Chiu (TELUS, Canada)*

Cyberattack Ontology: A Knowledge Representation for Cyber Supply Chain Security 65
*Abel Yeboah-Ofori (University of West London, UK), Umar Mukhtar Ismail (University of East London, UK), Tymoteusz Swidurski (University of East London, UK), and Francisca Opoku-Boateng (Dakota State University, USA)*

Cyber Threat Ontology and Adversarial Machine Learning Attacks: Analysis and Prediction Perturbance 71
*Abel Yeboah-Ofori (University of West London, UK), Umar Mukhtar Ismail (University of East London, UK), Tymoteusz Swidurski (University of East London, UK), and Francisca Opoku-Boateng (Dakota State University, USA)*

An Enhanced Approach of the K-Means Clustering for Anomaly-Based Intrusion Detection Systems 78
*Meriem Kherbache (University Abderrahmane Mira, Algeria), David Espes (University of Western Brittany, France), and Kamal Amroun (University Abderrahmane Mira, Algeria)*

Assessment of Challenges with Borrowing and Underlying Effects of MSMEs in Kaneshie, Greater Accra Region of Ghana .84
*Emmanuel Kwabla Ocloo (Ramaiah University of Applied Science Bangalore, India), Ruhiya Abubakar (Ghana Communication Technology University Accra, Ghana), and G. Deva Kumar (Ramaiah University of Applied Science Bangalore, India)*

Analysis of Collocated Base Transceiver Stations And Associated Risks in Erecting Base Stations .92
*Owusu Agyeman Antwi (Ghana Communication Technology University, Ghana), Albert Osei Owusu (Ghana Communication Technology University, Ghana), Joseph Wumboranaan Nanjo (Sunyani Technical University, Ghana), Gabriel Blanton Gidisu (Ghana Communication Technology University, Ghana), Dennis Sackey (Ghana Communication Technology University, Ghana), and Haruna Mohammed (Open University Malaysia, Ghana)*

Can Machines Communicate? .98
*Sanskar Jethi (Delhi Technological University, India), Avinash Choudhary (Delhi Technological University, India), and Yash Gupta (Delhi Technological University, India)*

Prediction of Telecommunication Network Outage Time Using Multilayer Perceptron Modelling Approach .104
*Francis Kwabena Oduro-Gyimah (Ghana Communication Technology University, Ghana), Kwame Osei Boateng (Kwame Nkrumah University of Science and Technology, Ghana), Prince Boahen Adu (Ghana Communication Technology University, Ghana), and Kester Quist-Aphetsi (Ghana Communication Technology University, Ghana)*

Selective Blocking Approach of User Equipment in Restricted Communication Zones .109
*Michael Agyare (Kwame Nkrumah University of Science and Technology, Ghana), Jerry John Kponyo (Kwame Nkrumah University of Science and Technology, Ghana), and Francis Kwabena Oduro-Gyimah (Ghana Communication Technology University, Ghana)*

Exploration of Endogenous Constraints Leading to Failure of Micro Small and Medium Enterprises (MSMEs) in Developing Countries (A Case Study of Mallam, Greater Accra Region of Ghana) .115
*Emmanuel Kwabla Ocloo (Ramaiah University of Applied Sciences Bangalore, India), Ebenezer Malcalm (Ghana Communication Technology UniversityAccra, Ghana), and G. Deva Kumar (Ramaiah University of Applied ScienceBangalore, India)*

Great in, Great Out is the new "Garbage in, Garbage Out": Subsampling from Data with no Response Variable using Various Approaches, Including Unsupervised Learning .122
*Lubomír Štěpánek (Faculty of Informatics and Statistics, University of Economics, Czech Republic; First Faculty of Medicine, Charles University, Czech Republic), Filip Habarta (Faculty of Informatics and Statistics, University of Economics, Czech Republic), Ivana Malá (Faculty of Informatics and Statistics, University of Economics, Czech Republic), and Luboš Marek (Faculty of Informatics and Statistics, University of Economics, Czech Republic)*

An Alternative to Cox's Regression for Multiple Survival Curves Comparison: A Random Forest-Based Approach using Covariate Structure .130
*Lubomír Štěpánek (Faculty of Informatics and Statistics, University of Economics, Czech Republic; First Faculty of Medicine, Charles University, Czech Republic), Filip Habarta (Faculty of Informatics and Statistics, University of Economics, Czech Republic), Ivana Malá (Faculty of Informatics and Statistics, University of Economics, Czech Republic), and Luboš Marek (Faculty of Informatics and Statistics, University of Economics, Czech Republic)*

Jack-Knifing in Small Samples of Survival Data: when Bias Meets Variance to Increase Estimate Precision .138
*Lubomír Štěpánek (Faculty of Informatics and Statistics, University of Economics, Czech Republic; First Faculty of Medicine, Charles University, Czech Republic), Filip Habarta (Faculty of Informatics and Statistics, University of Economics, Czech Republic), Ivana Malá (Faculty of Informatics and Statistics, University of Economics, Czech Republic), and Luboš Marek (Faculty of Informatics and Statistics, University of Economics, Czech Republic)*

Sustainable Waste Management Practices in a Higher Education Institution of Ghana .145
*Nana Agyeman-Prempeh (Faculty of IT Business Ghana Communication Technology University, Ghana), Patrick Acheampong (Faculty of IT Business Ghana Communication Technology University, Ghana), Emmanuel Freeman (Faculty of IT Business Ghana Communication Technology University, Ghana), Eric Ekobor-Ackah Mochiah (Faculty of IT Business Ghana Communication Technology University, Ghana), Ruhiya Abubakar (Faculty of Engineering Ghana Communication Technology University, Ghana), and Louis David Jnr. Annor (Faculty of IT Business Ghana Communication Technology University, Ghana)*

Smart Model of Accessibility and Mobility of Health Care .153
*Mêtowanou H.Ahouandjinou (University of Abomey-Calavi Cotonou, Benin), Daton Medenou (University of Abomey-Calavi Cotonou, Benin), Roland C. Houessouvo (University of Abomey-Calavi Cotonou, Benin), and M.A.Godwind Houdji (University of Abomey-Calavi Cotonou, Benin)*

A Cryptographic Tamper Detection Approach for Storage and Preservation of Forensic Digital Data Based on SHA 384 Hash Function .159
*Isaac Baffour Senkyire (Ghana Communication Technology University, Ghana; Cyber Security Division, CRITAC, Ghana; Directorate of Information Assurance and Intelligence Research, CRITAC, Ghana) and Kester Quist-Aphetsi (Ghana Communication Technology University, Ghana; Cyber Security Division, CRITAC, Ghana; Directorate of Information Assurance and Intelligence Research, CRITAC, Ghana)*

Crime Predictive Model in Cybercrime Based on Social and Economic Factors Using the Bayesian and Markov Theories .165
*Kester Quist-Aphetsi (Ghana Communication Technology University, Ghana; Cyber Security Division, CRITAC, Ghana; Directorate of Information Assurance and Intelligence Research, CRITAC, Ghana) and Emeh Jennifer Afoma (Cyber Security Division, CRITAC, Ghana; Directorate of Information Assurance and Intelligence Research, CRITAC, Ghana)*

**Author Index 171** . . . . . .