

# **2020 IEEE / ITU International Conference on Artificial Intelligence for Good (AI4G 2020)**

**Geneva, Switzerland  
21-25 September 2020**



**IEEE Catalog Number: CFP20X09-POD  
ISBN: 978-1-7281-7032-9**

**Copyright © 2020 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:	CFP20X09-POD
ISBN (Print-On-Demand):	978-1-7281-7032-9
ISBN (Online):	978-1-7281-7031-2

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Table of Contents

## 2020 IEEE / ITU International Conference on Artificial Intelligence for Good (AI4G)

### Managing and Implementing AI Projects

<i>Artificial Intelligence Driven Crop Protection Optimization for Sustainable Agriculture</i> Priyamvada Shankar (Luleå Technological University & BASF Digital Farming GmbH, Germany), Nicolas Werner (BASF Digital Farming GmbH, Germany), Sandra Selinger (BASF Digital Farming GmbH, Germany), Ole Janssen (BASF Digital Farming GmbH, Germany) .....	1
<i>Innovative Multi-Step Anomaly Detection Algorithm with Real-World Implementation</i> Emir Žunić (Info Studio Sarajevo and Faculty of Electrical Engineering, University of Sarajevo, Bosnia and Herzegovina), Zlatan Tucaković (Faculty of Electrical Engineering, University of Sarajevo, Bosnia and Herzegovina), Sead Delalić (Faculty of Science at University of Sarajevo, Bosnia and Herzegovina), Haris Hasić (Tokyo Institute of Technology, Tokyo, Japan), Kerim Hodžić (Faculty of Electrical Engineering, University of Sarajevo, Bosnia and Herzegovina) .....	9
<i>Proposal for a Chatbot Prototype in the Plant Health Department of Brazilian Ministry of Agriculture</i> Wiliam R Feitosa (Rua de Dioqo Botelho & IFSP, Portugal), Susana C. Silva (Católica Porto Business School - Universidade Católica Portuguesa, Portugal), Flora Patrocínio (IFSP, Portugal), Sara Santos (IFSP, Portugal) .....	17
<i>Reducing Modern Slavery Using AI and Blockchain</i> Pratap Tambe (Large IT Services Company, United Kingdom (Great Britain)), Prerna Tambay (Brunel University London, United Kingdom (Great Britain)) .....	22

### Responsible and Ethical Approaches to AI

<i>Seeking Nonhuman Advice: Ancient and Modern</i> Zachary Hutchinson (University of Maine, USA) .....	28
<i>Analysis of Soft Law Mechanisms for the Governance of AI</i> Carlos I Gutierrez (Arizona State University, USA), Gary Marchant (ASU, USA), Kaylee Hoffner (ASU, USA), Morgan Stevens (ASU, USA) .....	33
<i>eVision: Influenza Forecasting Using CDC, WHO, and Google Trends Data</i> Navid Shaqhaqi (Santa Clara University, USA), Andres Calle (Santa Clara University, USA), Yuhang Qian (Santa Clara University, USA) .....	38
<i>Misinformation in Crises: A Conceptual Framework for Examining Human-Machine Interactions</i> Thi Ngoc Tran (University of Texas at San Antonio, USA), Rohit Valecha (University of Texas at San Antonio, USA), Paul Rad (University of Texas at San Antonio, USA), Raghav Rao (unknown) .....	46
<i>A Novel Application for the Efficient and Accessible Diagnosis of ADHD Using Machine Learning</i> William H Das (Hunter College High School, USA), Shubh Khanna (Hunter College High School, USA) .....	51

### Technology Advancements in AI

<i>Combating Deepfakes: Multi-LSTM and Blockchain as Proof of Authenticity for Digital Media</i> Christopher CK Chan (Chaoyang University of Technology, Taiwan), Vimal Kumar (Chaoyang University of Technology, Taiwan), Steven Delaney (Capital Blockchain Inc., Canada), Munkhjargal Gochoo (United Arab Emirates University, United Arab Emirates) .....	55
<i>Maximising Value of Frugal Soil Moisture Sensors for Precision Agriculture Applications</i> Prachin Jain (Tata Consultancy Services, India), Swagatam Bose Choudhury (Tata Consultancy Services Limited, India), Prakruti V. Bhatt (Tata Consultancy Services, India), Sanat Sarangi (Tata Consultancy Services, India), Srinivasu Pappula (Tata Consultancy Services, India) .....	63
<i>Probabilistic Interpretation of Cognitive Radio in Entropy Nonlinear Networks with Quantum Mechanics</i> Huber Nieto-Chaupis (Peru & Universidad Privada del Norte, Peru) .....	71

<i>EdgeAI: Diabetic Retinopathy Detection in Intel Architecture</i> Gina Mathew (QuEST Global Services Pte. Ltd, India), Sindhu Ramachandran S (Quest Global Engineering Services, India), Suchithra Vezhavelil Suresh (QuEST-Global Services Pte. Ltd, India) .....	75
<i>A Tiny CNN Architecture for Identifying Bat Species from Echolocation Calls</i> Imran A. Zualkernan (American University of Sharjah, United Arab Emirates), Jacky Judas (Emirates Nature - WWF, United Arab Emirates), Taslim Mahbub (American University of Sharjah, United Arab Emirates), Azadan Bhaqwaqar (American University of Sharjah, United Arab Emirates), Priyanka Prakash Chand (American University of Sharjah, United Arab Emirates) .....	81

## AI for sustainable development

<i>Digital Crop Health Monitoring by Analyzing Social Media Streams</i> Priyamvada Shankar (Luleå Technological University & BASF Digital Farming GmbH, Germany), Christian Bitter (BASF Digital Farming GmbH, Germany), Marcus Liwicki (Lulea University of Technology, Sweden) .....	87
<i>Artificial Intelligence in Manufacturing: A Bibliometric and Content Analysis</i> Gordana Zeba (Mechanical Engineering Faculty in Slavonski Brod, Croatia), Marina Dabic (Nottingham Trent University, Nottingham Business School, United Kingdom (Great Britain) & University of Zagreb, Faculty of Economics and Business, Croatia), Mirjana Cicak (Mechanical Engineering Faculty in Slavonski Brod, Croatia), Tugrul Daim (Portland State University, USA) .....	95
<i>A Conceptual Framework for AI System Development and Sustainable Social Equality</i> Lucien Yen-Hao Chen (Equality and Anti-discrimination Ombud, Norway) .....	101
<i>IMPACT: a Strategic Partnership for Sustainable Development in Marine Systems and Robotics</i> Francesco Maurelli (Jacobs University Bremen, Germany), Szymon Krupinski (Jacobs University Bremen, Germany), António Pascoal (Instituto Superior Técnico, Portugal), Nikola Miskovic (University of Zagreb Faculty of Electrical Engineering and Computing, Croatia), Kostas Kyriakopoulos (Loughborough University, United Kingdom (Great Britain)), Pere Ridao (University of Girona, Spain), Maarja Kruusmaa (Tallin University of Technology, Estonia), Ralf Bachmayer (Memorial University of Newfoundland, Canada) .....	107

## Ethically-driven robotics and automation

<i>The Strategic Approach for Successful Realistic Improvements in Practical Vehicle Routing Algorithms</i> Emir Žunić (Info Studio Sarajevo and Faculty of Electrical Engineering, University of Sarajevo, Bosnia and Herzegovina), Dzenana Donko (Faculty of Electrical Engineering, University of Sarajevo, Bosnia and Herzegovina, unknown) .....	114
<i>Artificial Intelligence is Transforming the World Development Indicators</i> Abduladhim Ashtaiwi (American University of the Middle East, Kuwait) .....	122
<i>AI and Robotics-Based Cognitive Training for Elderly: A Systematic Review</i> Munkhjarqal` Gochoo (United Arab Emirates University, United Arab Emirates), Alistair Voqan (United Arab Emirates University, United Arab Emirates), Sumayya Khalid (United Arab Emirates University, United Arab Emirates), Fady Alnajjar (UAE University, United Arab Emirates) .....	129

## Managing and Implementing AI Projects

<i>A Review of Artificial Intelligence Applications to Achieve Water-related SDGs</i> Hamid Mehmood (United Nations University Institute for Water, Environment and Health (UNU-INWEH), Canada), Danielle Liao (United Nations University Institute for Water, Environment and Health (UNU-INWEH), Canada), Kimberly Mahadeo (United Nations University Institute for Water, Environment and Health (UNU-INWEH), Canada) .....	135
<i>Theory of Machine Learning Based in Quantum Mechanics</i> Huber Nieto-Chaupis (Universidad Privada del Norte, Lima, PERU, Peru) .....	142
<i>A Full Surveillance Internet of Bio-Nano-Things Based on Feynman-Integral and Machine-Learning</i> Huber Nieto-Chaupis (Peru & Universidad Privada del Norte, Peru) .....	147
<i>The Kullback-Leibler Divergence and QBER in Quantum Encryption Using the BB84 Protocol</i> Huber Nieto-Chaupis (Peru & Universidad Privada del Norte, Peru) .....	152

# Technology Advancements in AI

<i>SSM-Net for Plants Disease Identification in Low Data Regime</i> Shruti Jadon (USA) .....	158
<i>Optimizing Networked Rural Electrification Design Using Adaptive Multiplier-Accelerated <math>a^*</math> Algorithm</i> Jerry Chun-Fung Li (ADS Engineering Ltd., Hong Kong & Colorado State University, USA), Daniel Zimmerle (Colorado State University, USA), Peter Young (Colorado State University, USA) .....	164
<i>Edge-Cloud Collaboration Architecture for AI Transformation of SME Manufacturing Enterprises</i> Janpu Hou (Caloudi Corporation, USA), Dennis Hou (Caloudi Corporation, USA) .....	170
<i>Transforming Digital Employee Experience with Artificial Intelligence</i> Serap Zel (University of Bridgeport, USA), Elif Kongar (University of Bridgeport, USA) .....	176

# AI for Sustainable Development

<i>AI for Monitoring the SDGs and Supporting and Promoting Action and Policy Development</i> Lynn Miller (Monash University, Australia), Mitzi Bolton (Monash University, Australia), Julie Boulton (Monash University, Australia), Michael Mintrom (Monash University, Australia), Ann Nicholson (Monash University, Australia), Christoph Rüdiger (Monash University, Australia), Rob Skinner (Monash University, Australia), Rob Raven (Monash University, Australia), Geoffrey Webb (Monash University, Australia) .....	180
<i>Effective, Explainable and Ethical: Artificial Intelligence for Law Enforcement and Community Safety</i> Campbell Wilson (Monash University, Australia), Gregory Rolan (Monash University, Australia), Janis Dalins (Australian Federal Police, Australia) .....	186
<i>An Ecosystem Approach to Ethical AI and Data Use: Experimental Reflections</i> Mark Findlay (Centre for AI & Data Governance, Singapore Management University, Singapore), Josephine Seah (Centre for AI & Data Governance, Singapore Management University, Singapore) .....	192
<i>Mapping New Informal Settlements Using Machine Learning and Time Series Satellite Images</i> Isabelle B Tingzon (Thinking Machines Data Science, Philippines), Niccolo Dejito (Thinking Machines Data Science, Philippines), Ren Avell Flores (Thinking Machines Data Science, Philippines), Rodolfo De Guzman (Thinking Machines Data Science, Philippines), Liliana Carvajal (IMMAP Colombia, Colombia), Katerine Erazo (IMMAP Colombia, Colombia), Ivan Enrique Contreras Cala (IMMAP Colombia, Colombia), Jeffrey Villaveces (IMMAP Colombia, Colombia), Daniela Rubio (Premise Data, USA), Rayid Ghani (Carnegie Mellon University, USA) .....	198

# Social Inclusion and AI

<i>AI-Vision Towards an Improved Social Inclusion</i> Jinane Mounsef (Rochester Institute of Technology, United Arab Emirates), Boutheina Tlili (Rochester Institute of Technology dubai, United Arab Emirates), Rasem Alashkar (Rochester Institute of Technology, United Arab Emirates), Mohamed ElSabbahy (Rochester Institute of Technology, United Arab Emirates), Ahmad Sabha (Rochester Institute of Technology, United Arab Emirates), Momen Abdelghany (Rochester Institute of Technology, United Arab Emirates) .....	204
<i>Building Ethical AI from News Articles</i> Wonchul Kim (Yonsei University, Korea (South)), Keeheon Lee (Yonsei University, Korea (South)) .....	210
<i>DASSL: Dynamic, AI-Assisted, Scalable System for Labelling Used Bottle Images</i> Parnmet Daenaphruan (King Mongkut's Institute of Technology Ladkrabang, Thailand), Orathai Sangpetch (CMKL University & King Mongkut's Institute of Technology Ladkrabang, Thailand), Akkarit Sangpetch (CMKL University & King Mongkut's Institute of Technology Ladkrabang, Thailand) .....	218
<i>Towards an Audio-Based CNN for Classroom Observation on a Smartwatch</i> Imran A. Zualkernan (American University of Sharjah, United Arab Emirates), Muhammed S Khan (Regis University, USA) .....	224
<i>Automatic Identification of Skin Lesions Using Deep Learning Techniques</i> Madhurshalini M (Indira Gandhi Delhi Technical University for Women, India), Chitra Nair (Indira Gandhi Delhi Technical University for Women, India) .....	230