

Abstracts
and
Conference Materials
for the
**3rd European Conference on
the Impact of Artificial
Intelligence and Robotics**
A Virtual Conference hosted by
ISCTE Business School,
Instituto Universitário de Lisboa, Portugal



18-19 November 2021

A conference managed by ACI, UK

aci

**Abstracts of Papers
Presented at the**

**3rd European Conference on the Impact of
Artificial Intelligence and Robotics
ECIAIR 2021**

A Virtual Conference

**Hosted By
ISCTE Business School,
Instituto Universitário de Lisboa, Portugal**

18 - 19 November 2021

Copyright The Authors, 2021. All Rights Reserved.

No reproduction, copy or transmission may be made without written permission from the individual authors.

Review Process

Papers submitted to this conference have been double-blind peer reviewed before final acceptance to the conference. Initially, abstracts were reviewed for relevance and accessibility and successful authors were invited to submit full papers. Many thanks to the reviewers who helped ensure the quality of all the submissions.

Ethics and Publication Malpractice Policy

ACIL adheres to a strict ethics and publication malpractice policy for all publications – details of which can be found here:

<http://www.academic-conferences.org/policies/ethics-policy-for-publishing-in-the-conference-proceedings-of-academic-conferences-and-publishing-international-limited/>

Conference Proceedings

The Conference Proceedings is a book published with an ISBN and ISSN. The proceedings have been submitted to a number of accreditation, citation and indexing bodies including Thomson ISI Web of Science and Elsevier Scopus.

Author affiliation details in these proceedings have been reproduced as supplied by the authors themselves.

The Electronic version of the Conference Proceedings is available to download from DROPBOX <https://tinyurl.com/ECIAIR21> Select Download and then Direct Download to access the Pdf file. Free download is available for conference participants for a period of 2 weeks after the conference.

The Conference Proceedings for this year and previous years can be purchased from
<http://academic-bookshop.com>

E-Book ISBN: 978-1-914587-23-8

Book version ISBN: 978-1-914587-22-1

Published by Academic Conferences International Limited

Reading

UK

www.academic-conferences.org

Contents

Paper Title	Author(s)	Page No	Guide No
Preface		iii	vi
Committee		iv	vii
Biographies		vii	xi
Keynote Outlines			xxi
Research papers			
Will Robots Take all the Jobs? Not yet	Liadan Anandarajah and Dagmar Monett	1	1
Industry 4.0: The Impact of Technology on the Output Potentials of Skilled and Unskilled Workforce in Developing Countries	Oludele Awodele, Ogochukwu Ngige and Tobi Balogun	10	2
Artificial Intelligence Enhancing Social Engineering in Terrorism: The new Threats	Darya Bazarkina	19	3
Three Limitations of Algorithmic Reason: Steering the Human Mind in the Twenty First Century	Paulo Castro	26	4
Raising Artificial Intelligence Bias Awareness in Secondary Education: The Design of an Educational Intervention	Georgios Fesakis and Stavroula Prantsoudi	35	5
The Impact of Human-Artificial Intelligence Collaboration on Innovation Activities in Knowledge-Intensive Companies	Ana Lucija Gojakovic and Nebojsa Graca	43	6

Paper Title	Author(s)	Page No	Guide No
Artificial Intelligence in the Context of Intellectual Capital and Intellectual Capital in the Context of Artificial Intelligence	Nebojsa Graca and Ana Lucija Gojakovic	51	7
Computerised Consequentialism to Support Moral Reasoning and Decision Making in Crisis Management	Niklas Humble and Peter Mozelius	59	8
Eliciting Personal Attitude Changes on Friendship Based on a Multilinear Narrative	Thomas Keller, Elke Brucker, Thierry Seiler and Larissa Läubli	64	9
Artificial Intelligence Within Agile Software Development: Projected Impacts to Cyber Offense-Defense Balance	Timothy Kokotajlo, David Long, Mark Reith and Richard Dill	74	10
Sentiment Analysis: Challenges to Psychological Security and Political Stability	Yury Kolotaev	82	11
Blockchain Technology and Traceability in the Wine Supply Chain Industry	Florinda Matos, Tomás Alcobia and Ana Josefa Matos	90	12
Understanding the Factors That Influence the Implementation of Robotic Process Automation From Banking Sector Perspective	Nontobeko Mlambo and Tiko Iyamu	98	13
Military Unit Path Finding Problem	Daniel Mundell and Brett van Niekerk	105	14
The Legal Nature of Systems of Artificial Intelligence in South Africa	Tadiwanashe Murahwi and Nomalanga Mashinini	115	15
Machine Learning for Insider Threat Detection	Tristan Sashlen Naicker and Brett van Niekerk	122	15

Paper Title	Author(s)	Page No	Guide No
Comparison of European Commission's Ethical Guidelines for AI to Other Organizational Ethical Guidelines	Minna Nevanperä, Jaakko Helin and Jyri Rajamäki	132	16
The Malicious use of Artificial Intelligence Through Agenda Setting: Challenges to Political Stability	Evgeny Pashentsev	138	17
Artificial Intelligence: From Popular Myths to Risk Scenarios	Olga Polunina	145	18
COVID-19, Digital Transformation and the Expansion of Telework in Portugal	Isabel Salavisa, Glória Rebelo and Eduardo Simões	150	19
AI for Learning: Views on Impacts to Teachership in the era of Artificial Intelligence	Juha Saukkonen, Mari Huhtala, Mika Rantonen and Elina Vaara	157	20
Human Rights, Employee Rights and Copyrights: Parallels of AI Enablers and Obstacles Across Occupations in Human-Centric Domains	Juha Saukkonen, Kirill Anton, Nikita Karpov and William Lahti	166	21
Artificial Intelligence Strategies and Their Impact on Economic Stability: Conceptual Framework	Elena Serova	174	22
Mechanisms and Constraints Underpinning Ethically Aligned Artificial Intelligence Systems: An Exploration of key Performance Areas	Stephen Treacy	183	23
Artificial Intelligence and Limits of Political Stability: Are Politicians in Danger?	Marius Vacarelu	192	24

Paper Title	Author(s)	Page No	Guide No
Masters Research Papers		201	27
Emotional Response and Cognitive Performance in Digital vs. Presential Environments	Anabela Pereira	203	29
Customer Readiness Level to Adopt Artificial Intelligence in Banking: Case of Russia	Irina Shakina, Anastasia Shirokaya and Liudmila Tochilova	208	30
Data Fairness to Find Biases That Influence the Algorithm's Decision Making Results	Letícia Sakamoto Soares and Leandro Augusto da Silva	217	31
Non-Academic Paper		227	33
An Artificial Intelligence System Focused on COVID-19 Pandemic: Results and Impacts	Claudia Lopes Pocho, Marcelo de Carvalho, Carlos Frederico Maciel Silveira, Ricardo André Marques, Ana Claudia Rodrigues da Silva Quirino, Luiz Humberto Werdine Machado and Marcelo Fernandez Pineiro	229	35
Work In Progress Papers		239	37
Understanding Factors Affecting the Managers' Perception of AI Applications in Information Processing	Yanqing Duan, Guangming Cao, Mark Xu, Vincent Ong and Christian Dietzmann	241	39
Robots, Employment and Taxation: An (Im)possible Equilibrium	Cristina Sá and José Luís Martins	245	40
Abstracts Only			41
AI, 3D Printing and Robotics: An Anticipatory Ethical Analysis	Richard Wilson		43

Paper Title	Author(s)	Page No	Guide No
The Future of Robotic Assisted Surgery: An Anticipatory Ethical Analysis	Richard Wilson		44
Nanobots, AI, and Medical Applications: An Ethical and Anticipatory Ethical Analysis	Richard Wilson		45
AI and Robo Advising: An Anticipatory Ethical Analysis	Richard Wilson		46
AI and Cloud Computing: Ethical and Anticipated Ethical Issues	Richard Wilson		47
3D Printing, AI, Nanotechnology and Organ Printing: An Ethical and Anticipatory Ethical Analysis	Richard Wilson		48
Additional Materials			51
Participant List			53
Google Scholar	The Importance of Paper citations and Google Scholar		56
About ACI			58

ECIAIR Preface

These proceedings represent the work of contributors to the 3rd European Conference on the Impact of Artificial Intelligence and Robotics (ECIAIR 2021), hosted by ACI and Instituto Universitário de Lisboa (ISCTE-IUL), Portugal on 18-19 November 2021. The Conference Chair is Dr Florinda Matos, and the Programme Chairs are Prof Isabel Salavisa and Carlos Serrão, all from Instituto Universitário de Lisboa (ISCTE-IUL), Portugal

ECIAIR is now a well-established event on the academic research calendar and now, in its 3rd year, the key aim remains in the opportunity for participants to share ideas and meet people who hold them.

The conference was due to be held at Instituto Universitário de Lisboa (ISCTE-IUL), Portugal, but because of the global Covid-19 pandemic, it was moved online as a virtual event. The subjects covered in the papers illustrate the wide range of topics that fall into this important and ever-growing area of research.

The opening keynote presentation is given by Luis Paulo Reis, , from University of Porto, Portugal, on the topic of "Ethical, Explainable and Configurable Artificial Intelligence". The second day of the conference will be open by Prof. Jean-Gabriel Ganascia, Sorbonne University, Paris, France, who will talk about "*Justice, Fairness and AI*".,

With an initial submission of 57 abstracts, after the double blind, peer review process there are 25 academic research papers, , 3 Masters' research papers, 1 non-academic paper and 2 work-in-progress papers published in these Conference Proceedings. These papers represent research from Brazil, Finland, Germany, Greece, Ireland, Japan, Nigeria, Portugal, Romania, Russia, Serbia, South Africa, Sweden, Switzerland, UK and USA.

We hope you enjoy the conference.

Dr Florinda Matos

Instituto Universitário de Lisboa (ISCTE-IUL)
Portugal
November 2021

ECIAIR Conference Committee

Dr Kareem Kamal A.Ghany, Beni-Suef University , Egypt; Prof Azween Abdullah, Taylors University, Malaysia; Dr Kinaz Al Aytouni, Arab International University, Syria; Dr Hanadi AL-Mubarak, Kuwait University, Kuwait; Prof Hamid Alasadi, Iraq University college, Iraq; Prof Laurice Alexandre, Sorbonne Paris Cité , France; Dr José Álvarez-García, University of Extremadura, Spain; Dr Xiomí An, Renmin University of China, China; Prof Antonios Andreatos, Hellenic Air Force Academy, Greece; Prof Oscar Arias Londono, Institucion Universitaria de Envigado, Colombia; Dr Gil Ariely, Interdisciplinary Center, Herzliya, Israel; Dr Sotiris Avgousti, Cyprus University Of Technology, Cyprus; Prof Rosalina Babo, Polytechnic of Porto, Porto Accounting and Business School, Portugal; Prof Liz Bacon, Abertay University, UK; Assc Adrian Nicolae Branga, Lucian Blaga University of Sibiu, Romania; Prof Karl Joachim Breunig, Oslo Business School, Oslo Metropolitan University - OsloMet, Norway; Prof Elias Carayannis, George Washington University, USA; Prof Davide Carneiro, Polytechnic Institute of Porto, Portugal; Prof Karen Cham, University of Brighton, UK; Prof Jim Chen, U.S. National Defense University, U.S.A.; Dr Pericles Cheng, European University Cyprus, Cyprus; Prof Koteshwar Chirumalla, Malardalen University, Sweden; Mr. David Comiskey, Ulster University, UK; Dr Leonardo Costa, Universidade Católica Portuguesa - Católica Porto Business School, Portugal; Prof Carmen-Eugenia Costea, The Bucharest University of Economic Studies, Romania; Prof Larry Crockett, Augsburg University, USA; Dr Marija Cubric, University of Hertfordshire, UK; Francesca Dal Mas, Università di Udine/Università la Sapienza, Italy; Assc Ben Daniel, University of Otago, New Zealand; Prof Justine Daramola, Cape Peninsula University of Technology, South Africa; Geoffrey Darnton, WMG, University of Warwick, UK; Mr Martin De Bonis, Alma Mater Studiorum, Italy; Prof Armando Carlos de Pina Filho, Federal University of Rio de Janeiro (UFRJ), Brazil; Dr Martin De Saulles, University of Brighton, UK; Dr María de la Cruz Del Río-Rama, University of Vigo, Spain; Dr Souâd Demigha, CRI Univ of Paris 1 La Sorbonne, France; Paolo Di Muro, Politecnico di Milano School of Management, Italy; Dr Mihaela Diaconu, "Gheorghe Asachi" University of Iasi, Romania; Inês Domingues, DEIS-ISEC, Portugal; Dr Patrício Domingues, Polytechnic Institute of Leiria, Portugal; Prof Yanqing Duan, University of Bedfordshire, UK; Prof. John Edwards, Aston Business School, UK; Dr Kelechi Ekuma, The Global Development Institute, University of Manchester, UK; Dr Scott Erickson, Ithaca College- School of Business, USA; Dr José Esteves, IE Business School, Spain; Prof Rui da Assunção Esteves

Pimenta, Politécnico do Porto, Portugal; PhD Fernanda Faini, CIRSFID - University of Bologna, Italy; Dr Georgios Fessakis, University of the Aegean, Greece; Prof Eric Filoli, ENSIBS, Vannes, France & CNAM, Paris, France; Dr Panagiotis Fotaris, University of Brighton, UK; Prof Andreas Giannakoulopoulos, Ionian University, Greece; Dr Valerie Priscilla Goby, Zayed University, United Arab Emirates; Dr Amol Gore, UAE Government HCT, UAE; Dr Paul Griffiths, Ecole de Management de Normandie, Oxford, UK; Dr Hossein hakimpour, IAU , Iran; Prof William Halal, George Washington University, USA; Prof Ali Hessami, City University London, UK; Dr Grant Howard, University of South Africa (Unisa), South Africa; Prof Ulrike Hugl, Innsbruck University, Faculty of Business and Management, Department of Accounting, Auditing and Taxation, Austria; Prof Hamid Jahankhani, Northumbria University London, UK; Dr Aman Jatain, Amity University, India; Dr Runa Jesmin, University of Roehampton, UK; Dr Jari Jussila, Häme University of Applied Sciences, Finland; Dr Selvi Kannan, Victoria University, Australia; Prof Ergina Kavallieratou, University of the Aegean, Greece; Prof Thomas Keller, Institute of Business Information Technology, Switzerland; Dr Harri Ketamo, Headai Itd, Finland; Dr Nasrullah Khilji, University of Bedfordshire, UK; Prof Tatiana Khvatova, Emylon Business School, Ecully, France; Prof Jesuk Ko, Universidad Mayor de San Andres, Bolivia; Prof Michael Kohlegger, Institute for Web Technologies & Applications, Austria; Prof Renata Korsakiene, Vilnius Gediminas Technical University, Lithuania; Prof Ibrahim Krasniqi, University of Peja, Kosovo; Prof Konstadinos Kutsikos, Business School, University of the Aegean, Greece; Dr Jean Lai, Hong Kong Baptist University, Hong Kong; Dr Isah Abdullahi Lawal, Noroff University College, Norway; Dr Efstratios Livanis, University of Macedonia, Greece; Prof Eurico Lopes, Instituto Politécnico de Castelo Branco, Portugal; Dr Martin Magdin, Constantine the Philosopher University in Nitra, Faculty of Natural Sciences, Department of Informatics , Slovakia; Dr Paolo Magrassi, Alephuture, Switzerland; Prof António Martins, Universidade Aberta, Portugal; Prof Maurizio Massaro, Ca' Foscari University of Venice, Italy; Dr Nuno Melão, Polytechnic Institute of Viseu, Portugal; Prof Anabela Mesquita, Polytechnic of Porto, Portugal; Prof David Methé, Institute of International Strategy at Tokyo International University in Tokyo, Japan; Dr Larisa Mihoreanu, ANMDM Bucharest, Romania; Dr Clemente Minonne, Lucerne University of Applied Sciences, Institute for Innovation and Technology Management, Switzerland; Prof Harekrishna Misra, Institute of Rural Management Anand , India; Assoc Ludmila Mladkova, University of Economics Prague, Faculty of Business Administration, Czech Republic; Dr Artur Modliński, University of Łódź -

Faculty of Management, Poland; Prof Fernando Moreira, Universidade Portucalense, Portugal; Prof John Morison, Queen's University Belfast , UK; Dr Rabeh Morrar, Northumbria University, UK; Dr Hafizi Muhamad Ali, Yanbu University College, Saudi Arabia; Dr Antonio Muñoz, Universidad de Málaga, Spain; Prof Mihaela Muresan, Dimitrie Cantemir Christian University, Romania; Dr Minoru Nakayama, Tokyo Institute of Technology, Japan; Dr Milt Nowshade Kabir, Trouvus, USA; Dr Juan Jose Martinez Castillo, Acantelys Research Group, China; Dr Panicos Masouras, Cyprus University of Technology, Cyprus; Assoc. Prof. Dr. Nuran Öze, Arkin University of Creative Arts and Design (ARUCAD), Northern Cyprus; Prof Evgeny Pashentsev, Diplomatic Academy at the Ministry of Foreign Affairs of the Russian Federation, Russia; Assc Corina Pelau, Bucharest University of Economic Studies,, Romania; Dr Parag Pendharkar, Penn State Harrisburg , USA; Dr Alexander Pfeiffer, Applied Game Studies, Austria; Dr Cosmin Popa, Innovative Agricultural Services, UK; Prof Ricardo Queirós, ESMAD/P.Porto, Portugal; Prof Carlos Rabadão, Polytechnic of Leiria, Portugal; Assc Liana Razmerita, Copenhagen Business School, Denmark; Dr Marcin Relich, University of Zielona Gora, Poland; Prof José Carlos Ribeiro, Polytechnic Institute of Leiria, Portugal; Prof Sandra Ribeiro, ISCAP, IPP-Porto, Portugal; Dr Martin Rich, Cass Business School, UK; Dr Kenneth Rogerson, Sanford School of Public Policy, USA; Prof Göran Roos, University of South Australia, Australia; Dr Eleni Rossiou, Experimental School of Aristotle University , Greece; Prof Neil Rowe, U.S. Naval Postgraduate School, USA; Dr Melissa SAADOUN, EIVP, France; Prof Lili Saghafi, MSMU, USA; Prof Mustafa Sagsan, Cyprus Inter Univ, Turkish Rebuplic of Northern Cyprus; Prof Abdel-Badeeh Salem, Faculty of Computer and Information Sciences, Ain Shams University, Cairo, Egypt; Dr Char Sample, US Army Research Laboratory, USA; Dr Navjot Sandhu, Birmingham City University, UK; Prof Vitor Santos, NOVA IMS - New University of Lisbon, Portugla; Prof Ramanamurthy Saripalli, Pragati Engineering College, India; Prof Markus Schatten, Faculty of Organization and Informatics, University of Zagreb, Croatia; Dr Elena Serova, National Research University Higher School of Economics , Russia; Assistant Professor Sandro Serpa, Universidade dos Açores, Portugal; Dr Armin Shams, Sharif University of Technology, Iran; Dr Yilun Shang, Northumbria University, UK; Dr Eric Shiu, University of Birmingham, UK; Prof Fernando Silva, Polytechnic Institute of Leiria, Portugal; Prof Andrzej Sobczak, Warsaw School of Economics, Poland; Dr Caroline Stockman, University of Winchester, UK; Dr Darijus Strasunskas, Hemit, Norway; Dr Olga Strikuliené, Kaunas University of Technology, Lithuania; Dr Marta-Christina Suciu, Bucharest University of Economic Studies, România; Dr Saloomeh

Tabari, Sheffield Hallam University, UK; Prof Ramayah Thurasamy, Universiti Sains Malaysia, Malaysia; Assoc Milan Todorovic, Royal Melbourne Institute of Technology, Australia; Prof Jim Torresen, University of Oslo, Norway; Dr Khan Ferdous Wahid, Airbus, Germany; Prof Fang Wang, Nankai University, China; Prof Murdoch Watney, University of Johannesburg, South Africa; Prof Bruce Watson, Stellenbosch University, South Africa; Dr Santoso Wibowo, Central Queensland University, Australia; Prof Robert J. Wierzbicki, University of Applied Sciences Mittweida, Deutschland; Dr Marcus Winter, University of Brighton, UK; Dr Adam Wong, School of Professional Education & Executive Development, The Hong Kong Polytechnic University, Hong Kong; Mr Jason Wong, KDU University College, Malaysia; Mr Tuan Yu, Kent Business School, UK; Prof Daiva Zostautiene, Kaunas University of Technology, Lithuania.

Biographies

Conference and Programme Chairs



Florinda Matos holds a PhD in Social Sciences, Organizational Behavior Studies from the Technical University of Lisbon. She is a professor in Post-Graduate courses at the ISCTE – IUL and a researcher at DINÂMIA'CET – IUL . Presently, she is leading the project "KM3D - Knowledge Management in Additive Manufacturing: Designing New Business Models" in a national consortium, funded by FCT.



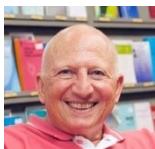
Prof Isabel Salavisa is Professor of Economics at ISCTE - Instituto Universitário de Lisboa, in Lisbon. Her research is conducted at DINAMIA'CET-IUL, Centre for Socioeconomic and Territorial Studies, of which she has been Director (2004-2013) and is joint coordinator of the Research Group 'Innovation and Labour'. Currently she works on project SPLACH - Spatial Planning for Change (2017-2020) – funded by Compete 2020, coordinated by CITTA (UPorto) with the participation of GOVCOPP (UAveiro) and DINAMIA'CET-IUL. She is advisor to the Jean Monet Centre of Excellence on "Labour, Welfare and Social Rights in Europe" (2018-2021). Her research subjects comprise economics of innovation; transitions and sustainability; and Welfare State policies in Europe. She coordinated and participated in a large number of projects. She wrote, edited and contributed to a number of books, published articles and presented papers in a great deal of conferences. She has supervised PhD. dissertations and taught mostly Economics of Innovation, Economics and Policies of the EU, and Sustainability Policies. She is a member of international associations and networks and referee of several international journals.



Carlos Serrão, Ph.D., is an Associate Professor in the Information Sciences and Technologies Department at Iscte – Instituto Universitário de Lisboa. Concluded his PhD in 2008, in Computer Architecture and Distributed Systems (Universitat Politècnica de Catalunya - UPC) in Barcelona. Main research topics are Information Security, Distributed Systems and Secure Access to Digital Assets. Lectures subjects related to Information Security and Development and Management of Information Systems at ISCTE-IUL and is part of the Software Systems Engineering group (ISTAR-IUL) as an integrated researcher. Participated on several national and international projects: ACTS AC051 OKAPI, ACTS AC242 OCTALIS, IST-1999-11443 OCCAMM, IST-2000- 28646 PRIAM, IST-2001-34144 MOSES, FP6 IP MEDIANET, FP6 NoE E-Next, FP6 STREP WCAM, QREN AAL4ALL,

P2020 AppSentinel and Trustchain. Participated on a European Space Agency project (HICOD2000). Author and co-author of several papers in international conferences, journals, books and project deliverables. Contributes to different standardisation initiatives (MPEG-4/21, JPEG2000, Blockchain and DLT) and global activities (ODRL, DMP, MPAI and OWASP).

Keynote Speakers



Engineer and philosopher by education, **Jean-Gabriel Ganascia** is presently Professor of Computer Science at Sorbonne University, EurAI fellow, senior member of the *Institut Universitaire de France*, chairman of the COMETS (CNRS Ethical Committee) and member of the LIP6 (Laboratory of Computer Science of Sorbonne University) where he heads the ACASA team. He is also deputy director of the OBVIL Laboratory of Excellence (Labex) which activities are focused on the literary side of Digital Humanities. Lastly, Jean-Gabriel Ganascia chairs the steering committee of the CHEC (Cycle des Hautes Études de la Culture). His current research activities are focused on Artificial Intelligence, Machine Learning, Symbolic Data Fusion, Computational Ethics, Computer Ethics and Digital Humanities. He published more than 450 papers in conference proceedings, scientific journals and books.



Luis Paulo Reis is an Associate Professor at the University of Porto in Portugal and Director of LIACC – Artificial Intelligence and Computer Science Laboratory. He is an IEEE Senior Member and he was president of the Portuguese Society for Robotics and is now President of APPIA - Portuguese Association for Artificial Intelligence. During the last 25 years, he has lectured courses, at the University, on Artificial Intelligence, Intelligent Robotics, Multi-Agent Systems, Simulation and Modelling and Educational/Serious Games. He was the principal investigator of more than 15 research projects in those areas. He won more than 50 scientific awards including winning more than 15 RoboCup international competitions and best papers at conferences such as ICEIS, Robotica, IEEE ICARSC and ICAART. He is the author of more than 400 publications in international conferences and journals (indexed at SCOPUS or ISI Web of Knowledge).

Mini Track Chairs



Karen Cham is Professor of Digital Transformation Design and academic lead of Connected Futures research at the University of Brighton. She heads up a £1.3m big data project with Gatwick airport in a Digital Catapult Centre B2B Data Innovation Lab and lead their £1.2m 5G Brighton testbed in partnership with 5GIC as part of the Govts 5G Strategy. She has 25 years in technology transformation and human centred design. Clients inc. Which?, Top Shop, EDF & EY. She is a NED of Nest, the UK Govts £10bn pension fund with 12m users, leading on its pivot to digital first FinTech transformation. In 2018 she was part of the 2018 DIT CreaTech mission to India alongside NHS Digital and CEO of Jaguar Landrover.



Marija Cubric is a Reader in e-learning and Principal Lecturer in Information Systems and Project Management at University of Hertfordshire Business School. She has published and presented her work in peer-reviewed publications and international conferences, and completed externally funded projects (JISC, HEA, EU COST) in the area of e- learning and information systems. Her current work is focused on exploring applications and implications of artificial intelligence, machine learning and data-driven innovation in e-learning and healthcare systems. She is a Fellow and a Chartered IT professional of the British Computing Society, and a journal Editor for EJEL (Scopus, ABS, ESCI).



Dr Mitt Nowshade Kabir is a serial entrepreneur, technology evangelist, business accelerator and an investor. He holds M. Sc. in Computer Science, MBA, PhD in Information Technology, and a DBA in management. His current interests are Innovation, Artificial Intelligence, Machine Learning, Consciousness, Entrepreneurship, and Strategic Management. He is the CEO of Trouvus.com, an AI consulting and development company. Dr Kabir penned numerous scholarly papers and generic articles. He also published a book on Knowledge-based Social Entrepreneurship. He worked as an advisor to various levels of government. Presently, he is writing a book on “AI and the future of humanity”.



Prof Ali Hessami is Director of R&D and Innovation at Vega Systems-UK. He represents UK on CENELEC & IEC safety & security systems, hardware & software standards and chairs the IEEE Humanitarian Technologies and the Systems Council Chapters in the UK and Ireland Section. He is Technical Editor and Chair of IEEE 7000 standard on technology ethics and the VC and Process

Architect of the IEEE 's global Ethics Certification Programme for Autonomous and Intelligent Systems. Ali is Visiting Professor at London City University and Beijing Jiaotong University. He is a Fellow of Royal Society of Arts (FRSA), Fellow of the UK Institution of Engineering & Technology (IET) and a Senior Member of IEEE.



Prof. Evgeny Pashentsev is a leading researcher at the Diplomatic Academy of the Ministry of Foreign Affairs of the Russian Federation and a director of the Center for Social and Political Studies and Consulting, Russia. Evgeny is an author of more than 200 publications on international security, MUAI and psychological warfare issues.



As an academic **Elena Serova** is working in National Research University Higher School of Economics St. Petersburg Branch, Russia. Her role combines teaching and research in equal measures. Her research interests are related to Artificial Intelligent, Intelligent Data Analysis, Business Analysis, Strategic Management, Marketing, and Information Management. She has co-authored the books and contributed chapters to several books and collections of essays, regular key presenter at national and international conferences and workshops.

Biographies of Contributing Authors

Oludele Awodele, is a Professor of Computer Science and Artificial Intelligence in the School of Computing and Engineering Sciences, Babcock University Nigeria. He has held several positions in the department including head of department, Dean of School of Computing. A fellow of the Nigeria Computer Society and has successfully supervised several PhDs.

Darya Bazarkina is a leading researcher at the Department of European Integration Research, Institute of Europe, Russian Academy of Sciences and a professor at the Department of the International Security, Russian Presidential Academy of National Economy and Public Administration. Darya is an author of more than 90 publications on communication aspects of the counter-terrorism.

Paulo Castro is a researcher in the Philosophy of Natural Sciences Research Group, at the Centre for the Philosophy of Sciences of the University of Lisbon, Portugal (CFCUL). His main areas of research are Philosophy of Quantum Physics and Philosophy of Artificial Intelligence and Computation, focusing mainly on AI ethics and on the ontology of algorithmic thought.

Marcelo de Carvalho Bachelor in Computer Science, specialist in Business Architecture and Corporate Systems and Master in Data Science (in progress). Currently working in Furnas Digital Transformation Department and Head of the monetization tribe of that Department. Technical Coordinator of the Keyapp implementation in Furnas.

Yanqing Duan is Professor of Information Systems at University of Bedfordshire, UK. Her principal research interest is the development and use of emerging ICTs and their impact on organisational performance, decision making, and knowledge management. She has received many research grants from various funding sources and published over 240 peer reviewed articles.

Georgios Fesakis holds a B.Sc. and a M.Sc. in Informatics from University of Athens and a PhD in Informatics Didactics from University of the Aegean. He serves as professor at the University of the Aegean where he is teaching since 2004. His research interests include ICT design for learning, CS & Mathematics Didactics.

Nebojsa Graca Independent scientific researcher, author, inventor, innovator and consultant. Research aspect includes: nature, mechanisms and functions of consciousness; development and application of new technologies based on bio-consciousness intelligence. Inventive aspect of professional work: a portfolio of IP

rights of Excellence by Graca™ created from scientific R&D. Innovative aspect of professional work: KIBS of high degree of innovation in the field of health, professional sports, art and knowledge economy.

Jaakko Helin is a Student at Laurea University of Applied Sciences, majoring in Digital Service Design. He collaborated in writing the publication Comparison of European Commission's Ethical Guidelines for AI to Other Organizational Ethical Guidelines and he's currently finishing his thesis on Contract Terms and Liability Issues Regarding Autonomous Robots in the Healthcare Sector.

Niklas Humble is a PhD Student in Computer and System Science at the Mid Sweden University. He has a background as a K-12 teacher and IT-coordinator and is now teaching on programming courses. Research interests include Programming education, Game-based learning, System development, Artificial intelligence, Learning analytics.

Thomas Keller studied electrical engineering at Swiss Federal Institute of Technology (ETH) Zurich and information technology at University of Zurich, where he obtained his Ph.D. Since 2007 he is a professor at ZHAW. His research focus is on the application of new technologies, e.g., mixed reality in entrepreneurial contexts and scenarios about our future digital lives.

Timothy Kokotajlo is currently seeking a Masters degree in Cyber Operations at the United States Air Force Institute of Technology (AFIT). His research contributes towards the preparation for disruptive AI technologies by designing and testing methodologies of education through Serious Games. He also has a background in cloud computing technologies.

Yury Kolotaev is a PhD student at the School of International Relations, St. Petersburg State University, Russia. He is an intern at the International Center for Social and Political Studies and Consulting. He authored several publications on European experience in tackling disinformation. His main research areas are harmful online content and malicious use of AI.

José Luís Martins, PhD in Financial Economics and Accounting from the University of Extremadura. Associate Professor of the Polytechnic of Leiria in the area of Accounting, Coordinator of the Management and Control Master course. Certified Accountant and Certified Auditor. Author of articles in journals on accounting and finance topics, published nationally and internationally.

Nomalanga Mashinini is a lecturer at the Rhodes University, South Africa. She is currently completing her doctoral thesis at the University of Pretoria which is focused on the Recognition of Image Rights in the Social Media Context. Her research interests include Personality Law, Artificial Intelligence and Social Media Law.

Nontobeko Mlambo is a Postgraduate student with Information Technology (IT) department, Cape Peninsula University of Technology. Professionally, Ms Mlambo specializes in auditing and robotics process automation in the field of IT. In her research pursuit, she focuses on Artificial intelligence, and have interest in the application of technology acceptance model and actor-network theory.

Dagmar Monett is Professor of Computer Science (Artificial Intelligence, Software Engineering) at the HWR Berlin. She has over 30 years of research and teaching experience. Co-founder of the AGI Sentinel Initiative, AGISI.org, dedicated to understanding intelligence in order to build beneficial AI. Other research areas include Machine Learning, Digital education ethics, and Computer Science education.

Tadiwanashe Murahwi is a Candidate Legal Practitioner based in Johannesburg, South Africa. He completed his Bachelor of Laws at Rhodes University in 2020 and he also holds a Bachelor of Social Science Honours Degree in Sociology. His research interests are in technology law, Artificial Intelligence and ICT in education.

Angelina Oreshkova Bachelor's degree in International Business and Management of the National Research University Higher School of Economics in Saint Petersburg, Russia, in 2021. The authors' thesis paper was devoted to the topic of Corporate Social Responsibility Practices and Their Impact on Employee Satisfaction and received an excellent grade. Scientific interests of comprise strategic management and investment instruments.

Evgeny Pashentsev is a leading researcher at the Diplomatic Academy of the Ministry of Foreign Affairs of the Russian Federation and a director of the Center for Social and Political Studies and Consulting, Russia. Evgeny is an author of more than 200 publications on international security, MUAI and psychological warfare issues.

Anabela Pereira is a researcher at Cies-Iscte, Instituto Universitário de Lisboa. She received her PhD in sociology from Iscte, Instituto Universitário de Lisboa in 2013, and she is currently a master student of Cognitive Science at the University of

Lisbon. Her main research interests are biographies and society, besides the relation between embodiment and technology.

Claudia Lopes Pocho. Graduated in Pedagogy at *Federal University of Rio de Janeiro* (UFRJ), she took her Master's degree in Education and her Doctor of Science degree in Production Engineering at this Institution. She has been working at *Furnas Centrais Elétricas S.A.* since 2005, mainly in corporate education, knowledge management, and human capital management areas, managing multidisciplinary projects.

Olga Polunina is an associate professor at the Russian State Social University. She received her PhD in history in 2008. Her main research area are Latin America, strategic communication, psychological warfare, role of AI development. She is the researcher at the International Centre for Social and Political Studies and Consulting and the author of the public Telegram-channel about Latin America.

Stavroula Prantsoudi holds a B.Sc. in Informatics, a Master's in Information Systems, and a M.Ed. in Interdisciplinary Didactics. Her research interests lie on the fields of Computational Thinking, Computer Science Education, Artificial Intelligence, Interdisciplinarity and Teachers' Training. Since 2003, she serves as an Informatics Teacher in several Greek public schools.

Vitali Romanovski is visiting researcher at the Diplomatic Academy of the Russian Foreign Ministry and the Belarusian Institute of Strategic Research. A Ph.D. candidate in Politics at the Diplomatic Academy of the Russian Foreign Ministry. A member of the International Studies Association (ISA) and East European Studies Association (CEEISA).

Olga Rivera-Hernández is Professor of Strategy and Innovation at Deusto Business School. She has been Deputy Minister for Quality, Research and Innovation Health of the Basque Government and President and member of the Council at diverse leading research centers. She has been part of the MOC Network of Harvard University, and has also worked on System Dynamics as MIT alumni. Her academic contributions have been published in International Journals as: Journal of Intellectual Capital, Journal of Knowledge Management, The Learning Organization, Systemic Practice and Action Research

Isabel Salavisa is Full Professor of Economics at Iscte - Instituto Universitário de Lisboa, in Lisbon. Her research is conducted at DINAMIA'CET-Iscte. Her research subjects comprise economics of innovation; sustainability transitions of large sociotechnical systems, such as energy and food; digital transition.

Juha Saukkonen, Dr.Sc. (Econ.), is a Senior lecturer of Management in the Business School of JAMK University of Applied Sciences in Jyväskylä, Finland. Saukkonen has published both individually and as part of multinational research teams in journals and conferences on topics of Foresight, Knowledge Management Anticipation and Entrepreneurial Learning and Education.

Elena Serova is an associate professor at the HSE University St. Petersburg Branch. Her role combines teaching and research in equal measure. She is an Academic supervisor of Ph.D. students. Her research interests are related to AI, Business Analysis, Strategic Management. She has co-authored the books and contributed chapters to several books and collections of essays, regular key presenter at national and international conferences and workshops.

Irina Shakina graduated from the Master's program in Management and Analytics for Business from the National Research University Higher School of Economics in St. Petersburg. Her research interests are exploratory data analysis, machine learning, financial model forecasting and sustainable development. Irina works in a consulting company as a financial analyst and business consultant.

Anastasia Shirokaya received her Master's degree in Management and Analytics for Business from the National Research University Higher School of Economics in St. Petersburg. Her main areas of interest are digital transformation, business model innovations and international business expansion. She has experience of promoting IT products and working on IT consulting projects in-house.

Carlos Frederico Maciel Silveira is Head of Enterprise Sales and Partner on CyberLabs Group, the largest Artificial Intelligence and CyberSecurity company in Latin América, and have occupied several executive and technical positions in Artificial Intelligence and Mission Critical software industries over the past 15 years, developing products and implementing solutions on major Latin America Energy, Marketplace, Logistics and Services players and worldwide.

Stephen Treacy is a lecturer of business information systems at Cork University Business School, Ireland. He received his PhD from University College Cork in 2016. His work has been published in several outlets including the Journal of Information Technology (JIT). His main research areas are open innovation, data compliance, and digital entrepreneurial ecosystems.

Marius Vacarelu Lecturer, PhD, National School of Political and Administrative Studies, Bucharest. Director of "Geopolitics of the East Association". Author/co-author-coordinator of 22 books and more than 200 scientific articles published in U.S, France, Russia, Poland, Czech Republic, Romania, etc. Blogger on the most read

Romanian journal, Adevarul (www.adevarul.ro). Presences on Romanian televisions on geopolitical topics.

Brett van Niekerk is a senior lecturer at the University of KwaZulu-Natal. He serves as chair for the IFIP Working Group on ICT in Peace and War, and co-Editor-in-Chief of the International Journal of Cyber Warfare and Terrorism. He holds a PhD focusing on information operations and critical infrastructure protection.

Richard L. Wilson is a Professor in Philosophy at Towson University in Towson, MD. Professor Wilson Teaches Applied Ethics in the Philosophy and Computer and Information Sciences departments at Towson while also serving as Senior Research Scholar in the Hoffberger Center for Professional Ethics at the University of Baltimore. Professor Wilson's interest's are directed towards applying phenomenology to issues with emerging and innovative technologies.

Keynote Outlines

Keynote Outlines

The following are outlines for the Keynote Speeches which will take place at ECIAIR 2021.

Justice, Fairness and AI

Jean-Gabriel Ganascia

The concept of fairness has a prominent status in John Rawls Theory of Justice as the grounding of Justice, while many other classical philosophers among who one can cite Aristotle or more recently Vladimir Jankélévitch, distinguishes it from the strict application of rules, showing there how laws distinguishes from ethics. After a general introduction of the concepts of justice and fairness, and then a conceptual clarification of the notions of equality, equity, bias, partiality, discrimination and inclusion, we shall show how it is possible to make AI based algorithmic decision making conform to the right and how it is difficult to make them fair. Doing this, the talk will provide rudiments to the AI-based legal and ethical reasoning simulations.

Research Paper Abstracts

Will Robots Take all the Jobs? Not yet

Liadan Anandarajah and Dagmar Monett

Computer Science, Berlin School of Economics and Law, Berlin,
Germany

s_anandarajah19@stud.hwr-berlin.de

dagmar.monett-diaz@hwr-berlin.de

DOI: 10.34190/EAIR.21.029

Abstract: Much has been speculated about intelligent artefacts and their potential abilities to automate entire industries or at least a broad variety of human-related tasks and processes. Recent advancements in the fields of Artificial Intelligence (AI) and Robotics have fueled these views, thereby propelling hyped narratives, unfounded fears, and dystopian futures alike. Some of the reasons behind such behaviors originate from the time-old dispute on what intelligence (e.g. in humans and in machines) truly means. Others, to the disparate realities between the promise of AI, i.e. to build machines with human-like intelligence and to consider what abilities current “intelligent” machines possess. The speedy automation of human labour and processes has been around since the industrial revolution. Automation wears new clothes in the digital era, especially that involving the development of emerging technologies, but it is still far from including countless human activities that require genuine intelligence and are not easy to automate. The aim of this paper is twofold. On the one hand, it clarifies why we are no closer to having truly intelligent systems. We base our statements on a thorough discussion about what genuine intelligence means. On the other hand, it presents an analysis of new jobs created in Robotics and related fields by mining and processing job offers posted to the mailing list “robotics-worldwide.” By using natural language processing techniques, not only is the evolution of all job offers posted over the last 15 years to that renowned mailing list presented, but also their most salient characteristics and backgrounds. In addition to the continuously growing number of job offers in the analyzed period, the results indicate substantial demand for jobs predominantly within the field of academic and scientific research. Proliferating innovation in AI and Robotics combined with a growing lack of experts in these domains indicates that both are broad fields that are yet to be thoroughly explored. The analysis of “The robotics-worldwide Archives” resoundingly displays that an obvious solution to this is the increased employment of researchers and academics to undertake this exploration. No, robots will not take all the jobs. At least not yet.

Keywords: AI, data mining, jobs, NLP, Robotics

Industry 4.0: The Impact of Technology on the Output Potentials of Skilled and Unskilled Workforce in Developing Countries

Oludele Awodele¹, Ogochukwu Ngige² and Tobi Balogun³

¹Babcock University, Ilishan-Remo, Nigeria

²Federal Institute of Industrial Research Oshodi, Lagos Nigeria

³Bells University of Technology Ota, Nigeria

delealways@gmail.com

ogorngige@gmail.com

balogunoluwatobi@gmail.com

DOI: 10.34190/EAIR.21.013

Abstract: Technologies are disrupting the way tasks are carried out at a quick pace, and businesses that tend to move with the trend often stay ahead of the curve and enjoy a significant improvement and benefits over their counterparts. Digitization, big data, internet of things (IoTs), cloud computing, artificial intelligence etc. all play a major role in influencing today's businesses. The wide adoption and usage of these digital technologies in the society and across businesses led to the emergence of the Fourth Industrial Revolution (4IR), also known as Industry 4.0. The Fourth Industrial Revolution refers a technologically-driven paradigm change that are combining the physical, digital and biological worlds, impacting all spheres of life, focusing on economies and, industries like the manufacturing industry, and sometimes even challenging ideas about what it means to be human. Extensive use of new and disruptive technology would usually affect jobs, skills, and occupations. While there usually would be potential job loss as a result of new technologies, new jobs are also created. This paper therefore studies the impacts of the fourth industrial revolution on the skilled and unskilled workforce in developing countries, and recommends that continuous education to meet the needs of the new revolutions should be adopted. Employees should embrace and invest in emerging degree courses and professions needing vocational training based on impacting extensive skills in information technology, communication and sciences. The conventional system of education must be reviewed in order to produce workers that are well equipped and positioned to meet with the skills requirement of the new technologically-driven industrial era.

Keywords: Industry 4.0, disruptive technology, skilled labor, unskilled labor, IoT

Artificial Intelligence Enhancing Social Engineering in Terrorism: The new Threats

Darya Bazarkina

Department of European Integration Research, Institute of Europe of the Russian Academy of Sciences, Moscow, Russia

Bazarkina-icspsc@yandex.ru

DOI: 10.34190/EAIR.21.008

Abstract: Terrorist organizations pursue political goals, seeking to achieve them through violence. At the same time, communication remains one of the main aspects of their activities. Their propaganda, recruitment and searches for funding are not just in the digital arena, but also involve the use of a wide range of sophisticated technologies—new encryption tools, crypto currencies, operations in the darknet, etc. At the same time, more and more crimes are committed with the help of social engineering tools (psychological manipulation in order to induce a person to perform certain actions or share confidential information). Given the importance for terrorists of influencing the public consciousness, as well as the convergence of terrorism and cybercrime, terrorist organizations and lone-wolf terrorists can actively use the mechanisms of social engineering in their psychological operations. This threat to the psychological security of society (and in some cases, its physical security) is already a reality. It can become even more relevant due to the development and spread of AI technologies, which (if used maliciously) can facilitate the tasks of social engineering even for criminals without special technical knowledge. Much more dangerous may be a turn to terrorism by specialists who are able to develop AI tools that will initially be designed for psychological manipulation. This could be as simple as AI that offers a user content on certain topics in social media designed to surround the victim of recruitment with content that glorifies terrorism and persuade them to transfer money to a terrorist organization. This paper aims to find out the answers to four main research questions: 1) what are the current and future factors in the turn to terrorism of AI specialists; 2) how can existing and (possibly) future AI technologies make it easier for criminals to perform social engineering tasks; 3) how can terrorist organizations and lone-wolf terrorists use social engineering tools through AI to achieve their goals; and 4) what means of countering this threat already exist and can be created in the future?

Keywords: terrorism, social engineering, psychological manipulation, malicious use of artificial intelligence, psychological operations with the use of artificial intelligence

Three Limitations of Algorithmic Reason: Steering the Human Mind in the Twenty First Century

Paulo Castro

Centre for the Philosophy of Sciences of the University of Lisbon
(CFCUL), Portugal

paulo.castro.pi@gmail.com

DOI: 10.34190/EAIR.21.001

Abstract: Artificial Intelligence has pervaded contemporary societies in almost every way as an externalized, fragmented, and optimized form of rationality. I call this externalized mode of thought “algorithmic rationality” and to the ideology favoring it, “algorithmic reason”. Although algorithmic reason original goal was to facilitate the arising of a highly participative and global Culture, fitting all citizens in a dynamic democratic society, History has it that AI technology would be ceased by consumer logic and computational propaganda. I discuss the economical, epistemological, and political implementation of algorithmic reason, introducing three cases. I argue that such implementation comprises a cybernetic loop, involving a centralized AI and its instrumentalized users. Commenting upon the ubiquity of such loop, I introduce three limitations of algorithmic reason. The first two are of a computational nature. The third owes its presence to a cybernetic loop, producing a steering effect on the human mind and promoting a cultural flattening effect. This, I conclude, may result in the impoverish of creativity, critical thought, and intellectual curiosity.

Keywords: artificial intelligence, algorithmic reason, cultural steering, human mind steering, cybernetic loop, computational propaganda, AI ethics

Raising Artificial Intelligence Bias Awareness in Secondary Education: The Design of an Educational Intervention

Georgios Fesakis and Stavroula Prantsoudi

University of the Aegean, Greece

gfe@aegean.gr

stapran@aegean.gr

DOI: 10.34190/EAIR.21.039

Abstract: The purpose of education should be to provide students with skills to thrive in their social and professional lives. To sufficiently prepare students for their future in a constantly evolving society, equal education in Artificial Intelligence (AI) is necessary. AI and its applications are already part of students' everyday lives. Smart devices, social media feeds and recommendation engines, digital voice assistants, videogames, and many other AI applications surround them. Such systems usually facilitate everyday life, however in several cases they may operate improperly due to algorithmic bias. What arises is the need to educate students in understanding and critically using AI technology. This work concerns the design of a secondary school educational intervention proposed to provide essential AI knowledge, by introducing students to AI and Machine Learning (ML) and further raising their awareness of algorithmic bias. The interventions' structure consists of an introduction and three lessons. Students are initially introduced to AI by identifying and discerning such applications in their everyday lives. They are guided to use selected AI applications, categorize them, and discuss the famous Turing test and its multiple social effects. What follows is a series of three lessons. In the first lesson students are introduced to ML, they train a ML model, and evaluate it to produce an optimal model for a certain problem. In the second lesson students code an application and embed the ML model they previously created in it. In the third lesson they discuss and learn about societal impacts of AI, algorithms, and data science. Students are introduced to the concept of algorithmic bias and highlight malfunctions caused from insufficient model training, due to non-representative or limited variety of the sample. They then discuss concerns and possible addressing of such cases. The proposed intervention is expected to raise students' awareness of AI and algorithmic bias and support them in creating Machine Learning applications and critically interacting with AI in their everyday lives.

Keywords: algorithmic bias, machine learning, artificial intelligence, secondary education

The Impact of Human-Artificial Intelligence Collaboration on Innovation Activities in Knowledge-intensive Companies

Ana Lucija Gojakovic and Nebojsa Graca

Independent Scientific Researchers, Belgrade, Serbia

nebojsagraca@gmail.com

DOI: 10.34190/EAIR.21.038

Abstract: Researching the impact of artificial intelligence (AI) on innovation activities in knowledge-intensive companies (KICs), the authors use a systematic approach in observing innovative entities. Scientific observation begins with an innovation ecosystem that is treated as a global innovative entity. In addition to the innovation ecosystem, the first part of the paper focuses on KICs. KICs are analysed as a subsystem of the global innovation ecosystem, on the one hand, and as a unique innovation system made up of numerous subsystems, on the other hand. Innovation activities in KICs are the next innovative entity of scientific observation. At the same time, they represent a subsystem in KICs and a special system made up of interconnected subsystems. Subsystems of innovation activities are also treated as unique systems made up of other subsystems. In order to respond to the requirements defined in the title of the paper, the authors specifically analyse research and development (R&D), and newly created knowledge (innovative output) as subsystems of innovation activities. At the end of the first part of the paper, the authors sublimate the conclusions related to AI as an innovative entity. AI is also viewed dual: as a subsystem of innovation activities (part of newly created knowledge), and as a resource for generating new inventions. Using this finding, in the second part of the paper, the authors state that AI will certainly cause changes in all subsystems in KICs. The most dominant will be changes in: human capital, knowledge and skills of knowledge workers, and the structure of team. The aforementioned changes will redefine innovation activities and their subsystems. Influenced by the trend of these changes, AI will influence changes in management practices in KICs. The impact of AI as a new resource in generating new inventions will have effects not only on KICs, but also on the global innovation ecosystem, as a starting point for researching the impact of human-AI collaboration on innovation activities in KICs.

Keywords: artificial intelligence, knowledge-intensive companies, research and development, innovation, knowledge management

Artificial Intelligence in the Context of Intellectual Capital and Intellectual Capital in the Context of Artificial Intelligence

Nebojsa Graca and Ana Lucija Gojakovic

Independent Scientific Researchers, Belgrade, Serbia

nebojsagraca@gmail.com

DOI: 10.34190/EAIR.21.022

Abstract: Looking at the statement of Mr Francis Gurry, WIPO Director General, that: "Artificial intelligence is a new digital frontier that will have a profound impact on the world, transforming the way we live and work", we realize that artificial intelligence (AI) inspires intensive change to our overall existence, starting with living styles and culture, through the development of science, art and technology, to changes in the creation of business value. We encounter different definitions of AI in world literature. Bearing in mind the issues dealt with in the paper, the authors will observe AI in two ways: as a kind of unique collection of inventions (knowledge fund) being the result of decades of research and development, and as part of intellectual capital (intangible assets). Based on current scientific studies, AI is treated as a strategic priority for the near future. This has led to the formation of a work group on AI and new technologies, which is expected to respond to a number of challenges. One of the challenges is the legal and regulatory framework for creations and inventions generated by AI. This further implies a paradigm shift in the creative (invention) process, in which robots will not only help people, but also help run the process themselves. Legal changes will also affect economic changes. Knowledge managers and intellectual capital (IC) managers also face numerous challenges. If AI, as an intellectual property (IP), to be able to independently make complex intellectual creations, which has hitherto been a uniquely human feature, will AI become part of the company's human capital (HC)? That is, will it be possible to equate AI to "active intelligence" of the company, since "AI has entered into the sphere of creativity and ingenuity" (Iglesias, Shamulia and Anderberg, 2019)? Is it realistic to ask whether AI will remain just a synonym for the legally protected IC of a company, a part of an existing brand? Or will AI become the primary strategic asset and the dominant corporate brand of existing and future companies?

Keywords: artificial intelligence, intellectual property, intellectual capital, management

Computerised Consequentialism to Support Moral Reasoning and Decision Making in Crisis Management

Niklas Humble and Peter Mozelius

Mid Sweden University, Östersund, Sweden

niklas.humble@miun.se

peter.mozelius@miun.se

DOI: 10.34190/EAIR.21.011

Abstract: Under normal conditions, humans are good at logic reasoning and taking appropriate decisions, but crisis management is not conducted under normal conditions. In complex and stressful situations, the moral aspects of crisis management could be hard to sort out, with decision makers stuck in moral dilemmas. Research has recommended that the detailed emergency handling manuals should be complemented with decision making support systems. This paper presents and discusses a model for an intelligent decision support system (IDSS), based on the ethical theory of consequentialism. Consequentialism posits that moral decisions can be calculated by the expected outcomes from presumptive actions. On the other hand, consequentialism has been criticised for deficiencies in the prediction of complex situations. Calculations in the suggested model are inspired by Hooker's Rule-consequentialist theory of morality. A theory with the fundamental idea that potential long-term and short-term outcomes should be weighed against each other. Furthermore, the positive and negative outcomes from presumptive actions should be estimated and weighed against each other. The suggested model should be flexible enough to be used in both real crisis situations and crisis management exercises. However, before testing the model in real life crisis situations there is a need for thorough evaluations in virtual crisis management exercises. As a complement, these virtual crisis exercises should preferably also include scripted collaboration. The most interesting specialisation of scripted collaboration are the conflict scripts, enabling the idea of scripting exercise conflicts that resemble moral dilemmas in philosophy.

Keywords: computerised consequentialism, decision support system, artificial intelligence, crisis management, conflict scripts, moral dilemmas

Eliciting Personal Attitude Changes on Friendship Based on a Multilinear Narrative

Thomas Keller, Elke Brucker, Thierry Seiler and Larissa Läubli

ZHAW Institute of Business Information Technology, Winterthur,
Switzerland

kell@zhaw.ch

brck@zhaw.ch

DOI: 10.34190/EAIR.21.014

Abstract: Affective Computing refers to a subfield of Artificial Intelligence that aims to recognize, interpret, and adequately respond to human emotions. Human-machine interactions should thus become more individual and emotionally appealing. But what would our everyday life look like if such an emotionally intelligent artificial being became our best friend? This question was addressed by a multilinear development scenario that lets the reader experience different stages in the life of the protagonist from the first day in secondary school to the loss of a loved one in midlife. The subject of this sci-fi prototyping was the progressive power of emotional artificial intelligence, which becomes tangible in this multilinear story in four fictional stages in the future. In each stage, the reader is presented with a decision that affects the role of the artificially intelligent being in the protagonist's life. In this way, different versions of our digital future can be experienced with affective computing.

Keywords: affective avatar, attitude change, interactive fiction

Artificial Intelligence Within Agile Software Development: Projected Impacts to Cyber Offense-Defense Balance

Timothy Kokotajlo, David Long, Mark Reith and Richard Dill

Air Force Institute of Technology, Wright Patterson AFB, USA

Timothy.kokotajlo@gmail.com

David.long@afit.edu

Mark.Reith@afit.edu

DOI: 10.34190/EAIR.21.030

Abstract: The cyber offense-defense balance theory evaluates the relative effort offense and defense forces need to prevail in conflict. Cyber conflict is a large domain, and many factors influence the offense-defense balance. Recent investments into Artificial Intelligence (A.I.) and Agile development can be used to make more accurate predictions using existing cyber offense-defense models. This paper predicts future shifts in the balance of cyber warfare caused by the current and projected capabilities of AI-augmented Agile software development pipelines. Initially, increased investments and capabilities are predicted to give an advantage to aggressing forces. Over time, however, technology advances and more standardized processes will likely create a more significant advantage for defensive capabilities.

Keywords: artificial intelligence (A.I.), Agile software development, offense-defense theory, cyber warfare

Sentiment Analysis: Challenges to Psychological Security and Political Stability

Yury Kolotaev

Saint Petersburg State University, Russia

yury.kolotaev@mail.ru

DOI: 10.34190/EAIR.21.016

Abstract: The rapid development of artificial intelligence (AI) algorithms raises serious concerns about its implications for public safety. A prominent example is sentiment analysis, which attempts to infer people's emotions from their expression in text, audio, and video. Sentiment analysis is a subfield of natural language processing, which combines advances in machine learning and computational linguistics. The ability to read human emotions has a wide range of application, from commercial use to politically motivated social engineering. While sentiment analysis brings great benefits via capturing societal trends, it may likewise entail the risks of malicious use of AI (MUAI). In this case, a threat to psychological security or even political stability at the national or global level may arise. Some of the most apparent examples of MUAI using sentiment analysis relate to the assessment of people's emotional triggers, which can be used for large-scale antisocial information campaigns. In practical terms, this might lead to a higher level of adaptation of disinformation, social engineering, hate speech, or phishing attacks to a specific audience. However, there are even more sophisticated ways of applying sentiment analysis in the context of MUAI. Soon, intelligence analytical systems may appear, which can (based on human emotions and public sentiments recognition) develop scenarios of targeted psychological impact on particular segments of almost the entire society. In this regard, the author of this paper aims to assess the potential dangers of using sentiment analysis concerning public safety. This paper focuses on the types and forms of malicious use of sentiment analysis, as well as the ways to mitigate its antisocial use. The outlined problems will be considered through scenario and system analysis. Both methods are capable of displaying the set of factors influencing the MUAI and its results. The relevance of the study derives from the need for a clear understanding of the potential threats arising from advanced technologies. The overall results can be useful for researchers of AI ethical problems and security professionals.

Keywords: sentiment analysis, artificial intelligence, psychological security, malicious use of artificial intelligence, social engineering, emotional AI

Blockchain Technology and Traceability in the Wine Supply Chain Industry

Florinda Matos¹, Tomás Alcobia² and Ana Josefa Matos³

¹DINÂMIA'CET-IUL - Centre for Socioeconomic Change and Territorial Studies, ISCTE - Lisbon University Institute, Portugal

²ISCTE - Lisbon University Institute, Portugal

³ICLab - ICAA - Intellectual Capital Association, Santarém, Portugal

florinda.matos@iscte-iul.pt

tomas_alcobia@iscte-iul.pt

anajosefa.matos@ic平aa.pt

DOI: 10.34190/EAIR.21.020

Abstract: In a global context, marked by the increase in digital transformation in all sectors of society, digitalisation in the wine industry faces various challenges. One of these challenges is ensuring the wine supply chain transparency and security to the more informed consumers and technology users. This study is part of an ongoing research project. It presents a literature review whose objective is to analyse the benefits of using blockchain technology in the wine industry supply chain to tackle these challenges. This technology, combined with other technologies and supported on Internet-of-Things-based interconnected systems, can guarantee protection systems with high security. This research demonstrates how blockchain technology can add value to the wine industry's supply chain and identifies the main challenges of implementing this technology in the Wine Industry. Also, it is presented a potential proposal to develop a traceability system for the wine industry. In terms of originality, this study aims to contribute and stimulate data-driven discussions regarding the use of technologies to support traditional industries' supply chains and provide security for producers and consumers.

Keywords: supply chain, wine, traceability system, blockchain

Understanding the Factors That Influence the Implementation of Robotic Process Automation From Banking Sector Perspective

Nontobeko Mlambo and Tiko Iyamu

Cape Peninsula University of Technology, Department of Information Technology, South Africa

Mlambononto@gmail.com

IyamuT@cput.ac.za

DOI: 10.34190/EAIR.21.019

Abstract: Robotics Process Automation (RPA) based systems are increasingly being employed by South African banking institutions. Although the technology has been deployed in many countries, the South African environment is unique from culture and banking technology platform settings platforms. Consequently, there is a growing push back from employees and other technology challenges in adopting RPA in some environments. It is on that basis that this study was conducted, to gain deeper understanding of the factors that can influence the deployment of RPA in the South Africa banking institutions. The interpretivist approach was followed, in the collection and analysis of the data. From the analysis, five factors were understood to influence the deployment of RPA in South African baking institutions: (1) limited referenced cases; (2) lack of balance between human actors and machines; (3) need for contextualisation; (4); essentiality for stability; and (5) operational architecture. An understanding of these factors and how they manifest to influence actions and activities can assist adopters in the process of adopting RPA in their environments.

Keywords: information technology, robotic process automation, banking sector, South Africa

Military Unit Path Finding Problem

Daniel Mundell and Brett van Niekerk

University of KwaZulu-Natal, South Africa

vanniekerkb@ukzn.ac.za

DOI: 10.34190/EAIR.21.037

Abstract: The Military Unit Path Finding Problem is concerned with finding the lowest cost safe path across a potentially changing or hostile environment. In military command and control, there is often imperfect information, such as unknown hostile units that can be detected during unit transversal, and different terrain types may have impact. As a result, the path finding algorithms must efficiently plan the new lowest cost safe path when hostile units are detected that impact on the selected route. This paper developed a web-based hexagonal grid simulation tool analyse and compare the behaviour and performance of various static and dynamic path finding algorithms, including Dijkstra's algorithm, the A* search, Focused D*, and D* Lite. The scenarios include both unknown hostile units as well as different terrain types. As expected, the dynamic algorithms had very fast replanning times, making them ideal for situations where multiple replanning processes are expected. However the static A* search algorithm was able to consistently outperform the dynamic algorithms in a specific scenario type as well as in finding the initial solution path in the least amount of time due to its guiding heuristic and simple implementation.

Keywords: artificial intelligence, command and control, dynamic path finding, imperfect information, information warfare

The Legal Nature of Systems of Artificial Intelligence in South Africa

Tadiwanashe Murahwi and Nomalanga Mashinini

Faculty of Law, Rhodes University, Makhanda, South Africa

tadiwamurahwi@gmail.com

n.mashinini@ru.ac.za

DOI: 10.34190/EAIR.21.027

Abstract: Systems of Artificial Intelligence (SAI) continue to pervade different aspects of life in South Africa. Despite such growth, there is no definitive legal position as to the legal nature of complex forms of SAI in South Africa. The unforeseeable human-like behaviour of SAI questions the effectiveness of the established areas of law in regulating SAI. This paper investigates the legal nature of SAI and explores the feasibility of granting legal personality to SAI under South African law. The paper employs a doctrinal research approach, exploring some examples established in jurisdictions such as the United States of America, Saudi Arabia, Nigeria and the European Union. This paper argues that flexible development in common law and legislation will effectively regulate the fast-paced advancement of SAI and promote innovation in South Africa. This approach will also be conducive for South African law to cultivate an indigenous approach to determine the legal nature of SAI. This is a call for proactive thinking to match the exponential growth of SAI, the risks it poses, and the need for certainty to allow innovation and development in South Africa.

Keywords: artificial intelligence, legal subjectivity, legal status, legal personality, personhood

Machine Learning for Insider Threat Detection

Tristan Sashlen Naicker and Brett van Niekerk

University of KwaZulu-Natal, South Africa

vanniekerkb@ukzn.ac.za

DOI: 10.34190/EAIR.21.036

Abstract: Companies invest vast amounts of time and resources into protecting themselves against outside invasion. However, employees and partners can deal as much damage from the inside. Whether from malice or negligence, the results can be equally as devastating. The focus of this study will be on discovering threats

within a predefined synthetic dataset (The Insider Threat Test Dataset by Carnegie Mellon's Software Engineering Institute) using popular machine learning algorithms (Random Forest, K-Nearest Neighbour, and Multi-Layer Perceptron). A comparison of the performance of the three algorithms is provided as a first phase, using a 5-tuple flow-based data. The paper then proposes a novel approach where the detection algorithm includes psychometric analysis (based on the Big Five Personality Traits applied to hacker types) of the network users in addition to traditional features used for detection with machine learning.

Keywords: cybersecurity, insider threat, intrusion detection, machine learning, psychometric analysis

Comparison of European Commission's Ethical Guidelines for AI to Other Organizational Ethical Guidelines

Minna Nevanperä, Jaakko Helin and Jyri Rajamäki

Laurea University of Applied Sciences, Espoo, Finland

minna.nevanpera@student.laurea.fi

jaakko.helin@student.laurea.fi

jyri.rajamaki@laurea.fi

DOI: 10.34190/EAIR.21.023

Abstract: The European Commission's Ethical Guidelines for AI has a great relevance on the field since it is very thorough. Hagerdorff (2020) has evaluated 22 different ethical guidelines for AI. He found that in 80 per cent of the guidelines handle privacy, fairness and accountability as minimal requirements of responsible AI system. He also noted that these matters in addition to robustness and explainability are more easily solved as technical matters than the social issues that might be arising from the development of AI system. He found that the company codes of ethics were the most minimalistic which was also verified in our paper. Hagerdorff also found that the ethical guidelines usually do not commit to larger societal interests. This paper compares EC's ethical guidelines with those of IBM, Google and IEEE for getting a picture how the ethical issues are approached in commercial environment. The applied analysis method is data-driven; the ethical guidelines are examined and the common themes are noted to appear. The EC's ethical guidelines are the basis of the comparison. Noticed common themes of these guidelines are accountability, transparency and explainability, diversity, inclusion and fairness, safety and security, and societal wellbeing and humanity,

even though all the themes are not discussed in all guidelines in detail. It seems that the ethical guidelines usually do not commit to larger societal interests because the societal issues and wider effects that AI has on the society are hard to write on the form of the simple guidelines. The discussion on the effects of the artificial intelligence on the societies needs to be addressed to political decision-makers and wider audience of researchers than just the developers of the AI or business organizations that exploit artificial intelligence. There is also need for involving the users and target groups to this discussion.

Keywords: ethical guidelines for AI, European Commission, ethics of AI

The Malicious use of Artificial Intelligence Through Agenda Setting: Challenges to Political Stability

Evgeny Pashentsev

Institute of Contemporary International Studies, Diplomatic Academy, Ministry of Foreign Affairs of the Russian Federation, Moscow, Russia

Center for Social and Political Studies and Consulting, Moscow, Russia

icpsc@mail.ru

DOI: 10.34190/EAIR.21.007

Abstract: The role of the news media in defining the important issues of the day, also known as agenda setting, has a strong effect on social and political life. In recent years, agenda setting has been influenced more and more powerfully by rapidly developing AI technologies. The news production process, the collection, processing, and analysis of information, the production of photo and video materials, storytelling, and news distribution are increasingly affected by these algorithms. AI is also widely used in searches for broadcast content, content production and management. Snackable video services, automated caption generation, topic-based profile enrichment, AI news anchors, the creation of new programs through the mining of archives and even the automated studio system utilizing the power of AI and that does not require camera people or an onsite director. The implementation of AI in agenda setting is reducing costs and boosting revenues both to the media industry itself and to its customers. At the same time, due to the crisis in the world economy, the degradation of democratic institutions in many countries, and increasingly acute geopolitical rivalries, there is a growing trend towards the malicious use of artificial intelligence (MUAI) through agenda

setting at the national and global levels. Reactionary regimes can focus the entire range of AI technologies on agenda setting in order to keep populations under their control and to pursue psychological aggression against other nations, thereby turning agenda setting into an important element of hybrid warfare. Self-interest in terms of making money by any means can also turn some global information resources, not least social networks, into dangerous MUAI tools. The current paper focuses on the following issues: the role of AI in the provision of agenda setting, the social and political context, and the technologies, current practices and implications of MUAI in shaping the important issues of the day. Specific recommendations are offered for minimizing the damage from MUAI and organizing international cooperation to counter such practices. Through the application of systemic analysis to this subject, we seek to avoid one-sided assessments, instead seeking to give an objective vision of the interrelated aspects of the development and double use of AI technologies in agenda setting.

Keywords: malicious use of artificial intelligence, agenda setting, risks, media, manipulation

Artificial Intelligence: From Popular Myths to Risk Scenarios

Olga Polunina

Russian State Social University, Russia

olga-polunina@inbox.ru

DOI: 10.34190/EAIR.21.018

Abstract: We are living in a world of complicated relations. And if we at least have learnt (but in fact we have not) how to build relationships with people around us, the relations within the paradigm of IoT are different, to put it mildly. The fact that there are more devices connected to the internet than people, or that these devices are able to communicate themselves not involving people, still seems unusual and exotic. In the sphere of the development of artificial intelligence (AI), things are far too complicated. To start with, AI has always been a controversial idea since it was first proposed. Ambitious goals and scientific challenges have attracted scientists from different fields. They started to conduct research with varying perspectives, interests and motivations, from mysteries of human thought to the design of intelligent, thinking machines. In other words, there has always been a controversy between conducting fundamental research and creating a functional device. What's more, most people are not familiar with the concept of AI. Quite a vivid example came from the USA: only 17% of senior business leaders out of 1,500 who

were asked in 2017 were familiar with the concept, despite the fact that AI is penetrating and/or transforming every sphere of our life. These changes on one hand, and the lack of clear and understandable information on the other, are the main causes of the thriving myths and anxiety around the development of AI. The proposed paper addresses such issues as the popular myths around AI and their origin and aims at debunking them. However, while we are caught up with the myths, AI is already altering the world and raising important questions for society, the economy and governments. In this paper we will discuss highly likely risk scenarios in order to understand the chain of events, think of effective strategies and optimise the efforts.

Keywords: artificial intelligence, risk scenarios, informational and psychological security, ICT, malicious use of artificial intelligence

COVID-19, Digital Transformation and the Expansion of Telework in Portugal

Isabel Salavisa¹, Glória Rebelo² and Eduardo Simões¹

¹DINAMIA'CET-Iscte, ISCTE-IUL, Lisboa, Portugal

²DINAMIA'CET-Iscte, ULHT, Lisboa, Portugal

isabel.salavisa@iscte-iul.pt

gloria.rebelo@netcabo.pt

eduardo.simoes@iscte-iul.pt

DOI: 10.34190/EAIR.21.033

Abstract: The COVID-19 pandemic has dramatically exposed the limits of globalization and the fragility of our societies. On the other hand, it has also accelerated the pace of the digital transformation underway (Schwab, 2016). Notwithstanding the subsequent deep economic crisis, the resilience revealed by the society and the economy owes a lot to a vast range of solutions based in telecommunications and ICT in work organization, services, sales, education and telemedicine. The rapid extension of teleworking represents a major change that is likely to be not fully reversed after the pandemic. In addition to the benefits provided in averting a dramatic blockade (stoppage) of the system, it has also revealed or deepen inequalities among workers, between those who may work from home with adequate access to digital devices and those who cannot. Work-life balance is both a major objective for employees and a big challenge for enterprises. Teleworking may contribute to this balance. It occupies a central place in EU social policies, especially related with the working environment and

organization associated with work-life balance, health, performance and workers' perspectives (Eurofound, 2020). In this paper, we will address theoretically and empirically the extension of teleworking and its socioeconomic, legal, and ethical impacts in advanced countries, with a particular focus on the Portuguese case. We will draw on official data and recent surveys carried out by the European Commission agencies, the OECD, the Portuguese Statistical Office, and other entities, such as research institutions, international consultancy companies and employers' organizations. We will also analyze the return to face-to-face activity after many workers have experienced the flexibility of working from home. These changes may strongly influence the shape of work organization and labour markets landscape in the short-term and in the future and affect society and economy as a whole (Huws, 2017; ILO, 2020).

Keywords: digital transformation, telework, COVID-19 social impacts, work organization, legal impacts, ethical aspects

AI for Learning: Views on Impacts to Teachership in the era of Artificial Intelligence

Juha Saukkonen, Mari Huhtala, Mika Rantonen and Elina Vaara

JAMK University of Applied Sciences, Jyväskylä, Finland

juha.saukkonen@jamk.fi; mari.huhtala@jamk.fi; mika.rantonen@jamk.fi;
elina.vaara@jamk.fi

DOI: 10.34190/EAIR.21.002

Abstract: Artificial Intelligence (AI) is an umbrella term for systems that can act in cognitive processes in a human-like and human-enhancing manner, e.g., in learning, problem solving, and pattern recognition. According to models of technology adoption, several factors influence the actual implementation of a new system within an organization and in an individual's professional practice. These factors include e.g. job relevance, demonstrable results, individual experience with technology, and voluntariness to adopt the new system. This research studies employees' views and expectations of AI applicability and its impact to teachership within a Finnish higher education institution (HEI). Survey data was collected from different schools and units from all hierarchical layers of the HEI, a University of Applied Sciences. Views on AI were assessed in relation to the core tenets of a teacher's professional guidelines as expressed in the Comenius' Oath. This research contributes to the AI research by shedding light on how people within the HEI evaluate the impacts of AI into their future operating environment, pointing out also the potential obstacles for AI adoption in this specific context.

Keywords: artificial intelligence, higher education, human-machine interaction, learning, ethics, teachership

Human Rights, Employee Rights and Copyrights: Parallels of AI Enablers and Obstacles Across Occupations in Human-Centric Domains

Juha Saukkonen¹, Kirill Anton², Nikita Karpov² and William Lahti²

¹Undergraduate program in International Business, JAMK University of Applied Sciences, Jyväskylä, Finland

²International Business, JAMK University of Applied Sciences, Jyväskylä, Finland

juh.saukkonen@jamk.fi; ;

nikita3698@gmail.com; L9931@student.jamk.fi

DOI: 10.34190/EIAIR.21.003

Abstract: Artificial Intelligence (AI) has been widely assumed to transform industries and occupations in them in the decade to come. Scholarly literature has addressed the phenomenon by studies of computerization across an array of jobs (Frey and Osborne, 2013) as well depictions of the way AI does the transformation (e.g. Bessen, 2018). There are also studies on specific occupational contexts such as managerial work and medical profession. This paper recapitulates the findings of three separate futures studies that addressed the potentials of AI-driven change in three distinct areas, which all have traditionally contained a strong human-based element. The primary data for the study was collected via qualitative interview on experts of both application areas as well as AI technology development. The data analyses relied on content analysis via thematic coding and presented using scenarios. The professional areas studied were primary medical care (human rights and human touch), recruitment function within HRM (human resources) and music composing (human creativity). The results of the study offer view on parallels and discrepancies in the AI-supported future between occupations, factors that may spark or slow down the AI-intrusion to the fields in focus. The results are illustrated to depict the joint potential opportunities as well as challenges in AI use and also the industry-specific benefits and challenges not shared with other domains of activity. The indication is that despite the common basic tenets of the technology, the goals and potential benefits differ in occupational contexts. The research also signals worries on legal and ethical dimensions i.e. rights and responsibilities in AI interventions to work processes across occupational areas. The research contributes to research streams of process

management, technology acceptance and ethics. The research gives also gives pragmatic guidance to AI technology and solutions developers as well as to the organizations and professionals deploying AI-based technologies.

Keywords: artificial intelligence, scenarios, change, technology, generic AI, sector-specific AI

Artificial Intelligence Strategies and Their Impact on Economic Stability: Conceptual Framework

Elena Serova

National Research University Higher School of Economics, St. Petersburg, Russian Federation

serovah@gmail.com

DOI: 10.34190/EAIR.21.021

Abstract: Understanding the exceptional role of intelligent technologies and systems in the new digital economy has given rise to a new technological race - artificial intelligence. In emerging markets, artificial intelligence and intelligent technologies are, in fact, an integral part of cutting-edge management systems. They add to the globalization of business by providing quick access to employees, customers, and partners worldwide, as well as coordinating global interaction between companies at different stages of the value chain. It does not mean that intelligent technologies and systems simply increase the efficiency of a company's operations; they can be considered as a key intangible asset. The AI strategy is defined as a set of coordinated policies that have a clear objective of maximizing the potential benefits and minimizing the potential costs of AI for the economy and society. In the past few years, two dozen countries have launched their national strategies in the field of artificial intelligence. Many countries have already developed their AI strategy at the official level during the last 3 years. The main goal of this paper is the analysis of the emerging market multinational enterprises (EMNEs) AI strategies to support the emergent economy and identify key AI strategies development directions. The research is based on the analysis of large volumes of information, the author's own experience, and literature review that includes the latest findings in this field. Research Methodology includes a systematic approach, comparative analysis, case-study, and modeling. The problem the author considers here is: How can we reduce the impact of risks and uncertainty on the economic stability with the help of AI and how the emerging market multinational enterprises (EMNEs)' AI Strategies have already been successfully using the AI Strategies in the past fifteen years? The findings of the research are

based on providing a framework for assessing the role of EMNEs' AI strategy and Machine Learning model for EMNE's strategy selection.

Keywords: artificial intelligence, machine learning, emerging market multinational enterprises, artificial intelligence strategy, artificial intelligence policy, multinational enterprises artificial strategies framework

Mechanisms and Constraints Underpinning Ethically Aligned Artificial Intelligence Systems: An Exploration of key Performance Areas

Stephen Treacy

University College, Cork, Ireland

stephen.treacy@ucc.ie

DOI: 10.34190/EAIR.21.005

Abstract: The unpredictability of artificial intelligence (AI) services and products pose major ethical concerns for multinational companies as evidenced by the prevalence of unfair, biased, and discriminate AI systems. Examples including Amazon's recruiting tool, Facebook's biased ads, and racially biased healthcare risk algorithms have raised fundamental questions about what these systems should be used for, the inherent risks they possess, and how they can be mitigated. Unfortunately, these failures not only serve to highlight the lack of regulation in AI development, but it also reveals how organisations are struggling to alleviate the dangers associated with this technology. We argue that to successfully implement ethical AI applications, developers need a deeper understanding of not only the implications of misuse, but also a grounded approach in their conception. Judgement studies were therefore conducted with experts from data science backgrounds who identified six performance areas, resulting in a theoretical framework for the development of ethically aligned AI systems. This framework also reveals that these performance areas require specific mechanisms which must be acted upon to ensure that an AI system implements and meets ethical requirements throughout its lifecycle. The findings also outline several constraints which present challenges in the manifestation of these elements. By implementing this framework, organisations can contribute to an elevated trust between technology and people resulting in significant implications for both IS research and practice. This framework will further allow organisations to take a positive and proactive approach in ensuring they are best prepared for the ethical implications associated with the development, deployment and use of AI systems.

Keywords: artificial intelligence, ethical development, transparency, accountability, governance, culture

Artificial Intelligence and Limits of Political Stability: Are Politicians in Danger?

Marius Vacarelu

National School of Political and Administrative Studies, Bucharest,
Romania

marius333vacarelu@gmail.com

DOI: 10.34190/EAIR.21.009

Abstract: A political system always needs a reasonable degree of stability to allow political actors and public administration to function in accordance with the electorate's interests. Political stability does not have to mean immobility – more precisely, the preservation of a certain system or a certain political group for decades or centuries. At the same time, the political turmoil that continues for many years – a decade or more – affects the entire geopolitical and economic coherence of a country, failing unique opportunities and broad development prospects. Politicians calculate their own steps relative to this stability and often consider it useful to them. In fact, for many people in the political environment stability is synonymous with controlled competition, so that within certain limits politicians will be harmed in their own interests only to a minimal extent. The twenty first century, however, is one in which rapid population growth is accompanied by rising demands from the electorate, which – as never before in history – is asking for rapid and substantial results in terms of raising living standards. In this perspective, the non-fulfilment of the citizens' demands has an immediate repercussion on the politicians, who ended up being discredited very quickly. This discredit therefore means that political leaders are changed rapidly and political stability is greatly reduced. Artificial Intelligence technology has also appeared in this 21st century, offering new possibilities both in favour of political stability increasing to the level of immobility – in countries with dictatorial regimes – and in favour of political competition growth. We are in this decade not only at the moment when this technology begins to impose itself in the economic sphere, but especially in the political area. The political environment will not remain immune to this transformation and many of the political landscape can, and, most likely, will be changed. For this reason, it is necessary to study the relationship between Artificial Intelligence and the political environment, in order to understand what the ways of mutual influence are, but especially what will be the changes that politics will experience in the not too distant future.

Keywords: artificial intelligence, political stability, authoritarian regimes, democratic institutions, civil service; active citizens

Masters Research Papers

Emotional Response and Cognitive Performance in Digital vs. Presential Environments

Anabela Pereira

Iscte-Instituto Universitário de Lisboa, Portugal

anabela_c_pereira@iscte-iul.pt

DOI: 10.34190/EAIR.21.026

Abstract: Starting from the theoretical background of cognitive embeddedness emphasizing the interdependence of a cognitive phenomenon on its environment, this research aims to test what kinds of influence digital embedding has on cognition. Cognitive embeddedness highlights the fact that “agents are coupled with a dynamic world” i.e., the physical interaction between the body and the world constrains the behaviours of the organism, which in turn, impacts and integrates the cognitive processes emerging from the interaction between them (Dawson, 2014, p.61-63). As Wilson (2002) states, “off-line cognition” (i.e., mental imagery, working memory, episodic memory, implicit memory, reasoning, and problem-solving) is body-based (Wilson, 2002, pp.632-634). Therefore, even if we think of cognition as dissociated from a specific environment, “the activity of the mind is grounded in mechanisms that evolved for interaction with the environment – i.e., mechanisms of sensory processing and motor control” (Wilson, 2002, p.626). Empirically, the idea is to test participants’ neuropsychological states and cognitive performance (after zoom and presential classes, seminar, or meeting), through neuropsychological assessment questionnaires, and one wearable headband that simultaneously acquires EEG (electroencephalography) and PPG (photoplethysmography) signals, through two pairs of frontal electrodes placed in the prefrontal region of the left and right hemispheres and an earlobe sensor, while a digital platform receives these signals, using different measures associated with cognitive control, emotional response, and biometrics. We hypothesized that the characteristics of the digital environment affect executive functioning, attentional functioning as well as physical and emotional states, leading to different levels of cognitive efficiency (vs. presential environment). We expect these changes to be bond to the environment, and in addition, we predict that these will be modulated by the perceptions and literacy participants had on the digital environment.

Keywords: embedded cognition, selective attention, emotional response, digital environments, biometrics, cognitive performance

Customer Readiness Level to Adopt Artificial Intelligence in Banking: Case of Russia

Irina Shakina, Anastasia Shirokaya and Liudmila Tochilova

National Research University Higher School of Economics, Saint-Petersburg, Russia

iashakina@edu.hse.ru

avshirokaya@edu.hse.ru

ltochilova@edu.hse.ru

DOI: 10.34190/EAIR.21.032

Abstract: To survive in the digital age, banks leverage on Artificial Intelligence (AI) to gain a competitive advantage. Along with various goals, banks seek to improve customer experience, enhance customer satisfaction, and assure customer retention through AI applications. Such achievements are expected to generate revenue growth and increase profitability. While customer service is a promising area for AI applications, there is a lack of studies investigating how interactions with AI systems influence customer behavior and satisfaction. Empirical research that contributes to a deep understanding of the consumer's attitude towards AI technologies provides value to the existing literature and uncovers insights that have importance for bank managers and customer relationship experts. The objective of the research is to evaluate the readiness level of the clients of Russian banks to adopt AI technologies and to study how the customer readiness level impacts customer satisfaction from interactions with AI-enabled services. The study considers trust in AI systems, previous experience, and individual personality traits as factors influencing customer readiness level. The research has an empirical nature. The mixed-method research method was chosen as it best suited our research. The study results are based on the analysis of 188 responses collected through online surveying. Responses were analyzed using structural equation modeling and sentiment analysis. The results show a strong positive relationship between customer readiness level and customer satisfaction. Trust has a positive effect on customer readiness level, while previous experience does not play a significant role. Innovativeness strengthens the relationship between trust and customer readiness level. However, the influence of extraversion and openness to experience is not significant. The findings of this study provide a baseline for future research on AI in the Russian banking sector and point out key customer pain points in the interaction with AI technologies that banks should address.

Keywords: artificial intelligence, customer readiness level, technology acceptance, customer satisfaction, banking

Data Fairness to Find Biases That Influence the Algorithm's Decision Making Results

Letícia Sakamoto Soares and Leandro Augusto da Silva

Mackenzie Presbyterian University, São Paulo, Brazil

leticiasakamoto.soares@mackenzista.com.br

leandroaugusto.silva@mackenzie.br

DOI: 10.34190/EAIR.21.034

Abstract: The problem addressed in this research aims to ensure that the decision-making process guided by algorithms is equitable. With significant advances in Artificial Intelligence, Machine Learning among others, the algorithm can replace a human being in several tasks. However, there is a discussion about the proper definitions of data justice in which it attracts the attention of researchers from different areas such as: software engineering, law and sociology. Seeking to observe the impacts and influence that data can apply on the results of decision-making algorithms, we used a dataset from an investigative study carried out by ProPublica on the commonly cited Compas tool (Correctional Offender Management Profiling for Alternative Sanctions) in the area of algorithmic bias. Due to the emerging application of decision-making algorithms and other types of models by the scientific and corporate community, coupled with the disposal of various sources to extract or create datasets used to train algorithms, the need for prudence and social responsibility with the results highlights its importance to mitigate the effects of algorithmic discrimination. By investing in the search for the author of the algorithmic bias, one can aim at the structural social inequality present in these data. This due diligence is required for all steps of algorithm construction, from exploring the dataset to development and decision making. Based on the consulted literature, an Exploratory Analysis was applied to the COMPAS dataset to verify the presence of class imbalance, which in this case was confirmed. Subsequently, the Self Organizing Map (SOM) artificial neural network was applied as a visual way to analyze the impact of imbalanced data in the generation of clusters in aspects of class distribution. The experiments were divided into three steps to understand the behavior of imbalanced data: In the first stage, when data is imbalanced by class and intraclass. In the second step, when it is balanced by class. Also, in the third step by intraclass. Thus, it was possible to observe the arrangement of each element in the dataset and its relevance in the

generation of the cluster, concluding that when the data balanced by the intraclass has more imbalances, they make the classifications more equal.

Keywords: algorithmic bias, artificial neural networks, Kohonen network, self-organizing map, discrimination

Non-Academic Paper

An Artificial Intelligence System Focused on COVID-19 Pandemic: Results and Impacts

Claudia Lopes Pocho¹, Marcelo de Carvalho¹, Carlos Frederico Maciel Silveira², Ricardo André Marques¹, Ana Claudia Rodrigues da Silva Quirino¹, Luiz Humberto Werdine Machado¹ and Marcelo Fernandez Pineiro¹

¹FURNAS Centrais Elétricas S.A., Rio de Janeiro, Brazil

²Cyberlabs Produtos e Serviços Tecnológicos S.A, Rio de Janeiro, Brazil

pocho@furnas.com.br, marcarv@furnas.com.br,

frederico.maciel@cyberlabs.com.br, rmarques@furnas.com.br,

anac@furnas.com.br, lwerdine@furnas.com.br, pineiro@furnas.com.br

DOI: 10.34190/EAIR.21.040

Abstract: Artificial intelligence (AI) is rapidly becoming fundamental in our society, reaching from industry to our homes. AI benefits for human being lives are undoubtful, especially in its application on Health and Safety at Work. Specifically, when there is a high degree of uncertainty in preventive measures and protocols definition, such as the case of COVID-19, AI may enlighten and anticipate decisions saving lives. Therefore, this paper aims to discuss the success factors and the results of an AI application related to Covid-19 prevention in workplaces, named CyberLabs KeyApp. It presents a case study in the Brazilian energy sector applied to approximately 3000 employees located in more than 30 different cities. The system was composed by an application including Control Facial Recognition when employees reach the electric power plants, substations, and offices, conjugated with temperature control; a daily COVID-19 self-assessment form fulfilment gathering personal habits related to Covid-19 furthering the artificial intelligence processing; and surveillance cameras for agglomerations detecting on facilities. As a result, there is an AI COVID score calculation that classifies the employee's risk into four categories. Medical staff is notified with warns reporting each employee with High or Very High classification. The four categories are listed: *Low* - user pre-access to the facility is granted. *Medium* - user pre-access to the facility is granted and AI prescribes individual COVID avoidance good practices that are informed to the user by notification; *High* - user pre-access to the facility is conditioned to a prior individual medical staff evaluation and medical staff is notified for proceed to contact with the user; and *Very High* - user pre-access to the facility is not granted and the AI application notifies medical staff to contact immediately with the user.

A set of operational, tactical, and strategic panels are available for managers and doctors for daily consulting. Through these AI dashboards, the variables – habits, symptoms, and preventive measures – that influences employees' Covid high risk are detected. Innovative Protocols were elaborated to diminish this risk rates as well as specific communication campaigns. Consequently, the company has reached the lowest Covid-19 rates among the Brazilian public energy sector institutions.

Keywords: COVID-19, artificial intelligence, cloud computing, employee's COVID-19 risk score, self-assessment, facial recognition, LGPD law compliance, anti-ransomware

Work in Progress Papers

Understanding Factors Affecting the Managers' Perception of AI Applications in Information Processing

Yanqing Duan¹, Guangming Cao², Mark Xu³, Vincent Ong⁴ and Christian Dietzmann⁵

¹University of Bedfordshire, Luton, UK

²Ajman University, UAE

³Portsmouth University, UK

⁴Regent's University London, UK

⁵University of Leipzig in Germany and Business Engineering Institute St. Gallen AG in Switzerland

Yanqing.Duan@beds.ac.uk, g.cao@ajman.ac.ae, ongv@regents.ac.uk,
mark.xu@port.ac.uk, christian.dietzmann@bei-sg.ch

DOI: 10.34190/EAIR.21.025

Abstract: Artificial Intelligence (AI) bears great potential in supporting and/or replacing managers' information processing activities, but the benefits of AI can only be realized if the organisational managers are willing to use AI for information processing. The academic literature contains very limited theoretical and empirical research focusing on understanding the acceptance and applications of AI in manager's personal information processing. To address this knowledge gap, this work-in-progress paper aims to develop a conceptual framework on factors affecting the managers' perceived roles of AI in their information processing and their intention to use AI. Underpinned by the relevant theories of information processing, the research framework can be used to examine if and to what extent the situational, personal, and performative factors of information systems (IS) influence the managers' perception of AI-based applications in terms of preferred human-AI collaboration modes and levels of AI input in information processing activities. The proposed framework offers a theoretical understanding and development of AI-based applications in the context of information processing from an end user's perspective.

Keywords: artificial intelligence, information processing, AI-human collaboration, big data

Robots, Employment and Taxation: An (Im)possible Equilibrium

Cristina Sá¹ and José Luís Martins²

¹CARME, ESTG, Polytechnique of Leiria, Portugal

²Polytechnique of Leiria, Portugal

cristina.sa@ipleiria.pt

jose.martins@ipleiria.pt

DOI: 10.34190/EAIR.21.028

Abstract: Robotization is an unavoidable reality in today's global society. The 2020 European Commission's White Paper on Artificial Intelligence points out several advantages. However, robotization also raises issues related with economic equality, income redistribution and tax revenues. Since most tax and social security systems are based on a strong contribution from work-related taxes and the introduction of robots may cause a reduction of workplaces, then States face a double problem when social benefits increase (e.g., due to unemployment) and tax revenues decrease. This work addresses the potential effects of robotization concerning to the loss of tax revenues because of unemployment. Currently, robotization is an issue of great discussion in the taxation domain and there is no consensual opinion about it. This is a knowledge scientific domain where tax policies have not yet been assessed. In most countries, namely in the UE there are no specific laws addressing the consequences of robots in society, in what concerns to taxation. In this work based on literature review we will highlight the pros-and-cons on robotization and possible taxation, considering how legislation should serve to compensate and rebalance the impact of robotization in society.

Keywords: robotization, employment, taxation

Abstracts Only

AI, 3D Printing and Robotics: An Anticipatory Ethical Analysis

Richard Wilson

Towson University, USA

wilson@towson.edu

Abstract: The rise of 3D printing as a disruptive technology the past decade has often been marked by some pretty grandiose plans, with talk of printing aircraft, boats, buildings, even entire cities. Those large-scale applications are still in the works, but some of the most intriguing innovations in 3D printing these days are going small, often fueled by AI and machine learning. Applying the same deep learning techniques that have led to great strides in improving speech recognition, image analysis, language translation and any number of gaming triumphs, with AI's skills at processing vast amounts of data and recognizing patterns, could expand the field of 3D-printed designs to innovative robotics and medical applications, among other uses. Combined with 3D printing's own innovations, AI and machine learning could create whole new avenues for relatively inexpensive, effective and on-demand devices. Whilst these new methods of working are still in early stages of development, designers are anticipating the day they could revolutionize the medical and manufacturing industry's who use robotics for medical processes. The ability to print robots and robot mechanisms and then apply AI technology so that they can efficiently move effortlessly is just the beginning of the new technology age. Many of these innovations are starting small — flexible, but strong little robots powered by nothing more than a little light, and others that draw on alternative power devices. And while what the tiny devices can do on their own is impressive, the research going into them could open new doors for medical devices and robotics with broader applications. This paper will describe how Artificial Intelligence will potentially create alterations medical practice with developments in AI in combination with the processes of 3D Printing and robotics. Examples from the field of 3D-printed designs, to innovative robotics and medical applications will be given. Examples from each of these areas will be presented with an attempt to anticipate some of the ethical issues that may arise for the integration of introduction of Artificial Intelligence to 3 D Printing and robotics to medical practice. Conclusions will be developed from an ethical and anticipatory ethical analysis which will then be the basis for making recommendations about what potential developments should be pursued should be pursued in the future.

Keywords: AI, 3D printing, robotics, ethics, anticipatory ethics

The Future of Robotic Assisted Surgery: An Anticipatory Ethical Analysis

Richard Wilson

Towson University, USA

wilson@towson.edu

Abstract: This paper provides an overview of some of the central ethical issues related to the future development of surgical robots. A survey of potential developments with surgical robots is developed followed by an outline of the ethical issues with surgical robots. This discussion introduces the idea of an anticipatory ethical analysis of possible positive and negative consequences for the use of robotic surgery as it is currently employed. Anticipatory ethics aims at identifying ethical problems with emerging technologies while they are at the research & development (R&D) and introductory stages.[1] Robotic surgery presents a range of possibilities, which include treating patients more safely and effectively, to caring for patients with telesurgery [2] to eventually to treating astronauts on missions in outer space. The role of engineers in developing this technology needs to include attempts to mitigate negative consequences while the technology is being developed. As with many technologies originally developed by the US Army or NASA, these advancements are now moving into the private sector as well. The possibility of more effective treatments and surgery across distance are driving market demand for these new technologies. As robotic surgery introduces changes and transforms the surgical world, there will be challenges as well. Injuries caused by robotic surgical devices pose challenges to full adoption of these approaches that are still largely research based. It will take carefully crafted policy and regulation based upon sound technical and anticipatory ethical analysis to ensure a successful transition from robotic surgery at the R&D stage to the widespread adoption of this surgical method. A conclusion is developed by discussing how robotic surgery may function in the future and what ethical issues may arise for the future development and adoption of autonomous surgical robots.

Keywords: future, robotic, assisted surgery, anticipatory ethics

Nanobots, AI, and Medical Applications: An Ethical and Anticipatory Ethical Analysis

Richard Wilson

Towson University, USA

wilson@towson.edu

Abstract: Nanobots are extremely tiny robots that operate at a microscopic scale. Although they have been created in a biological context, no actual mechanical nanobots have yet been created, but they remain an area of active research and hold a great deal of promise for a number of fields. The theoretical uses of nanobots are potentially endless, as their size would allow them to essentially rebuild matter. Properly programmed nanobots would be able to take raw materials and build them into anything, from proteins to foods to tiny microprocessors. If set up to do so, they could in theory even build more nanobots, through the process of auto-replication, so that a small group of nanobots could quickly develop into a massive swarm capable of large-scale projects. The medical applications of nanobots with the help of AI are particularly promising, and many researchers focus on the medical use of nanobots as the likely first uses of the technology. Because nanobots interact at the same scale as many invaders in the body, they could in theory be used as specifically-programmed warriors, helping to fight off cancerous cells or viruses. They could also be used for much more detailed scans of people, to help with early detection or simply to make sure the body is functioning at an optimal level. When professional and practical ethics, in any area of professional existence, attempt to identify ethical problems before they arise, we take a proactive approach to ethics. Anticipatory ethics has emerged and begun to gain attention in the area of information technology ethics. Anticipatory ethics can be characterized as focusing on the problems that can be anticipated as potentially arising because of emerging technologies. Anticipatory ethics can be seen as a necessary development in both ethical analysis and within professional ethics because of the rapid developments related to information technology. This analysis will examine issues related to the use of nanobots in the practice of medicine while introducing an anticipatory ethical analysis of potential ethical issues with the future development of nanobots in medicine.

Keywords: nanobots, AI, medical applications, ethics, anticipatory ethics

AI and Robo Advising: An Anticipatory Ethical Analysis

Richard Wilson

Towson University, USA

wilson@towson.edu

Abstract: The financial services industry makes up a large portion of the world economy, and it is estimated that it makes up approximately 20 percent of GDP for developed countries in the world. Prior to 2008, investing in securities usually took place between an investor and a wealth manager. The wealth manager and the investor would discuss the specific goals the investor had in mind for their portfolio, and the broker would try and tailor an investment strategy that would meet these goals. Through investing with a wealth manager, there is usually a personal bond formed between the investor and wealth manager. However, just like many other industries, financial services have been affected from automation and advancements in Artificial Intelligence. Since 2008 there has been an alteration in ways to invest in securities because of the rise robo-advisors. In 2008, 'Betterment' became the first robo-advisor, with the goal of the firm being to allow investors to manage passive buy and hold investments online. Robo-advisors work similarly to wealth managers, except they provide an online platform that increasingly employs Artificial Intelligence and automates financial services. Robo-advisors are able to do this by using data taken from surveys their investors fill out, and using algorithms to find out the investments that align with the goals of the clients. Robo-advisors often email their clients about any changes that are made to their portfolio and provide reports about the status of their investment. Robo-advising has already become a large part of financial services with assets managed by robo-advising platforms in 2015 being \$60 billion. This analysis of AI and robo-advising will examine the technical factors that link robo-advising and Artificial Intelligence. Artificial intelligence creates the possibility for the alteration of many areas of the financial world such as speed trading and accounting. The combination of Artificial intelligence and robo-advising creates a variety of ethical issues that need to be considered from a variety of stakeholders perspectives all of who will be affected by this combination. An important goal of this analysis is to anticipate the ethical issues that could arise as a result of introducing AI into robo-advising into the financial services industry as a profession.

Keywords: AI, robo-advising, financial services, ethics, anticipatory ethics

AI and Cloud Computing: Ethical and Anticipated Ethical Issues

Richard Wilson

Towson University, USA

wilson@towson.edu

Abstract: There is no industry where Artificial Intelligence (AI) has not been a part of the development and now the practices of the industry. One area where the effect of AI is being felt is over the worldwide cloud computing market. This is one of the rapidly developing markets on the planet today. [Emerging Technologies like machine learning, big data, artificial intelligence, IoT etc. have led to innovative ways of business processes. There is an urgent need for organizations to pivot from their traditional business processes and to customize their services to the needs of their customers and to the needs of the modern consumer. Digital transformation is creating the path towards this shift through big data and cloud computing storage. Cloud computing deploys remote servers over a network providing functionalities for business like storage, analytics, processing, and security. To enable digital disruption an organization needs to revolutionize its business processes to leverage emerging technologies including big data analytics, internet of things (IoT), machine learning, chatbots, augmented reality etc. Leveraging emerging technologies requires storage, IT infrastructure and heavy computing power. Cloud computing provides custom storage suited to organizations to store their analytics and Big data silos. Cloud computing and big data have played a pivotal role to bring a new wave of Digital Transformation across industries. This analysis will be focused on an anticipatory ethical analysis of cloud computing. When applying anticipatory ethics to cases such as Apple and Microsoft, the first thing to focus on is the increasing reliance on specific cloud computing products, such as iCloud. As technology progresses and companies decide to utilize these storage platforms more and more, the benefit and risk analysis that we have been referring to will become obsolete. Cloud computing will become more of a necessity in the modern world rather than the option that it is now. Increasing regulations within the technology industry should be the main concern for every stakeholder involved. Finding the most appropriate organization for a business when considering which cloud platform to employ requires examining the ethical issues with Ai and Cloud technologies while also attempting to anticipate technical developments and the accompanying ethical issues.

Keywords: AI, Cloud computing, big data, ethics, anticipatory ethics

3D Printing, AI, Nanotechnology and Organ Printing: An Ethical and Anticipatory Ethical Analysis

Richard Wilson

Towson University, USA

wilson@towson.edu

Abstract: Organ printing and tissue engineering can be used in conjunction with the application of additive computer-aided manufacturing process technologies, which create a layered pattern disposition of complex 3D bearing biological structures with biomolecular and biopolymer material integration. The term organ printing has been more narrowly defined as a biomedical variant of rapid prototyping technology or computer-aided robotic layer-by-layer at biofabrication of 3D human tissues and organs using self-assembling tissue spheroids as building blocks. The combination of 3D printing, nanotechnology, and organ printing can make a tremendous impact on the practice of medicine. 3D printed organs based upon his biological principles in which the self-assembly process, refers to a series of processes, where researchers are actively involved in combining atoms and molecules in aggregates of molecules and components, which eventually arrange themselves into ordered function entities without human intervention. The analysis will review current developments and attempt to identify future developments in organ printing techniques including, micro extrusion based printing, inkjet base printing, and laser-based printing as the possible ways that organs can be printed through developments in nanotechnology and 3D printing. In order for this to occur many challenges will need to be overcome. This analysis will focus on the ethical issues related to 3D organ printing in conjunction with developments in nanotechnology from the perspectives of researchers and physicians, patients and future patients (members of society). In addition an anticipatory ethical analysis will be conducted based upon a projection of future possibilities related to the confluence of 3D technology, nanotechnology and organ printing. When practical ethicists attempt to identify ethical problems that may develop in the future, these problems are often identified based upon these general ethical principles. Anticipatory ethics has emerged and begun to gain attention in the area of information technology ethics. Anticipatory ethics can be characterized as focusing on the problems that can be anticipated as potentially arising because of emerging technologies. In this analysis anticipatory ethics will be employed to analyze future possibilities related to the confluence of 3D technology, nanotechnology and organ printing.

Keywords: 3D printing, AI, nanotechnology, organ printing, ethics, anticipatory ethics

Additional Materials

Participant List

Surname	First Name	Institution	email
Anandarajah	Liadan	Berlin School of Economics and Law, H.-H.Focke GmbH & Co. KG, Germany	Liadan.anandarajah@focke.de
Awodele	Oludele	Babcock University Nigeria, Lagos, Nigeria	awodeleo@babcock.edu.ng
Barbosa	Jorge	ISCTE-IUL; DINAMIA'CET-Iscte, Lisboa, Portugal	jorbar@isec.pt
Bazarkina	Darya	Institute of Europe of the Russian Academy of Sciences, Moscow, Russia	bazarkina-icpsc@yandex.ru
Carvalho	Marcelo de	Furnas Centrais Elétricas S.A., Rio de Janeiro, Brazil	marcarv@furnas.com.br
Castro	Paulo	FCiências.ID – Associação para a Investigação e Desenvolvimento de Ciências, Lisbon, Portugal	paulo.castro.pi@gmail.com
Chan	Karen	University of Brighton, UK	K.Cham@brighton.ac.uk
Duan	Yanqing	University of Bedfordshire, UL	yanqing.duan@beds.ac.uk
Fesakis	Georgios	University of the Aegean Research Unit, Mytilene, Greece	gfectakis@rhodes.aegean.gr
Ganascia	Jean-Gabriel	Sorbonne University, France	jean-gabriel.ganascia@cnrs.fr
Graca	Nebojsa	Independent scientific researcher, Belgrade, Serbia	nebojsagraca@gmail.com
Helin	Jaakko	Laurea University of Applied Sciences, Espoo, Finland	jaakko.helin@student.laurea.fi
Hessami	Ali	VGS	hessami@vegaglobalsystems.com
Humble	Niklas	Mid Sweden University, FRÖSÖN, Sweden	niklas.humble@miun.se
Iyamu	Tiko	Cape Peninsula University of Technology, Cape Town, South Africa	iyamut@cput.ac.za

Surname	First Name	Institution	email
Kato	Tomohiro	Nagoya Institute of Technology, Japan	kt178tom@gmail.com
Keller	Thomas	ZHAW, Winterthur, Switzerland	kell@zhaw.ch
Kokotajlo	Timothy	Air Force Institute of Technology, USA	tkokotaj@gmail.com
Kolotaev	Yury	Saint Petersburg State University, St Petersburg, Russia	yury.kolotaev@mail.ru
Malmkjaer	Peter	CBS, Frederiksberg, Denmark	spm.om@cbs.dk
Martins	José Luís	Instituto Politécnico de Leiria, Portugal	jose.martins@ipleiria.pt
Mashinini	Nomalanga	Rhodes University, Grahamstown, South Africa	n.mashinini@ru.ac.za
Matos	Florinda	DINÂMIA'CET – ISCTE - Instituto Universitário de Lisboa, Portugal	florinda.matos@iscte-iul.pt
McAlaney	John	Bournemouth University, Poole, UK	jmcalaney@bournemouth.ac.uk
Mlambo	Nontobeko	Cape Peninsula University of Technology, Cape Town, South Africa	mlambononto@gmail.com
Monett	Dagmar	Berlin School of Economics and Law (HWR Berlin), Germany	dagmar.monett-diaz@hwr-berlin.de
Murahwi	Tadiwanashe	Rhodes University, Grahamstown, South Africa	tadiwamurahwi@gmail.com
Pashentsev	Evgeny	Institute of Contemporary International Studies, Diplomatic Academy, Ministry of Foreign Affairs of the Russian Federation, Moscow, Russia	icpsc@mail.ru
Pereira	Anabela	ISCTE, IUL, Lisboa, Portugal	anabela_c_pereira@iscte-iul.pt
Pocho	Claudia	Furnas Centrais Elétricas S.A., Rio de Janeiro, Brazil	pocho@furnas.com.br
Polunina	Olga	Russian State Social University, Moscow, Russia	olga-polunina@inbox.ru

Surname	First Name	Institution	email
Prantsoudi	Stavroula	University of the Aegean Research Unit, Mytilene, Greece	stapran@gmail.com
Reis	Luis Paulo	University of Porto, Portugal	lpreis1970@gmail.com
Sá	Cristina Isabel	Instituto Politécnico de Leiria, Portugal	cristina.sa@ipleiria.pt
Salavisa	Isabel	ISCTE - Instituto Universitário de Lisboa, Portugal	isabel.salavisa@iscte-iul.pt
Saukkonen	Juha	JAMK University of Applied Sciences, Jyväskylä, Finland	juha.saukkonen@jamk.fi
Serova	Elena	HSE University, St Petersburg, Russia	serovah@gmail.com
Serrão	Carlos	ISCTE - Instituto Universitário de Lisboa, Portugal	carlos.serrao@iscte-iul.pt
Shakina	Irina	National Research University Higher School of Economics St. Petersburg Branch, Saint-Petersburg, Russia	iashakina@edu.hse.ru
Shirokaya	Anastasia	National Research University Higher School of Economics St. Petersburg Branch, Saint-Petersburg, Russia	avshirokaya@edu.hse.ru
SILVEIRA	CARLOS FREDERICO	CyberLabs Group, Brasilia, Brazil	frederico.maci@cyberlabs.com.br
Soares	Leticia	Mackenzie Presbyterian University, Sao Paulo, Brazil	sakamoto.leri@gmail.com
Treacy	Stephen	University College Cork, Ireland	stephen.treacy@ucc.ie
Vacarelu	Marius	SNSPA Bucharest, Romania	marius333vacarelu@gmail.com
van Niekerk	Brett	University of KwaZulu-Natal, Westville, South Africa	vanniekerkb@ukzn.ac.za
Wilson	Richard	Towson University, USA	wilson@towson.edu

The importance of paper citations and Google Scholar

As an academic researcher you will know the importance of having access to the work of other researchers in your field as well as making your own work available to others. In the area of academic publishing this is achieved through citation indexing. There are a number of bodies that undertake this task including Thompson ISI, Elsevier Scopus and Google Scholar – to name just a few.

At ACPI we do all we can to ensure that the conference proceedings and the journals that we publish are made available to the major citation bodies and you can see a list relevant to this conference on the home page of the conference website.

However, it is also important for you, the author, to make sure that you have made your work available for citation – particularly with organizations such as Google Scholar. We are providing you here with the simple steps you need to take to do this and we would ask you to take the time to upload your paper as soon as you can.

Step one: Extract your paper from the full proceedings that you have downloaded from the Dropbox link provided to you.

Step two: Upload your paper to your own website, e.g.,

www.university.edu/~professor/jpdr2009.pdf; and add a link to it on your publications page, such as www.university.edu/~professor/publications.html.

Make sure that the full text of your paper is in a PDF file that ends with ".pdf",

The Google Scholar search robots should normally find your paper and include it in Google Scholar within several weeks. If this doesn't work, you could check if your local institutional repository is already configured for indexing in Google Scholar, and upload your papers there.

More information is available from
<http://scholar.google.com.au/intl/en/scholar/inclusion.html>

We will separately upload the proceedings to Google Books which is also searched – but evidence has shown that individual upload results in quicker indexing by Google Scholar.

Your own institution may also subscribe to an institutional repository such as
<http://digitalcommons.bepress.com/> or
<http://dspace.org/>

Providing the original reference of your paper is included you have our permission as publishers to have your paper uploaded to these repositories.

Sue Nugus ACIL

Academic Conferences International

***Facilitating excellence in scholarship
through double blind peer reviewed
conferences on eight topics***

Vision and Mission

Our vision is that there is an ever increasing need for high quality research in most if not all aspects of 21st century society. Universities are the primary provider of quality research education.

Quality research education requires the participation of both established faculty, newly appointed staff and research students. There is also the requirement for academe to reach out to the general society as comprehensively as possible.

As the university sector becomes increasingly focused on research excellence there is a need to provide more fora, primarily in the form of peer reviewed conferences, for academics to exchange ideas, questions, problems, and achievements concerning their personal research activities. These fora provide opportunities to exchange ideas, to experience critiques and to obtain some recognition for individuals' progress towards research excellence. The more international the forum the more effective it is.

Although publishing in highly rated indexed academic journals is still the most prized form of academic communication, the conference medium has become a significant outlet for research findings as well as an important facilitator to achieving this goal. All papers submitted to ACIL conferences are double blind peer reviewed and accepted papers are published in a book with an ISBN and ISSN. These conference proceedings are indexed by a number of authorities, including WOS, Scopus, Proquest, etc.

Our mission is to facilitate the creation of global academic research communities by providing all the administrative and management functions required to deliver a comprehensive academic conference experience.

This is supported by the provision of seminars, workshops and the publishing of suitable books, monographs and proceedings.

It is also supported by 5 academic journals three of which are indexed by Elsevier Scopus.

ACIL's conference activities

For over 20 years we have facilitated conferences globally. Originally our focus was only on ICT. Over the years we have broadened the scope, but there is still a strong leaning towards ICT. Currently there are 16 conferences run in various parts of the world which are attended by approximately 1,500 conference participants annually. Global reach is one of the dimensions that differentiates us. At any given conference there are regularly participants from 30 or more countries. Some of the conferences are accompanied by master classes in their associated field which are run on the day before the conference.

Seven conferences are associated with Excellence Awards for which we appoint judges, accept nominations, conduct evaluations and award prizes. The Games Based Learning Conference runs an established annual competition. Details of these events are contained in our website at www.academic-conferences.org

Contact information

If you would like to host a conference, facilitate a workshop or have a book published please contact louise@academic-conferences.org

Academic Bookshop!



Get 20% discount on our bookshop

USE CODE: BKSHP20

WHEN PROMPTED AT CHECKOUT TO CLAIM THE DISCOUNT



Indexed by Elsevier Scopus

EJKM

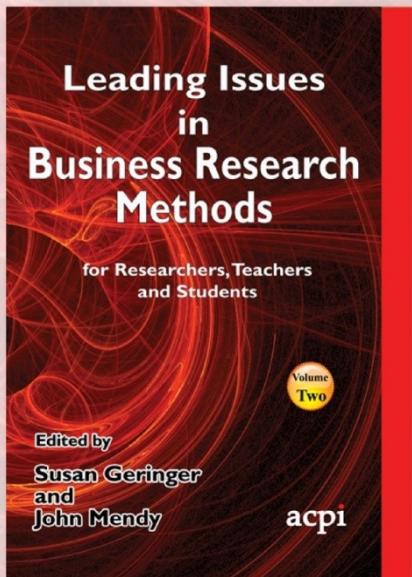
THE ELECTRONIC JOURNAL OF
KNOWLEDGE MANAGEMENT

view, download and read the issues from
www.ejkm.com/main.html

An Open Access Journal following a continuous
Publication Model

LEADING ISSUES IN BUSINESS RESEARCH METHODS

FOR RESEARCHERS, TEACHERS AND STUDENTS



Since it started publishing academic research and project-type papers in 2002, the Electronic Journal of Business Research Methods (EJBRM) has covered enormous ground on research perspectives, processes and issues. Through its publications, the journal has sought to continuously and constantly shed light on Business and Management issues and it is anticipated that the current second volume of Leading Issues in Business Management Research will build on from the first volume and add to the contributions of EJBRM.

In selecting the current papers, the editors have sought to cover a representative set of papers from both quantitative and qualitative strands. Papers that set out what research methods were adopted, their epistemological and philosophical positions, considerations of alternative research methods (interviews, surveys, the Web, focus groups...) and epistemological positions (positivism, interpretivism, constructivism...), why these might not have been chosen and what contributions were made to the field have generally been selected for the current volume. It is the editors' view that established and early career researchers as well as students learning to do research will benefit from the selection.



**Susan
Geringer**



**John
Mendy**

AVAILABLE AT : WWW.ACADEMIC-BOOKSHOP.COM

acpi