



2021

IEEE CSDE/i-COSTE

08–10th December 2021

Brisbane, Australia [[Online Event](#)]

PROGRAM

GENERAL CHAIR MESSAGE



Dear IEEE CSDE/-i-COSTE 2021 Authors, Invited Guests, and Delegates

As the General Chair of the IEEE Asia-Pacific Conference on Computer Science and Data Engineering (CSDE 2021)/ International Conference on Sustainable Technology and Engineering 2021 (i-COSTE 2021), it gives us immense pleasure to welcome over 150 guests and delegates from Universities, Research Organizations, Industry, Government, and NGOs from over 15 countries around the world to the Conference. Also, a very warm welcome to the beautiful and Australian Tropical Capital Brisbane in a virtual way. COVID-19 changed many of our current practices in 2021 including face-to-face conferences but we are thankful to all conference authors and delegates who supported our idea of arranging this conference online.

CSDE & i-COSTE 2021 received just below 386 submissions from 21 countries with 810 co-authors across six continents. Authors from China, Australia, Japan, the United States, Germany, India, Bangladesh, Fiji, the United Kingdom, Korea, Malaysia, South Africa, and Brazil had respectively submitted the highest number of papers to the Conference. Each submission was peer-reviewed by at least two experts in the respective fields and the acceptance decisions were based on at least two consistent recommendations, ensuring high quality and standard of the Conference and its Proceedings. In total, 150 papers from 810 authors were finally accepted and are included in the Conference Proceedings and Program. From these authors, 120 have one accepted paper, 25 have two accepted papers and 5 have 3 or more accepted papers. The accepted and scheduled papers will be presented in 23 oral sessions over a 3-day period. A few accepted papers were submitted to the special sessions of the Conference.

We are also privileged to have 5 distinguished keynote speakers, one PhD thesis symposium. We would like to take this opportunity and thank all distinguished keynote speakers, subject track chairs, session chairs, numerous reviewers and authors, and all members of the technical and organization committees. We sincerely thank the Conference's financial sponsor IEEE and technical co-sponsors, and all supporting universities from several countries. Without their great support, this conference could not have been successful. We wish all of you a very pleasant and fruitful online time at the Conference, and we hope that you could have an opportunity to Brisbane in a future conference, hosted by us, when the COVID-19 pandemic is settled down.

Now officially I announce the opening of IEEE CSDE/i-COSTE 2021. Over to MC.

Professor Suzanne Wilkinson, Massey University, New Zealand
General Chair

GENERAL CHAIR BIO

Suzanne Wilkinson is a Professor of Construction Management in the New School for Built Environment, Massey University, Director of Postgraduate Studies, School for Built Environment and Associate Dean (Research), College of Sciences, Massey University. She has a PhD in Construction Management, and a BEng (Hons) in Civil Engineering, both from Oxford Brookes University, and a Graduate Diploma in Business Studies (Dispute Resolution) from Massey University. Prior to working at Massey University, Suzanne was at the University of Auckland, Department of Civil and Environmental Engineering, from lecturer to Professor and Deputy Head of Department.

Suzanne's research focuses on resilience, disaster management, construction innovation and smart cities. She is interested in how cities, communities and organisations plan for disasters and manage hazard events and has a particular interest in how cities, communities and organisations rebuild and recover. Suzanne has been advisor to organisations on resilience building and disaster recovery, most recently including Auckland Council, Government Agencies in New Zealand and Hunter Water in Australia. Suzanne has been Principal Investigator and Research Leader on many projects, including a recent 5 year, \$10 million NZD project, where she is programme lead, on building capacity and capability for the construction sector and a recently completed 4million NZD Principal Investigator for the Urban theme in the National Science Challenge: Resilience to Nature's Challenges. She has published over 300 research papers and co-written 3 books, the most recent being *Resilient Post Disaster Recovery Through Building Back Better* (Routledge in 2019), with her colleagues Sandeeka Mannakkara and Regan Potangaroa. Suzanne is a keen PhD supervisor and has now supervised to completion over 30 PhD students.

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A/Professor Abu Shadat Muhammad Sayem, Chittagong University of Engineering & Technology, Bangladesh
Dr Shelvin Chand, CSIRO, Australia

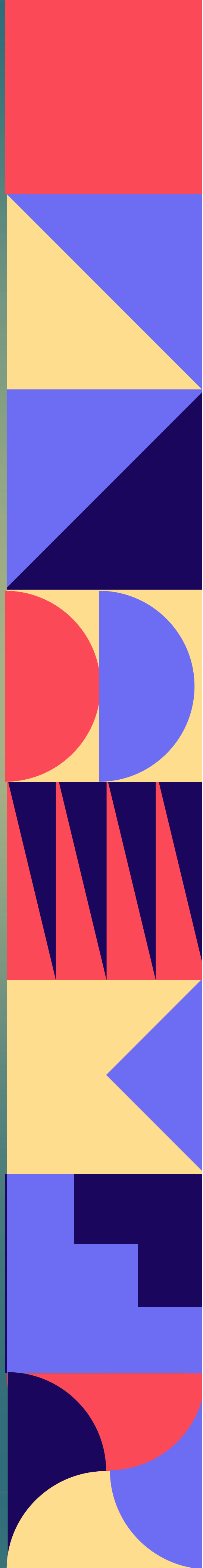
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Dr Rahul Kumar, The University of the South Pacific, Fiji
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Professor Tapan Kumar Jodder, Islamic University, Bangladesh
Ms. Tresia Holtzhausen, Nelson Mandela University, South Africa
Professor Tushar Shaha, Jatiya Kabi Kazi Nazrul Islam University, Bangladesh
Ms. Zahra Mungloo-Dilmohamud, University of Mauritius, Mauritius



KEYNOTE SPEAKERS



Professor Cristian Sorin Calude
The University of Auckland, New Zealand

Topic: Do We Need Quantum Random Generators?

Professor Mohamed Medhat Gaber
Birmingham City University
United Kingdom



Topic: Deep Convolutional Neural Networks for Covid-19 Detection from Chest X-ray Images: From Class Decomposition to Self-supervision



Professor Anuradda Ganesh (Fellow-INAEE)
IIT Bombay, India

Topic: Have we defined the problem right : Renewables or Sustainability

Professor Richard Sinnott

The University of Melbourne, Australia

Topic: Big Data Platforms for Applied Research: from Theory to the Real World



Professor Rezaul Begg
Victoria University, Melbourne, Australia

Topic: Machine Learning for Gait Pathology Diagnosis and Rehabilitation

CONFERENCE PROGRAM

DAY - 1: 08th December 2021

16.00-16.30 AEST || Virtual Registration and Cocktail Reception
Virtual Lounge & Bar Area - Zoom 1
OPENING CEREMONY

16.30-17.15 || Keynote Talk ONE - Zoom 1

17.15-18.00 || Keynote Talk TWO - Zoom 1

18.00-19.30 || PhD Thesis Symposium - Zoom 1

18.00-20.00 || Session 1 - Zoom 2

DAY - 2: 09th December 2021

09.00-10.30 AEST || Session 2 - Zoom 1; Session 3: Zoom 2; Session 4: Zoom 3

10.30-11.00 || Break Time for Tea and Coffee

11.00-13.00 || Session 5 - Zoom 1; Session 6: Zoom 2; Session 7: Zoom 3

13.00-14.00 || Lunch Break

14.00-16.00 || Session 8 - Zoom 1; Session 9: Zoom 2; Session 10: Zoom 3

16.00-16.45 || Keynote Talk Three - Zoom 1

16.50-17.35 || Keynote Talk Four - Zoom 1

DAY - 3: 10th December 2021

09.00-10.30 AEST || Session 11 - Zoom 1; Session 12: Zoom 2; Session 13: Zoom 3

10.30-11.00 || Break Time for Tea and Coffee

11.00-13.00 || Session 14 - Zoom 1; Session 15: Zoom 2; Session 16: Zoom 3

13.00-14.00 || Lunch Break

14.00-16.00 || Session 17 - Zoom 1; Session 18: Zoom 2; Session 19: Zoom 3

16.00-16.45 || Keynote Talk Five - Zoom 1

16.50-17.50 || Closing and Award Ceremony



DAY

1

[Zoom 1 Link](#)[Zoom 2 Link](#)[Zoom 3 Link](#)

Meeting ID: 912 2912 4156

Meeting ID: 998 7048 2510

Meeting ID: 964 8102 0864

Passcode: 529147

Passcode: 998668

Passcode: 739330

IEEE CSDE & i-COSTE 2021 - Day 1

Date: 08th December 2021; Time: 16:00 – 16:30 **AEST (Australian Eastern Standard Time)**

OPENING CEREMONY

CHIEF GUEST

Professor Suzanne Wilkinson, Massey University, New Zealand

Associate Professor M G M Khan, The University of The South Pacific, Fiji

CONFERENCE REPORT

Professor A B M Shawkat Ali, The University of Fiji, Fiji

MASTER OF CEREMONIES

Shayneel Chand, The University of Fiji, Fiji

KEYNOTE TALK

Date: 08th December 2021; Time: 16:30 - 18:00 **AEST** Venue: Zoom 1Keynote Talk ONE Time: 16.30-17.15 **AEST**Keynote Speaker: [Professor Anuradda Ganesh \(Fellow-INAE\), IIT Bombay, India](#)

Title: Have we defined the problem right: Renewables or Sustainability

Chair: [Associate Professor Jahangir Hossain, University of Technology Sydney, Australia](#)Keynote Talk TWO Time: 17.15-18.00 **AEST**Keynote Speaker: [Professor Cristian Sorin Calude, The University of Auckland, New Zealand](#)

Title: Do We Need Quantum Random Generators?

Chair: [Professor Girija Chetty, University of Canberra, Australia](#)

Keynote Talk ONE



DAY

1

Speaker: Professor Anuradda Ganesh (Fellow-INAE), IIT Bombay, India

Topic: Have we defined the problem right: Renewables or Sustainability

BRIEF BIO

Professor Dr Anuradda Ganesh is the Chief Technical Advisor at the Cummins Technologies India Pvt Ltd. She advises on innovative technology, regulatory trends and policy. She also advises on University and Government collaboration areas and strategic partnerships. In her earlier roles, she established and led the Research and Innovation for Cummins Tech Center (India), to address the fit-for-market requirements for Cummins India products. She was the Director of Cummins Research and Technology India, focusing on the application of Analysis Led Design tools to reduce the time and cost of product development.

As a PhD in Chemical Engineering, she brings in a unique combination of excellence in academia as well as industry. Prior to joining the industry, she had an extensive career in Academia and Research as a Professor of the Department of Energy Science and Engineering (DESE) at the Indian Institute of Technology Bombay (IITB). She has contributed extensively to the field of renewable energy. Her research spans different subjects including alternate fuels (producer and syngas), chemicals (using supercritical fluid extraction) from biomass and “smart-carbon”, underground coal gasification, and energy systems modelling. She has contributed to the subject with over 60 international publications, over 4000 citations, supervised 16 PhDs and has half a dozen granted patents.

In 2020, she was inducted as a Fellow of the Indian Nation Academy of Engineering. She is the recipient of the SWE Prism Award in 2021 for her impact on Society as well as the engineering community. She has shared her journey and tips in an e-book published in 2021, by the Confederation of Indian Industries (CII) on 51 Indian women achievers in STEM.

Keynote Talk TWO

DAY
1

Speaker: Professor Cristian Sorin Calude, Auckland University
New Zealand

Topic: Do We Need Quantum Random Generators?



BRIEF BIO

Professor Cristian Sorin Calude is a Romanian-New Zealander mathematician and computer scientist.

After graduating from the Vasile Alecsandri National College in Galați, he studied at the University of Bucharest, where he was student of Grigore C. Moisil and Solomon Marcus. Calude received his Ph.D. in Mathematics from the University of Bucharest under the direction of Solomon Marcus in 1977. He is currently chair professor at the University of Auckland, New Zealand and also the founding director of the Centre for Discrete Mathematics and Theoretical Computer Science. Visiting Professor in many universities in Europe, North and South America, Australasia, South Africa, including Monbusho Visiting Professor, JAIST, 1999 and Visiting Professor ENS, Paris, 2009, École Polytechnique, Paris, 2011; Visiting Fellow, Isaac Newton Institute for Mathematical Sciences, 2012; Guest Professor, Sun Yat-sen University, Guangzhou, China, 2017–2020; Visiting Fellow ETH Zurich, 2019. Former professor at the University of Bucharest. Calude is author or co-author of more than 270 research articles and 8 books, and is cited by more than 550 authors. He is known for research in algorithmic information theory, quantum computing, discrete mathematics and history and philosophy of computation.

In 2017, together with Sanjay Jain, Bakhadyr Khoussainov, Wei Li, and Frank Stephan, he announced an algorithm for deciding parity games in quasipolynomial time. Their result was presented by Bakhadyr Khoussainov at the Symposium on Theory of Computing 2017 and won a Best Paper Award. Calude was awarded the National Order of Faithful Service in the degree of Knight by the President of Romania, Mr. Klaus Iohannis, in June 2019.

ABSTRACT

Quantum random number generators (QRNGs) have proliferated in the last decade because higher quality randomness is required in many areas, from cryptography, statistics, information science to medicine, and the many pitfalls, sometimes catastrophic, of pseudo-random number generators (PRNGs). QRNGs claim to be better than PRNGs, but are these assertions true? In this talk we will present a QRNG based on a new theory of quantum randomness which guarantees the maximal unpredictability of its quantum random digits, a quality no PRNG can match.



DAY

1

[Zoom 1 Link](#)
[Zoom 2 Link](#)
[Zoom 3 Link](#)

Meeting ID: 912 2912 4156

Meeting ID: 998 7048 2510

Meeting ID: 964 8102 0864

Passcode: 529147

Passcode: 998668

Passcode: 739330

Date: 08th December 2021; Time: 18:00 – 19:30 AEST

Venue: Zoom 1

PHD THESIS SYMPOSIUM

Chair: Professor A B M Shawkat Ali, The University of Fiji, Fiji

Panel Members: Professor Girija Chetty, Professor Rajkumar S. Pant, Assoc. Professor Bibhya Sharma, Dr. Michael J. Dinneen, Assoc. Professor Md. Golam Rabiul Alam

PhD Candidate	Supervisor and Institute Details
Ggaliwango Marvin CSDE14 & CSDE20	Associate Professor Md. Golam Rabiul Alam BRAC School of Data and Sciences, BRAC University, Bangladesh
Tim Giese CSDE138	Prof. Dr.-Ing Reiner Anderl Computer Aided Design, Technische Universität Darmstadt, Germany
Mojgan Hafezi Fard CSDE244	Dr. Krassie Petrova School of engineering, computer and mathematical sciences, Auckland University of Technology, New Zealand
RAMFUL Raviduth CSDE30 & CSDE35	Professor Sachiko Sukigara Department of Advanced Fibre Science, Kyoto Institute of Technology, Japan
Hanif Auwal Ibrahim iCISTE26	Dr. Michael Ayomoh Industrial and Systems Engineering, University of Pretoria, South Africa
Xudong Hu CSDE188	Associate Professor Biplab Sikdar Electrical and Computer Engineering, National University of Singapore, Singapore
iCOSTE46 Amna Farrukh	Dr. Sanjay Mathrani School of Food and Advanced Technology, Massey University, Auckland, New Zealand

Date: 08th December 2021; Time: 18:00 – 20:00 AEST

Venue: Zoom 2

Special Session 1: 3D Vision, Virtual and Augment Reality

Chair: Associate Professor Md. Ashraful Alam, BRAC University, Bangladesh

Paper ID	Paper Title
CSDE65	Run or Pat: Using Deep Learning to Classify the Species Type and Emotion of Pets <i>Richard O. Sinnott, Uwe Aickelin, Yunjie Jia, Elizabeth R.J. Sinnott, Pei-Yun Sun and Rio Susanto</i>
CSDE68	Canteen Automation System: An Approach for “Smart City” Planning <i>Syeda Tanzina Farhin Toma, Dolan Karmaker, Sumaiya Iqbal, Md Humayun Kabir Pantho and Raihana Shams Islam Antara</i>
CSDE70	Improved Prediction of Monthly Pan Evaporation Utilising Support Vector Machine Technique <i>Mustafa Abed, Monzur Imteaz, Ali Najah Ahmed and Yuk Feng Huang</i>
CSDE122	Covid-19 Tracker: A data visualization tool for timeseries data of pandemic in India <i>Yaksh Talavia, Priyanka Singh and Sathiamoorthy Manoharan</i>
CSDE123	Deep Learning Method for Haze Prediction in Singapore <i>Azam Che Idris and Hayati Yassin</i>
CSDE129	Mobility Assistance for Visually Impaired Using LiDAR <i>Vikrant Gurav, Kevin Sherla, Abhinav Parameshwaran</i>
CSDE285	A Color Vision Approach Considering Weather Conditions Based on Autoencoder Techniques Using Deep Neural Networks <i>Mohammad Mainuddin Raj, Samaul Haque Tasdid, Maliha Ahmed Nidra, Jobaer Noor, Sanjana Amin Ria and Md. Ashraful Alam</i>
CSDE159	Detection of Malicious URLs through an Ensemble of Machine Learning Techniques <i>U Ananthanagu, Manav Agarwal, Rishab Kashyap, Shreya Panale, Shreya Venugopal</i>

IEEE CSDE/i-COSTE 2021 | PhD Thesis Symposium & Session 1



DAY

2

[Zoom 1 Link](#)

Meeting ID: 912 2912 4156

Passcode: 529147

[Zoom 2 Link](#)

Meeting ID: 998 7048 2510

Passcode: 998668

[Zoom 3 Link](#)

Meeting ID: 964 8102 0864

Passcode: 739330

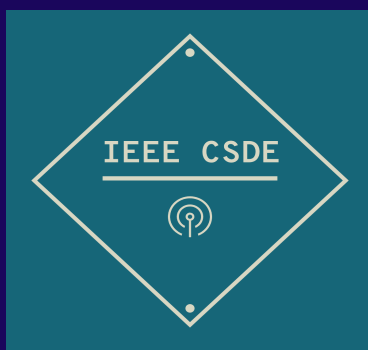
IEEE CSDE & i-COSTE 2021 – Day 2

09.12.2021

Date: 09 th December 2021; Time: 09:00 – 10.30 AEST		Venue: Zoom 1
Session: 2		
Chair: Dr. Andrew Chiou, CQUniversity, Australia		
Paper ID	Paper Title	
CSDE3	An Overview of Gamification in Conflict Resolution and Complex Problems Using Scaled Down Arenas in Areas of Contention <i>Maneerat Rumsamrong and Andrew Chiou</i>	
CSDE22	A Performance Comparison of Fake News Detection Approaches <i>Richard O. Sinnott and Haichao Zhu</i>	
CSDE31	The impact of demographics on user satisfaction in cloud-based payment systems in Australia <i>Domingos Mondego and Ergun Gide</i>	
CSDE8	Supporting End User Comprehension in Intelligent Decision Support Systems Using Data Visualisation Techniques <i>Maneerat Rumsamrong and Andrew Chiou</i>	
CSDE36	Deep AE: application to financial mathematics <i>Yuga Iguchi, Riu Naito, Yusuke Okano, Akihiko Takahashi and Toshihiro Yamada</i>	
CSDE42	Retail Analytics to anticipate Covid-19 effects Using Big Data Technologies <i>Jessica, Deepikesh and Krishneel</i>	

Date: 09 th December 2021; Time: 09:00 – 10.30 AEST		Venue: Zoom 2
Session: 3		
Chair: Dr Meena Jha, CQUniversity, Australia		
Paper ID	Paper Title	
CSDE77	Cyber-Physical Systems and Digital Twins in Practice - A Real-Life Application Example <i>Ulrich Dahmen, Marc Priggemeyer, Jürgen Roßmann</i>	
CSDE60	Autonomous UAV Landing on Mobile Platforms <i>Darmesh Kumar, Jai Raj, Krishna Raghuwaiya and Jito Vanualailai</i>	
CSDE62	Social Media Rumour Detection through Graph Attention Networks <i>Xinpeng Zhang, Shuzhi Gong and Richard O. Sinnott</i>	
CSDE69	Finding the drivers for ERP systems uptake in SMEs – an exploratory multiple-case study of selected Fijian companies <i>Sanmugam Goundar, M.G.M Khan and Karuna Garan Reddy</i>	
CSDE75	Decoy-File-Based Deception without Usability Degradation <i>Yu Aoike, Masaki Kamizono, Masashi Eto, Noriko Matsumoto and Norihiko Yoshida</i>	
CSDE38	A Conceptual Framework to Enhance Business Performance using Social Media: An Australian Context <i>Meena Jha, Suresh Khatiwada and Lily Li</i>	

IEEE CSDE/i-COSTE 2021 | Session 2 & 3

[Zoom 1 Link](#)[Zoom 2 Link](#)[Zoom 3 Link](#)

Meeting ID: 912 2912 4156

Meeting ID: 998 7048 2510

Meeting ID: 964 8102 0864

Passcode: 529147

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Passcode: 739330

Date: 09th December 2021; Time: 09:00 – 10.30 AEST		Venue: Zoom 3
Session: 4		
Chair: Dr Md Mamunur Rashid, CQUniversity, Australia		
Paper ID	Paper Title	
CSDE108	A Deep Reinforcement Learning Scheduler with Back-filling for High Performance Computing <i>Lingfei Wang, Aaron Harwood and Maria A. Rodriguez</i>	
CSDE121	Churn Prediction in Telecom Industry using Machine Learning Ensembles with Class Balancing <i>Abdullahi Chowdhury, Shahriar Kaisar, Md Mamunur Rashid, Sakib Shahriar Shafin, Joarder Kamruzzaman</i>	
CSDE132	Detection of Android Malware using Tree-based Ensemble Stacking Model <i>Sakib Shahriar Shafin, Md. Maroof Ahmed, Mahmud Alam Pranto, Abdullahi Chowdhury</i>	
CSDE137	Older Adults and Digital Game: Trends, Challenges and Benefits <i>Nurul Farinah Mohsin, Suriati Khartini Jali, Mohamad Imran Bandan, Nurfaiza Jali, Amelia Jati Robert Jupit</i>	
CSDE141	Exploring the Evolutionary Characteristics of Project Management Approaches at Different Levels of Operations <i>Nazish Saleem, Sanjay Mathrani and Aymen Sajjad</i>	
CSDE147	Statistical Methods for Data mining Mathematics students' online presence <i>Mohammed Naseem, Emmenual Reddy and Ravneil Nand</i>	

Tea and Coffee Break

Time: 10.30-11.00 AEST

Date: 09th December 2021; Time: 11:00 – 13.00 AEST		Venue: Zoom 1
Session: 5		
Chair: Associate Professor Norsaremah Salleh, International Islamic University Malaysia, Malaysia		
Paper ID	Paper Title	
CSDE14	A Machine Learning Approach for Predicting Therapeutic Adherence to Osteoporosis Treatment <i>Ggaliwango Marvin and Md Golam Rabiul Alam</i>	
CSDE17	A Comparative Analysis of Hyper-parameters using Neural Networks for E-mail Spam Detection <i>Syed Mahbubuz Zaman, Md. Mohidul Hasan, Redwan Islam Sakline, Dipto Das and Md. Ashraful Alam</i>	
CSDE20	Cardiotocogram Biomedical Signal Classification and Interpretation for Fetal Health Evaluation <i>Ggaliwango Marvin and Md. Golam Rabiul Alam</i>	
CSDE28	A new Dataset of Wideband Radar Signals for Training Deep Neural Networks on Classification and Detection Tasks <i>Mohamed A. Ammar, Mohamed S. Abdel-Latif, Khaled Mahmoud Badran, Hossameldin A. Hassan</i>	
CSDE37	Multi-modal Emotion Recognition for Determining Employee Satisfaction <i>Farhan Uz Zaman, Maisha Tasnia Zaman, Saadat Hussain, Nahian Kabir, Md. Ashraful Alam, Md. Golam Rabiul Alam</i>	
CSDE46	Multi-dimensional comparison and selection of high-quality drinking water renovation project schemes for communities <i>Zeng Jiayu, Liu Siwei, Lu Yao, Cao Haochen, Zhu Yanping and Shu Shihu</i>	
CSDE07	Australian COVID-19 Data Visualization and Forecasting <i>Proma Ali, Ayesha Reddy and Mohammed Zameel</i>	

Older Adults and Digital Game: Trends, Challenges and Benefits

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Abstract— The usage of digital games is not limited to entertainment purposes. It can be used in healthcare and social science studies focusing on older adults as the main subject. The objectives of this review are to identify the challenges related to older adults, the benefits they gained using the digital game, and the method used in previous studies. There are 27 articles reviewed based on keywords searched in Scopus database. These studies are evaluated regarding their approaches, challenges and benefits of digital games highlighted in their studies. Finally, several improvable points in the current approaches are highlighted and suggestions are provided as further works.

Keywords— *andragogical perspectives, benefits, challenges, digital game, older adults*

I. INTRODUCTION

Digital gaming is widely known as an entertainment tool. However, the currently available games in the market are designed and developed specifically for the younger users in mind. The potential of digital games can be seen in healthcare, primarily focusing on older adults specifically. According to [1], digital games can be used as technology to enhance older adult's life by providing enjoyment. Serious game is a game that serves the purpose of improving the daily activities of older adults such as vision, balance and memory [2]. It can help older adults improve physical and cognitive functions [3].

To attract the attention of older adults and utilise their cognitive abilities, it is crucial to apply the key principles of andragogy while designing and developing the game. Andragogy is an art and science of helping adults to learn. According to the principles of andragogy, older adults who understand the rationale of playing, know the game, and acknowledge the importance of the digital game will make the process of the gameplay session run smoothly and increase their motivation and attention.

The principal focus is a systematic review of gaming studies, platform and technology for seniors gleaned from the Scopus database. This review paper aim is to conduct a systematic review on the game platform and technology used in previous studies between 2015 to 2020, the challenges for older adults to interact, and experience the digital games and the benefits they gain from interacting with digital games computer game is commonly referred to as an entertainment instrument. However,

the games currently on the market are specifically designed and developed for the younger user in mind.

II. METHODOLOGY

A. Data Collection

There are two methods used for data collection, keywords identification and database, period researched and review process.

1) Keywords Identification

The first step in this systematic literature review is to define keywords used to ensure the process of this research runs smoothly and meets the purpose of this re-view. The keywords used in this review is ("older adults AND digital game") OR ("andragogy").

2) Database, Period Researched and Review Process

Scopus, the chief database source was used to identify relevant articles containing the identified keywords. Only publications published from 2015 until 2020 were selected for this review. Publication from 2015-2020 were selected to understand the gap knowledge related to older adults and digital gaming in recent years. The articles selection for review are based on abstract, target groups, and language used in the published articles. Only articles written in English and the target group focussing on older adults are selected for this review paper.

B. Data Analysis

There are four data are analysed in this paper, game platform and technology, challenges related to older adults, benefits gains through playing digital games and research purposes and methodologies used in previous studies.

1) Game Platform and Technology

The previous researchers used many types of game technology and game platform in their studies. In this review, it only focuses on mobile, console, and web-based game technology.

2) Challenges Related to Older Adults

There are many challenges related to older adults interacting with digital games and we group it based on four categories: